## REFERENCE LIST OF FURNITURE AND EQUIPMENT FOR SECONDARY SCHOOL <br> IN 2023/2024 SCHOOL YEAR <br> ADOPTING STANDARD SCHEDULE OF ACCOMMODATION

## Part I List of Furniture and Equipment by Function

Appendix
Updated Cost in 2023
rounded)

Computer Assisted Learning Room Conference
274,100
General Furniture and Equipmen
1,647,200
Guidance Activity Room
Interview Room 1 6,700 6,700
Interview Room 2
Language Room 47,000
Multi-purpose Area
15,500
41,400
Preparation Room for IT Teaching Materials
Student Activity Centre
School Library
Staff Common Room
1,000
Tuck Shop-cum-Central Portioning Area

Part IIa List of Furniture and Equipment by Subject

| Audio Visual Aids | 15 | 78,500 |
| :--- | :--- | ---: |
| Music | 16 | 247,800 |
| Physical Education | 17 | 470,200 |
| Visual Arts | 18 | 401,500 |
| Design and Technology | 19 | 448,600 |
| Home Economics Room 1 | 20 | 196,700 |
| Home Economics Room 2 | 21 | 82,700 |
| Science (S1 - S3) | 22 | 418,400 |
| Computer Subject Room |  | 23 |
|  | Sub-total: |  |

Part IIb List of Furniture and Equipment by Senior Secondary (SS) Subjects

| SS Biology | 24 | 578,600 |
| :--- | ---: | ---: |
| SS Chemistry | 25 | 503,000 |
| SS Physics | 26 | 604,800 |
| SS Music | 27 | 24,600 |
| SS Geography | 28 | 290,400 |
| SS Visual Arts | 29 | -- |
| SS Design and Applied Technology | 30 | 94,700 |
| SS Information and Communication Technology | 31 | -- |
| SS Technology and Living: |  | 8, |
|  | Food Science \& Technology Strand | 32 a |
|  | 32 b | 8,300 |
| SS Physical Education | Fashion Clothing and Textiles Strand | 33 |

Assuming that all SS subjects are to be offered at the same time by a school, adjustment for shared items is done in calculating the total F\&E cost

School Building Section, EDB
July 2023

Reference List of Furniture and Equipment
for Secondary School
Room : Computer Assisted Learning Room

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | Microcomputer workstation Computer peripherals | 41 sets |
| 2 | Printer or Printer cum Scanner (small) <br> Audio/Video equipment | 4 |
| 3 | Headphones | 41 |
| 4 | Media player (DVD/VCD/CD/Bluetooth/USB) | 1 |
| 5 | Smart TV | 1 |
| 6 | Digital video camera | 1 |
| 7 | Projection system and screen <br> Other furniture and equipment | 1 |
| 8 | Dehumidifier | 2 |
| 9 | Vacuum cleaner | 1 |
| 10 | Notice board | 3 |
| 11 | Fire extinguisher | 2 |
| 12 | Teacher chair | 1 |
| 13 | Student chair | 40 |
| 14 | Bookcase / storage cabinet | 1 |
| 15 | Blackout curtains | 1 set |
|  | Total Cost for Room | 274,400 |

Reference List of Furniture and Equipment
for Secondary School

## Room : Conference Room

| Item No |  | Description |
| :---: | :--- | :---: |
| 1 | Small conference table | Quantity |
| 2 | Office chair | 8 |
| 3 | Projection system with screen | 24 |
|  | Total Cost forRoom | 1 |

Reference List of Furniture and Equipment
for Secondary School
Room : General Furniture and Equipment

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | 30 CLASSROOMS |  |
| 1 | Projection system with screen | 30 |
| 2 | Teacher chair | 30 |
| 3 | Student chair | 1,080 |
| 4 | Student desk | 1,080 |
| 5 | Umbrella stand | 30 |
| 6 | Teacher desk | 30 |
| 7 | Lockers, 9 doors | 20 sets |
|  | COMPUTER EQUIPMENT ITEM |  |
| 8 | Microcomputer workstation | 30 |
| 9 | Computer server equipment | 1 set |
|  | 3 REMEDIAL TEACHING ROOMS |  |
| 10 | Teacher chair | 3 |
| 11 | Student chair | 30 |
| 12 | Student desk | 60 |
| 13 | Teacher desk | 3 |
| 14 | Bookcase / storage cabinet | 3 |
| 15 | Microcomputer workstation | 3 |
|  | PRINCIPAL'S OFFICE AND 2 DEPUTY PRINCIPAL'S OFFICES |  |
| 16 | Notice board | 3 |
| 17 | Bookcase / storage cabinet | 3 |
| 18 | Office chair (headmaster) | 3 |
| 19 | Office chair | 6 |
| 20 | Office desk / reading desk | 3 |
| 21 | 4-drawer cabinet with safe | 1 |
| 22 | 4-drawer file cabinet | 2 |
| 23 | Filing tray | 6 |
| 24 | Microcomputer workstation | 3 |
|  | CAREERS MASTER'S/ MISTRESS'S OFFICE |  |
| 25 | 4-drawer file cabinet | 1 |
| 26 | Office chair | 2 |
| 27 | Office desk / reading desk | 1 |
| 28 | Notice board | 1 |
| 29 | Bookcase / storage cabinet | 1 |
|  | DISCIPLINE MASTER'S OFFICE |  |
| 30 | 4-drawer file cabinet | 1 |
| 31 | Office chair | 2 |
| 32 | Office desk / reading desk | 1 |
| 33 | Notice board | 1 |
| 34 | Bookcase / storage cabinet | 1 |
|  | SCHOOL SOCIAL WORKER'S OFFICE |  |
| 35 | 4-drawer file cabinet | 1 |
| 36 | Office chair | 2 |
| 37 | Office desk / reading desk | 1 |
| 38 | Notice board | 1 |
| 39 | Bookcase / storage cabinet | 1 |
|  | General Office |  |
| 40 | Key storage board | 1 |
| 41 | Notice board | 2 |
| 42 | 4-drawer file cabinet | 4 |
| 43 | Drawer tray file cabinet | 1 |
| 44 | First-aid cabinet | 1 |
| 45 | Office chair | 6 |
| 46 | Bookcase / storage cabinet | 1 |
| 47 | Office desk / reading desk | 2 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 48 | Typist rack | 1 |
| 49 | Umbrella stand | 1 |
| 50 | Office desk / reading desk | 1 |
| 51 | Filing tray | 6 |
| 52 | Electric stapler | 1 |
| 53 | Punch binder | 1 |
| 54 | Facsimile machine | 1 |
| 55 | Microcomputer workstation | 3 |
| 56 | Time stamp machine | 1 |
| 57 | Labeller | 1 |
| 58 | Laminator | 2 |
|  | Printing Room \& Security Store |  |
| 59 | Bookcase / storage cabinet | 1 |
| 60 | Printer or printer cum scanner (large) | 1 |
| 61 | Printer or printer cum scanner (small) | 1 |
|  | 3 STAFF ROOMS |  |
|  | Computer Equipment Item |  |
| 62 | Microcomputer workstation | 50 |
| 63 | Printer or printer cum scanner (large) | 1 |
| 64 | Printer or printer cum scanner (small) | 1 |
| 65 | Notice board | 8 |
| 66 | Bookcase / storage cabinet | 8 |
| 67 | Teacher chair | 52 |
| 68 | Umbrella stand | 4 |
| 69 | Small conference table | 4 |
| 70 | Office desk / reading desk | 50 |
| 71 | Water dispenser | 2 sets |
|  | MEDICAL INSPECTION ROOM |  |
| 72 | First-aid cabinet | 1 |
| 73 | Office chair | 8 |
| 74 | Medical examination couch | 1 |
| 75 | Medical examination 2-step platform | 1 |
| 76 | Folding screen | 1 |
| 77 | Office desk / reading desk | 2 |
| 78 | Automated external defibrillator <br> STORE ROOM | 1 |
| 79 | Floor polisher | 1 |
| 80 | Ladder (short) | 1 |
| 81 | Ladder (tall) | 1 |
|  | PANTRY |  |
| 82 | Refrigerator | 1 |
| 83 | Electric tea urn ASSEMBLY HALL | 1 |
| 84 | Student chair | 760 |
| 85 | Lectern with stand | 1 |
| 86 | Pedestal fan | 12 |
| 87 | Public address system (stationed or portable) | 1 set |
| 88 | Stage curtains | 1 set |
| 89 | Curtain for high level windows | 1 set |
| 90 | Small conference table | 1 |
|  | Total Cost for Room | 1,647,200 |

Reference List of Furniture and Equipment
for Secondary School
Room : Guidance Activity Room

| Item No | Description | Quantity |
| :---: | :--- | :---: |
| 1 | Small conference table | 2 |
| 2 | Office chair | 10 |
| 3 | Notice board | 1 |
| 4 | 4-drawer filing cabinet | 2 |
| 5 | Bookcase / storage cabinet | 1 |
| 6 | Sofa (2-seater) | 2 |
| 7 | Tea table | 1 |
|  | Total Cost for Room | $\mathbf{1 1 , 4 0 0}$ |

Reference List of Furniture and Equipment
for Secondary School
Room : Interview Room 1

| Item No | Description | Quantity |
| :---: | :--- | :---: |
| 1 | Small round table | 1 |
| 2 | Tea table | 1 |
| 3 | Office chair | 4 |
| 4 | Sofa (2-seater) | 2 |
| 5 | Bookcase / storage cabinet |  |
|  | Total Cost for Room | $\mathbf{2}$ |

Reference List of Furniture and Equipment
for Secondary School
Room : Interview Room 2

| Item No | Description | Quantity |
| :---: | :--- | :---: |
| 1 | Small round table | 1 |
| 2 | Tea table | 1 |
| 3 | Office chair | 4 |
| 4 | Sofa (2-seater) | 2 |
| 5 | Bookcase / storage cabinet | 1 |
|  | Total Cost for Room | $\mathbf{6 , 7 0 0}$ |

Reference List of Furniture and Equipment
for Secondary School
Room: Language Room

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | Student chair | 41 |
| 2 | Classroom student desk | 14 |
| 3 | Microcomputer workstation | 21 |
| 4 | Projection system and screen | 1 |
| 5 | Bookcase / storage cabinet | 3 |
|  | Total Cost for Room | 136,000 |

Reference List of Furniture and Equipment
for Secondary School
Room : Multi-purpose Area

| Item No |  | Description |
| :---: | :--- | :---: |
| 1 | Student chair | Quantity |
| 2 | Folding table and benches | 240 |
| 3 | First-aid cabinet | 20 sets |
| 4 | Ceramic whiteboard | 1 |
|  | Total Cost for Area | 2 |

Reference List of Furniture and Equipment
for Secondary Schoo

Room : Multi-purpose Room

| Item No |  | Description |
| :---: | :--- | :---: |
| 1 | Office desk / reading desk | Quantity |
| 2 | Student chair | 2 |
| 3 | Bookcase / storage cabinet | 82 |
| 4 | Folding table and benches | 2 |
|  | Total Cost for Room | 2 sets |

Reference List of Furniture and Equipment
for Secondary School

Subject : Preparation Room for IT Teaching Materials

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | COMPUTER EQUIPMENT ITEMS |  |
| 1 | Microcomputer workstation <br> Computer peripherals | 5 |
| 2 | Printer or printer cum scanner (small) Other equipment | 3 |
| 3 | Dehumidifier | 1 |
| 4 | Vacuum cleaner | 1 |
| 5 | Ceramic whiteboard | 1 |
| 6 | Fire extinguisher | 1 |
|  | Furniture |  |
| 7 | Office desk / reading desk | 1 |
| 8 | Teacher chair | 9 |
| 9 | Bookcase / storage cabinet | 1 |
|  | Total Cost for Room | 41,400 |

Reference List of Furniture and Equipment
for Secondary School
Room : Student Activity Centre

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | Furniture |  |
| 1 | Student chair | 2 |
|  | Equipment |  |
| 2 | Smart TV | 2 |
| 3 | Media player (DVD/VCD/CD/Bluetooth/USB) | 2 |
| 4 | Blackout curtains | 1 set |
| 5 | Projection system with screen | 1 |
| 6 | HIFI system | 2 |
| 7 | Microphone | 4 |
|  | Total Cost for Room | 37,900 |

Reference List of Furniture and Equipment
for Secondary School
Room : School Library

| Item No |  | Description |
| :---: | :--- | :---: |
| 1 | Bookend set | Quantity |
| 2 | Trolley | 100 |
| 3 | CD Cabinet | 2 |
| 4 | Office chair | 1 |
| 5 | Office desk / reading desk | 5 |
| 6 | Headphones | 15 |
| 7 | Library books | 4 |
| 8 | (Including cataloguing tool books for teacher-librarian) | 1 |
| 9 | Step stool |  |
| 10 | Student chair |  |
| 11 | Microcomputer workstation | 3 |
| 12 | Printer or printer cum scanner (small) | 60 |
| 13 | Automated library system | 1 |
| 14 | Barcode laser scanner | 8 |
| 15 | Media player (DVD/VCD/CD/Bluetooth/USB) | 1 |
| 16 | Magazine Shelf | 1 |
| 17 | Book Display Shelf | 1 |
|  | Total Cost for Library | 1 |

Reference List of Furniture and Equipment
for Secondary Schoo
Room : Staff Common Room

| Item No |  | Description |
| :---: | :--- | :---: |
| 1 | FURNITURE |  |
| 2 | Sofa (3-seater) | Quantity |
| 3 | Lona (2-seater) |  |
| 4 | Teacher chair | 1 |
| 5 | Bookcase / storage cabinet | 2 |
| 6 | Tea table | 1 |
| 7 | Trolley | 12 |
| 8 | EQUIPMENT | 1 |
| 9 | Smart TV | 1 |
| 10 | Redia player (DVD/VCD/CD/Bluetooth/USB) | 1 |
| 11 | Microwave oven | 1 |
| 12 | Electric hot water kettle (small) | 1 |
|  | Total Cost for Room | 1 |

Reference List of Furniture and Equipment
for Secondary School

Room: Tuck Shop-cum-Central Portioning Area

| Item No |  | Description |
| :---: | :--- | :---: |
| 1 | Facilities | Quantity |
| 2 | Cooker for vegetables |  |
| 3 | Rice cooker | 1 |
| 4 | Boiler for drinking water | 1 |
| 5 | Dishwasher | 10 |
| 6 | Refrigerator for tuck shop | 1 |
| 7 | Furniture | 1 |
| 8 | Working table $/$ kitchen table | 1 |
| 9 | Trolley for transfer/collection of food/trays | Kitchen shelf |

Reference List of Furniture and Equipment
for Secondary Schoo
Subject : Audio-visual Aids

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | Media player (DVD/VCD/CD/Bluetooth/USB) | 15 |
| 2 | Smart TV | 2 |
| 3 | Projection system and screen | 2 |
| 4 | Visualizer | 2 |
| 5 | Digital video camera | 2 |
| 6 | Video tripod | 1 |
| 7 | Bookcase / storage cabinet | 2 |
|  | Total Cost for Subject | 78,500 |

Note: All electrical appliances should be in compliance with the existing Electrical Products (Safety) Regulations.

Reference List of Furniture and Equipment
for Secondary School

Subject: Music

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | FURNITURE |  |
| 1 | Student chair | 40 |
| 2 | Teacher table | 2 |
| 3 | Teacher chair | 2 |
| 4 | Blackout curtains | 1 set |
|  | MUSICAL INSTRUMENTS / EQUIPMENT Pianos |  |
| 5 | Upright School Model Piano 1 | 1 |
| 6 | Upright Piano Cover | 1 |
| 7 | Grand Piano 2 | 1 |
| 8 | Grand Piano Cover | 1 |
|  | Unpitched Percussion Instruments |  |
| 9 | Triangle | 2 |
|  | 15 cm , with beater and holder |  |
| 10 | Solo Triangle | 2 |
|  | 24 cm , with beater and holder |  |
| 11 | Pair of Wooden Castanets | 2 |
|  | Mounted on a wooden handle |  |
| 12 | Pair of Finger Castanets | 2 |
| 13 | Two-tone Tubular Woodblock | 2 |
|  | With beater and holder |  |
| 14 | Tambour | 2 |
|  | 25 cm vellum |  |
| 15 | Tambourine | 2 |
|  | 25 cm vellum, with jingles and wooden frame |  |
| 16 | Sleigh Bells | 2 |
|  | With 10 bells and handle |  |
| 17 | Pair of Cymbals | 1 |
|  | 26 cm |  |
| 18 | Cymbal | 1 |
|  | 40 cm , with stand and soft beater |  |
| 19 | Pair of Wooden Maracas | 1 |
|  | Mexican style or fish style |  |
| 20 | Cabasa | 1 |
|  | Standard size |  |
| 21 | Guiro | 1 |
| 22 | Pair of Claves | 1 |
|  | Rosewood, large size |  |
| 23 | Pair of Bongo Drums with Stand | 1 |
| 24 | Snare Drum | 1 |
|  | With stand and beaters |  |
| 25 | Bass Drum | 1 |
|  | With stand and beater <br> Pitched Percussion Instruments |  |
| 26 | Soprano Glockenspiel | 1 |
|  | - single row <br> - C major scale c"' - c\#'"' with additional F\# and Bb <br> - 19 individual removable bars ( $20 \times 4 \mathrm{~mm}$ ) complete with case and one pair of double-headed beaters |  |
| 27 | Chromatic Glockenspiel <br> - tenor-alto range c" - c\#"" <br> - 26 individual removable bars ( 20 X 4 mm ) double row with chromatic scale together with case and one pair of double-ended rubber beaters | 1 |
| 28 | Soprano Xylophone (Rosewood) <br> - single row <br> - C major scale c" - f "' with additional F\# and Bb <br> - 14 individual bars ( $40 \times 15 \mathrm{~mm}$ ) complete with one pair of single-headed beaters | 1 |
| 29 | Tenor-alto Xylophone (Rosewood) <br> - diatonic c' - c\#" with additional F\# and Bb <br> - 19 individual bars ( $40 \times 15 \mathrm{~mm}$ ) complete with one pair of single-headed beaters | 1 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 30 | Bass Xylophone（Rosewood） | 1 |
|  | －diatonic $\mathrm{c}^{\prime}$－ $\mathrm{a}^{\text {＂}}$ with additional $\mathrm{F} \#$ and $\mathrm{B} b$ <br> － 16 individual bars（ $40 \times 18 \mathrm{~mm}$ ）complete with one pair of single－headed beaters |  |
| 31 | Set of Chime Bars | 1 |
|  | －single notes c＂－c\＃＂＂accurately <br> －tuned and mounted on a tuned wood or metal resonator <br> － 26 individual notes forming a chromatic scale as specified above <br> －with a pair of medium－hard rubber single－headed beaters |  |
|  | Other Instruments |  |
| 32 | Descant Recorder／Soprano Recorder | 4 |
|  | Baroque fingering |  |
| 33 | Treble Recorder／Alto Recorder | 4 |
|  | Baroque fingering |  |
| 34 | Guitar | 1 |
| 35 | Melodica | 1 |
|  | 36 notes |  |
| 36 | Portable Electronic Keyboard | 1 |
|  | With transformer and stand <br> － 61 full－size keys <br> －32－note polyphonic sounds or more <br> －MIDI in／out |  |
|  | Music Stand |  |
| 37 | Music Stand | 20 |
|  | －desk adjustable（Pipe ： 30 mm diameter） <br> －with wide，folding legs |  |
|  | Chinese Percussion Instruments |  |
| 38 | Pair of Dajingbo（大京鈸一對） | 1 |
| 39 | Pair of Xiaojingbo（小京鈸一對） | 1 |
| 40 | Pair of Dabo， 40 cm （大鈸一對，40厘米） | 1 |
| 41 | Wuyinmuyu with Stand and Beaters（五音木魚連架及棒子） | 1 |
| 42 | Zhonghuyinluo with Beater（中虎音鐲連棒子） | 1 |
| 43 | Jingluo with Beater（京鑼連棒子） | 1 |
| 44 | Xiaoluo with Luo Pian（小鑼連鑼片） | 1 |
| 45 | Stand for Luo and Bo（鑼查架一套） | 1 |
| 46 | Pair of Pengling（碰鈴一對） | 1 |
| 47 | Dabukyu with Beaters，Rosewood（花梨木大卜魚連棒子） | 1 |
| 48 | Shadi with Stand and Beaters（沙的連架及棒子） | 1 |
| 49 | Wuyingu with Stand and Beaters（五音鼓連架及棒子） | 1 |
| 50 | Zhangu with Stand and Beaters（戰鼓連架及棒子） | 1 |
| 51 | Shuangpigu with Stand and Beaters（雙皮鼓連架及棒子） | 1 |
|  | Audio－visual Equipment |  |
| 52 | Projection system with screen | 1 |
| 53 | Media player（DVD／VCD／CD／Bluetooth／USB） | 1 |
|  | －conforming to all region code <br> －capable of CD，VCD and DVD playback <br> －connection to the stereo speakers below |  |
| 54 | Microcomputer workstation | 1 set |
|  | －DVD－RW Drive <br> －MIDI－compatible <br> －installation of music notation／sequencing software <br> －connection to the stereo speakers below |  |
| 55 | Pair of Stereo Speakers | 1 |
|  | －with amplification（Amplifier Power Output：50W＋50W RMS） <br> －woofer $\geqq$ f 200 mm <br> －connection to the multimedia computer system and DVD player |  |
| 56 | Mixer | 1 |
|  | －8－12 Channels including Balance／Unbalance Microphone and Line Inputs with： <br> Aux Channels with Send and Return EQ（Equalisation） Other Electronic Equipment |  |
| 57 | Dehumidifier | 2 |
|  | A Collection of Self－chosen Teaching Materials | 1 set |
| 58 | Audio－visual materials（such as CDs，DVDs） |  |
| 59 | Music Software（such as notation and／or sequencing software） |  |
| 60 | Wall Charts |  |
| 61 | Music Scores／Music Books |  |
| 62 | Teachers＇Reference Books |  |
|  | Total Cost for Subject | 247，800 |

Notes：－
1 School may consider using an 88－key digital piano with acoustics and touch similar to an upright piano．
2 School may consider using an 88－key digital piano with acoustics and touch similar to an upright piano．

Subject : Physical Education




| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 65 | Dumb bell | 4 pairs |
|  | Weight : $2.5-2.7 \mathrm{~kg}$ |  |
| 66 | Dumb bell | 4 pairs |
|  | Weight : $3.5-3.7 \mathrm{~kg}$ |  |
| 67 | Medicine ball | 2 |
|  | Rubber. Weight :1.5-1.8 kg |  |
| 68 | Medicine ball | 2 |
|  | Rubber. Weight : $2.2-2.7 \mathrm{~kg}$ |  |
| 69 | Medicine ball | 2 |
|  | Rubber. Weight : 3.6 - 3.7 kg |  |
| 70 | Skinfold calipers | 2 |
|  | Made of plastic, alloy or steel. <br> Measuring scale : 0-50 mm, 1 mm interval |  |
| 71 | Sit and reach box | 2 |
|  | Made of sturdy wood or comparable construction material. <br> Measuring scale: should extend from about $9-50 \mathrm{~cm}$ with the 23 cm mark exactly in line with the vertical plane against which the feet will be placed. |  |
| 72 | Inclined pull-up stand | 2 |
|  | Poles and bars made of steel <br> Platform made of plywood <br> Elastic rubber band 160 cm long <br> Height: adjustable chinning bar between 25 cm and 155 cm . <br> Foldable and lockable stand |  |
| 73 | Handgrip dynamometer | 2 |
| 74 | Sphygmomanometer (digital) | 1 |
| 75 | Metronome | 1 |
|  | Miscellaneous |  |
| 76 | Balance bench | 6 |
|  | With/ without two hooks at one end, made of hardwood or pinewood or fibre glass. <br> Flank : 3,000 -3,350 mm x 250 mm <br> Height: 350 mm <br> Rib : 100 mm (width) 60 mm (thickness) |  |
| 77 | Bean bag (C) | 40 |
|  | Made of good quality twill in bright colours, containing plastic beads or beans. |  |
| 78 | Plastic bar | 20 |
|  | Smoothly finished. <br> Length : 900-1,000 mm <br> Dia. : 20 mm |  |
| 79 | Plastic bar | 20 |
|  | Smoothly finished. <br> Length : 1,200-1,500 mm <br> Dia. : 20 mm |  |
| 80 | Coloured band (C) | 40 |
|  | Made of braided cotton or nylon in bright colours. <br> Length : $1,060 \mathrm{~mm}$ <br> Width : 30 mm |  |
| 81 | Hoop (large) (C) | 10 |
|  | Made of plastic or smoothly finished cane. Joint to be bonded, riveted and covered with resin glue. <br> Dia. of hoop : 800 mm <br> Dia. of cane : 20 mm |  |
| 82 | Hoop (medium) (C) | 20 |
|  | Made of plastic or smoothly finished cane. Joint to be bonded, riveted and covered with resin glue. <br> Dia. of hoop : 600 mm <br> Dia. of cane : 20 mm |  |
| 83 | Jump rope (C) | 40 |
|  | Length : $3,000 \mathrm{~mm}$ |  |
| 84 | Jump rope (C) | 6 |
|  | Length : 7,000 mm |  |
| 85 | Measuring tape | 2 |
|  | Made of steel, fibreglass or fabric. <br> Length : 50 m |  |
| 86 | Polypad | 12 |
|  | Made of strong urethane foam rubber. <br> Cover made of strong canvas or nylon reinforced vinyl. Size : $2,440 \mathrm{~mm} \times 1,830 \mathrm{~mm} \times 200 \mathrm{~mm}$ <br> (Schools must specify the material of the cover) |  |
| 87 | Playground marker cone |  |
|  | Made of hard-wearing plastic. <br> a) Height: 350-400 mm | 24 |
|  | Base: $250 \mathrm{~mm} \times 250 \mathrm{~mm}$ |  |
|  | b) Height: $160-300 \mathrm{~mm}$ | 20 |
|  | Base: $130-230 \mathrm{~mm} \times 130-230 \mathrm{~mm}$ |  |
|  | c) Height: $50 \mathrm{~mm} \times 150 \mathrm{~mm}$ | 20 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 88 | Base: square or round <br> Multi-purpose marker cone set <br> Made of Plastic, with holes <br> Height: 425-500 mm <br> Base : $240 \times 240 \mathrm{~mm}$ <br> Pole: Length $1,600 \mathrm{~mm}$ with diameter : 250 mm | 12 |
| 89 | Stop watch <br> 1/100 second. <br> Measures accumulated split times. | 8 |
| 90 | Quoit (C) <br> Rubber, in various colours. <br> Dia. : 165 mm <br> Weight : 280 g <br> Dia. of rubber ring : 25 mm | 40 |
| 91 | Weighing scale (digital) <br> With weight and body fat indicator | 2 |
| 92 | Triangular body height measuring tape <br> Pull down when measuring height <br> Part II - FURNITURE FOR STORAGE OF EQUIPMENT | 2 |
| 93 | Plastic storage box <br> Size : 680-740 mm x 470-500 mm x 455-470 mm (H) | 4 |
| 94 | Storage cabinet | 1 |
| 95 | Rack <br> Made of wood or metal with shelves. <br> size : $1,830 \mathrm{~mm} \times 610 \mathrm{~mm} \times 1,675 \mathrm{~mm}(\mathrm{H})$ | 1 |
| 96 | Basket drawers <br> Made of wire mesh/fibre with handle; <br> Size: 840 mm (L) $\times 460 \mathrm{~mm}(\mathrm{~W}) \times 430 \mathrm{~mm}(\mathrm{H})$ | 4 |
| 97 | Ballcages with casters (with or without lid) | 4 |
| 98 | Storage Trolley (with side door or sliding door) <br> made of wire-mesh, with adjustable shelves and non-marking multi-direction swivel casters. $1,500 \times 1,500 \times 650 \mathrm{~mm}$ <br> Dia. of caster : 100 mm <br> (School should choose either type; i.e. with side door or sliding door) | 1 |
| 99 | Mat trolley (horizontal, with or without handle) <br> for gymnastic mats, made of painted G.I. tube, with swivel non-marking rubber multi-direction swivel casters. <br> Length : $1,800 \mathrm{~mm}$ <br> Width : 1,200 mm <br> Diameter of tube : 25 mm <br> Diameter of caster : 220 mm <br> (Schools should choose either type; i.e. with or without handle) | 1 |
| 100 | Polypad Trolley (vertical) <br> Made of painted G.I. tube with non-marking rubber multi-direction swivel casters. <br> Length : 2,450 mm <br> Width : 850 mm <br> Height : $2,200 \mathrm{~mm}$ <br> Dia. of tube : 25 mm <br> Dia. of caster : 220 mm | 2 |
|  | Total cost for subject | 470,200 |

Reference List of Furniture and Equipment
for Secondary School
Subject : Visual Arts

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | FURNITURE |  |
|  | Working table | 10 |
|  | Working, $1,830 \mathrm{~mm}$ (L) x 920 mm (W) x 760 mm (H), formica top, mat finish, fixed teakwood leg, with open shelf underneath |  |
| 2 | Wooden Panel for Working Table Tops | 10 |
|  | For working table tops $1,930 \mathrm{~mm} \times 1,020 \mathrm{~mm}$, about 12.7 mm thickness, with timber rail edges |  |
| 3 | Stool | 40 |
| 4 | Teacher desk | 1 |
| 5 | Teacher chair | 1 |
| 6 | Cupboard with lock for media storage | 1 |
| 7 | Plan Chest | 2 |
|  | Steel, approx. $1,200 \mathrm{~mm}$ (W) x 915 mm (D) x 625 mm overall, fitted with 5 equal drawers |  |
| 8 | First-aid Cabinet | 1 |
| 9 | Blackout Curtains | 1 set |
|  | EQUIPMENT |  |
| 10 | Trolley | 1 |
|  | Stainless steel, with 3 tiers |  |
| 11 | Hair Dryer (blower with handle) | 2 |
|  | For drying prints including hot and cold air, approx. $1,000 \mathrm{~W} / 220 \mathrm{~V} / 50 \mathrm{~Hz}$ AC (or use standard specifications "spec. 60/07/02 C(6)" issued by the Electrical and Mechanical Services Department) |  |
| 12 | Domestic Iron | 2 |
|  | Operating on approx. $1,000 \mathrm{~W} / 220 \mathrm{~V} / 50 \mathrm{~Hz}$ AC. <br> With adjustable thermostat control and indicating selfresetting <br> (e.g. General Electric, National) |  |
| 13 | Paper Trimmer | 1 |
|  | Rotary trimming blade, cut length 610 mm . <br> The maximum thickness of cut is about 3 mm |  |
| 14 | Drawing Board | 40 |
|  | Plywood, 8mm thick, size A2 (420 mm x 594 mm ) |  |
| 15 | Palette | 40 |
| 16 | Light Box for Screen Printing | 1 |
| 17 | Squeegee for Screen Printing | 1 set |
|  | Assorted sizes: (20 nos.) |  |
| 18 | Etching Press | 2 |
|  | Steel bed plate size at least $330 \mathrm{~mm} \times 660 \mathrm{~mm} \times 6 \mathrm{~mm}$ approx. With upper and lower rollers. Four-arm spoked drive wheel. Fitted with one sheet of felt blanket and one oiler |  |
| 19 | Scissors | 40 |
|  | 150 mm , stainless steel |  |
| 20 | Staple Gun | 5 |
|  | (e.g. Rapid 13 or equivalent) |  |
| 21 | Stapler | 40 |
|  | (e.g. Max. HD-10 or equivalent) |  |
| 22 | Staple Remover | 5 |
|  | (e.g. Max. R2 or equivalent) |  |
| 23 | $\underline{\text { Knife }}$ | 40 |
|  | 130 mm blade |  |
| 24 | Woodblock Cutters | 40 boxes |
|  | Heavy duty, 6 shapes in box, with grind stone and baren |  |
| 25 | Lino Dabber | 40 |
| 26 | Bench Hook | 40 |
| 27 | Plastic Mug | 40 |
|  | 100 mm diameter |  |
| 28 | Palette Knife | 10 |
|  | 100 mm blade |  |
| 29 | Paper Cutter | 40 |
|  | With chippable, retractable blade and safety lock (e.g. N.T. Cutter, S200 or equivalent) |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 30 | Mat Cutter with Guide Rail | 1 |
|  | For picture frames cutting. (e.g. Logan Model 440 or equivalent) |  |
| 31 | Oval and Circle Cutter | 1 |
|  | (e.g. Logan Model 2013 -step oval and circle cutter or equivalent) |  |
| 32 | Ruler | 40 |
|  | Plastic, 450 mm |  |
| 33 | Ruler | 1 |
|  | Wooden or plastic, 1 meter long |  |
| 34 | T-square, Al | 2 |
|  | Hardwood, length of blade 920 mm |  |
| 35 | T-square, A2 | 5 |
|  | Hardwood, length of blade 650 mm approx. |  |
| 36 | Set Square | 5 sets |
|  | Plastic, $45^{\circ}, 60^{\circ}, 30^{\circ}, 200 \mathrm{~mm}$ in set |  |
| 37 | Cutting Mat | 40 |
|  | Plastic, 3 layers structure (soft P.V.C. sandwiches hard <br> P.V.C. board), double sided usage, $300 \mathrm{~mm} \times 450 \mathrm{~mm}, 3 \mathrm{~mm}$ thickness |  |
| 38 | Lino Roller | 1 set |
|  | $\begin{aligned} & 100 \mathrm{~mm}-5 \text { nos. } \\ & 150 \mathrm{~mm}-5 \text { nos. } \\ & 270 \mathrm{~mm}-2 \text { nos. (rubber) } \end{aligned}$ |  |
| 39 | Claw Hammer | 2 |
|  | 450 g head |  |
| 40 | Screw Driver | 2 |
|  | 100 mm blade length, 6 mm tip |  |
| 41 | Screw Driver | 2 |
|  | 150 mm blade length, 8 mm tip |  |
| 42 | Hand Drill | 2 |
|  | 6 mm capacity, overall length about 330 mm |  |
| 43 | Hand Saw | 1 |
|  | Length $400 \mathrm{~mm}, 10$ points per 25 mm |  |
| 44 | Pliers | 10 |
|  | Round nose, overall length 150 mm |  |
| 45 | Pliers | 10 |
|  | Combination, overall length 150-250 mm |  |
| 46 | Pincers | 2 |
|  | Carpenter, overall length 150-250 mm |  |
| 47 | Tenon Saw | 1 |
|  | Length 250 mm , 11 to 20 points per 25 mm |  |
| 48 | Hacksaw | 2 |
|  | Adjustable, to take blades up to 310 mm |  |
| 49 | File | 1 set |
|  | Needle, second cut, 12 assorted shapes |  |
| 50 | File | 1 |
|  | Flat, rough with handles, overall length about 250 mm |  |
| 51 | File | 1 |
|  | Flat, smooth, with handles, overall length about 250 mm |  |
| 52 | Rasp | 1 |
|  | (Chinese style - small size) |  |
| 53 | Chisels | 1 set |
|  | Firmer, square edge, with handles, $6 \mathrm{~mm} / 10 \mathrm{~mm} / 12 \mathrm{~mm} / 20 \mathrm{~mm}$ (2 of each size) |  |
| 54 | Gouges | 1 set |
|  | Firmer outcannelled, with handles, $6 \mathrm{~mm} / 10 \mathrm{~mm} / 12 \mathrm{~mm}$ ( 4 of each size) |  |
| 55 | Centre Punch | 2 |
| 56 | Nail Punch | 2 |
|  | Point diameter 2 mm and 3 mm (one of each) |  |
| 57 | "G" Clamp | 1 |
|  | 100 mm |  |
| 58 | "G" Clamp | 1 |
|  | 150 mm |  |
| 59 | Stainless Steel Ruler | 2 |
|  | 300 mm |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 60 | Stainless Steel Ruler | 1 |
|  | 600 mm |  |
| 61 | Drying Rack | 1 |
|  | Steel, spray painted, 50 tiers with spring action for shelves. <br> Size of wire mesh shelves : $700 \times 920 \mathrm{~mm}$, approx., mesh opening not larger than $200 \times 200 \mathrm{~mm}$. <br> Overall dimension: $740 \times 940 \times 1,350 \mathrm{~mm}$, approx. with four rollers ( 80 mm diam. approx.) |  |
| 62 | Teacher Reference Books | 1set |
| 63 | Electric Ceramic Kiln | 1 |
|  | (a) Framework: <br> The kiln shall be robustly constructed and the kiln door shall be mounted on strong hinges allowing easy but firm closing. There shall be a spy-hole situated in the door for cone sighting. If the kiln is a side-loading type, it shall be provided with an integral metal stand. <br> (b) Firing Chamber : <br> Firing chamber capacity shall be about 80 litres and shall be lined with low conductivity materials and faced with special high temperature refractory insulation bricks. <br> (c) Heating element : <br> The heating elements shall be made of long lasting high temperature wire and shall not be more than 6 KW and at <br> 200 V . The elements shall be securely carried. <br> (d) Control : <br> For the control and regulation of firing, the ceramic kiln shall be fitted with the following items : <br> (i) an energy regulator; <br> (ii) a temperature indicator/control device incorporated with thermocouple; <br> (iii) an automatic time controller for predetermined firing control. <br> (e) Firing temperature : <br> The maximum firing temperature shall be $1,260^{\circ} \mathrm{C}$ or above. The heat-up time required to reach $1,000^{\circ} \mathrm{C}$ shall not be more than 8 hours. (f) Safety : <br> The ceramic kiln shall be suitable and safe to use in schools. <br> It shall be equipped with at least three electrical safety precautions : <br> (i) a warning light which glows whenever the elements are live; <br> (ii) a door-operated switch to disconnect the electrical automatically as the door is opened; <br> (iii) a key-operated switch/door lock, or has provision for fitting a padlock for the kiln door to prevent unauthorized opening of the kiln. <br> (g) Accessories: <br> (i) Bat, refractory, about 15 mm thickness, size to match the kiln; (12 pcs) <br> (ii) Prop, tubular, about 100 mm long. ( 20 pcs ) |  |
| 64 | Potters' Kick Wheel | 4 |
|  | All moving parts fitted with bearings (wheel-head 250 mm ) |  |
| 65 | Turntable | 10 |
|  | 250 mm diam. for pottery |  |
| 66 | Clay Storage Bin with Lid | 4 |
|  | Water proof, plastic, min., capacity, 35 litres |  |
| 67 | Turning Tools | 4 sets |
|  | Assorted shapes, 4 in a set |  |
| 68 | Modelling Tools | 10 sets |
|  | Wood, assorted shape, 10 in a set |  |
| 69 | Rolling Pin | 10 |
|  | Wooden, 510 mm long approximately, for rolling clay |  |
| 70 | LED Spotlights | 1 |
|  | 3 pieces of LED spotlight (continuous, daylight) with tripod stand for photography |  |
| 71 | IT Equipment for Visual Arts |  |
|  | (A) Microcomputer workstation for graphic use, teacher | 1 |
|  | Specifications: with software items for: word processing <br> graphic <br> picture and photo processing <br> video editing <br> presentation <br> animation |  |
|  | (B) Microcomputer workstation for graphic use, student | 5 |
|  | Specifications: with software items for: word processing <br> graphic <br> picture and photo processing <br> video editing <br> presentation <br> animation |  |
|  | (C) Pressure Sensitive Drawing Tablet | 1 |
|  | - Pressure levels: 1,024 <br> - Active area: $15 \times 20 \mathrm{~cm}$ |  |
|  | (D) Digital Camera with Accessories | 4 |
|  | Specifications: <br> for High Definition photo and video shooting with AVI <br> and HDMI <br> tripod <br> moisture proof plastic box for storage |  |
|  | (F) Printer or printer cum scanner (small) | 1 |
| 72 | Projection system with screen | 1 |
|  | Total Cost for Subject | 401,500 |

Subject : Design \& Technology

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | (A) FURNITURE |  |
|  | Square woodwork bench | 2 |
|  | $1,070 \mathrm{~mm}$ (L) $\times 1,070 \mathrm{~mm}$ (W) $\times 760 \mathrm{~mm}$ (H) |  |
| 2 | Square woodwork bench | 3 |
|  | $1,070 \mathrm{~mm}$ (L) $\times 1,070 \mathrm{~mm}$ (W) $\times 800 \mathrm{~mm}$ (H) |  |
| 3 | Design table | 3 |
|  | $1,800 \mathrm{~mm}(\mathrm{~L}) \times 1,000 \mathrm{~mm}(\mathrm{~W}) \times 760 \mathrm{~mm}(\mathrm{H})$, heavy-duty tabletop covered with light-covered plastic laminated sheet, sturdy metal underframe. <br> Demo Bench | 1 |
| 4 | $1,800 \mathrm{~mm}(\mathrm{~L}) \times 800 \mathrm{~mm}(\mathrm{~W}) \times 700 \mathrm{~mm}(\mathrm{H})$, heavy-duty tabletop covered with light-coloured plastic laminated sheet, sturdy metal underframe. |  |
| 5 | Stool | 20 |
|  | Stackable, 460 mm height, made from plastics or hardwood. |  |
| 6 | Trolley | 2 |
|  | Stainless steel, 4 shelves, rubber casters |  |
| 7 | Bin for inflammable fluids | 2 |
|  | 760 mm (L) $\times 450 \mathrm{~mm}$ (W) $\times 380 \mathrm{~mm}$ (H) ( 20 SWG G.I.) |  |
| 8 | Cabinet, first aid | 1 |
|  | (B) COMPUTER-AIDED DESIGN WORKSTATION \& |  |
|  | TECHNOLOGY KITS |  |
| 9 | Computer workstation | 21 |
| 10 | Integrated software pac | 21 |
|  | MS Chinese/English Office (Standard suite) (Education Version) |  |
| 11 | 3-D CAD software | 21 |
|  | Inventor/SolidWorks /ProENGINEER or equivalent (Education Version) |  |
| 12 | Animation software | 21 |
|  | 3D Studio VIZ or equivalent (Education Version) |  |
| 13 | Computer graphics software | 21 |
|  | - CorelDrAW or equivalent (Education Version) |  |
| 14 | CAL on Electronics | 1 |
|  | Interactive, simulate electronic circuits (Education Version) |  |
| 15 | Printer or printer cum scanner (small) | 1 |
| 16 | Digital video camera | 4 |
| 17 | Mechanisms kit | 2 |
|  | for introduction of mechanical components, structures and forces, completed with building instruction sheets and storage unit. Class pack is preferable. |  |
| 18 | Pneumatics kit | 1 |
|  | for constructing simple pneumatic systems, completed with teacher's manual and instruction sheets. An air pump unit (without cylinder) should be included. |  |
| 19 | Robotics kit | 3 |
|  | Robotics kit, completed with interface, capable of simulating a variety of manufacturing processes such as pick and place, sorting, assembling. (Site license preferable) |  |
| 20 | Learning kit for electronics | 1 |
|  | DC operated electronics system with decisions module containing AND, OR, NOT gates and other accessories such as micro-switch, sensors, battery, connecting leads. Completed with teacher's manual \& worksheets. Class pack is preferable. |  |
| 21 | Learning kit for computer / microcontroller control <br> completed with the following essential elements:- <br> - flowchart-based control software <br> - text-based control software <br> - interface with i/o ports/adapters <br> - set of digital i/o devices and sensor devices <br> - motorised model e.g. 'Buggy' or manufacturing unit <br> - building guide and publication resource <br> Site license of software is preferable, if applicable. | 3 |
| 22 | Laser Cutter and Engraver | 1 |
|  | Completed with odour reduction and exhaust system (C) PLASTICS \& ELECTRICAL EQUIPMENT |  |
| 23 | Strip heater | 1 |
|  | for heating acrylic sheets, 500 mm length, 220 V 50 Hz single phase A.C., 1 kW approx., electrical components and cabling conform to the latest B.S.S. earthing through 3-core supply cable. |  |
| 24 | Oven (curing) | 1 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 25 | 220 V , approx. $1,000 \mathrm{~W}$, single phase, up to 300 oC , electrical components and cabling conformed to the latest B.S.S. earthing through 3-core supply cable, exterior temperature 50 oC at max. optimum temperature, safety door interlock, firing chamber approx. $250 \times 300 \times 450 \mathrm{~mm}$. <br> Vacuum former (manual) <br> capable of blank size $300 \mathrm{~mm} \times 300 \mathrm{~mm}$ end up to 2 mm thick sheet. Heating element is 1.5 kW . Vacuum pump is self-contained unit, 200W. Electrical components and cabling conform to the latest B.S.S. Operated on 220 V , 50 Hz single phase A.C. and earthing through 3 core supply cable. | 1 |
| 26 | Multimeter <br> battery operated. | 4 |
| 27 | Glue gun for 11 mm dia. glue-sticks, double insulated, 220 V 50 Hz A.C. | 10 |
| 28 | Electric soldering iron with stand 220 V 50 Hz , single phase A.C., 25 W . | 4 |
| 29 | Electric soldering iron with stand 220 V 50 Hz , single phase A.C., 125 W . | 1 |
| 30 | Electric soldering iron with stand <br> 220 V 50 Hz , single phase A.C., 240W. | 1 |
| 31 | Hand engraver <br> 220 V 50 Hz single phase A.C., variable stroke control, electrical components and cabling conformed to the latest B.S.S., earthing through 3 core supply cable. | 1 |
| 32 | Power hand drill with accessories <br> single phase, 220 V 50 Hz 2 speed - 1,150 r.p.m. and 2,300 r.p.m., double insulation, heavy duty motor with ball bearings, capacity 10 mm , earthing through 3 core supply cable. | 1 |
| 33 | Solid state D.C. power supply <br> mains input 220V A.C. 50 Hz , Output 0-20V D.C., 0-2A approx. on-off switch with indicator lamp, earthing through 3 core supply cable. <br> (D) MACHINERY | 2 |
| 34 | Drilling machine <br> bench model, 13 mm drilling capacity, 100 mm spindle travel, chuck and adequate chuck guard, push button starter with overload protection and no-volt release unit with operating coil designed for $220 \mathrm{~V}, 370 \mathrm{~W}, 3$ phase, 380 V 50 cycles AC motor, safety belt guard. (To comply with E. \& M. standard specification and F. \& I. U. Ord. \& Regulations) Circular saw | 2 |
| 35 | bench, 250 mm , tilt-arbor depth of cut at $450,50 \mathrm{~mm}$, depth of cut at $900,70 \mathrm{~mm}$ max., quick release safety guard fitted to riving knife, precision machined rip-fence locks back and front of table with single lever, fine adjustment through rack and pinion, extra heavy close grained cast iron table unit size $700 \times 700 \mathrm{~mm} .1 .5 \mathrm{Kw}, 3$ phase, 380 V , 50 cycle motor A.C. supply. Push button starter with no-volt release unit with coil designed to operate at 220 V with over-load protection; accessible door for saw dust removal. <br> (To comply with F. \& I. U. Ord. \& Regulations) | 1 |
| 36 | Chip extractor for woodworking machine <br> mobile extractor, $220 \mathrm{~V}, 50 \mathrm{~Hz}$ single phase A.C., motor driven at 560 W with airflow rate $0.2 \mathrm{~m} 3 / \mathrm{s}$ approximately. <br> Supplied with 2.5 m long flexible hose of 100 mm dia. <br> Electrical components and cabling conform to the latest B.S.S., earthing through 3-core supply cable. | 1 |
| 37 | Power disc sander <br> bench type, $260 \pm 50 \mathrm{~mm}$ dia. Disc, with 550 W motor, single phase, 220 V , 50 cycles A.C. supply, mounted on solid cast iron bases. Fitted with fixed disc guard covering the major part of disc, leaving only the portion of the disc in use, and supplied with dust extraction port. <br> Push button overload and no-volt release starter for 220 V supply. <br> (To comply with latest F. \& I.U. Ord. \& Regulations.) | 1 |
| 38 | Jigsaw <br> bench model, stroke of blade $25 \mathrm{~mm}, 400 \mathrm{~mm}$ throat, size of table approx. $200 \times 225 \mathrm{~mm}, 720$ strokes per min. 200 W motor, single phase, $220 \mathrm{~V}, 50$ cycles A.C. supply, earthing through 3 core supply cable. <br> Safety guard must be included. | 2 |
| 39 | Metalworking lathe <br> metric model, 250 mm , on cabinet base to admit 560 mm between centres, with 560 W 3-phase motor and lever controlled gear change mounted inside the cabinet base, push button starter with overload protection and no-volt release unit with operating coil designed for 220 V . Electrical equipment to be fully tropicallised and suitable for $380 \mathrm{~V}, 50 \mathrm{~Hz}, 3$ phase A.C., emergency stop button at convenient position, chuck guard with safety interlocking device, suds pump and fitting, single phase low voltage lighting unit preferably 24 V but not exceeding 50 V and saddle limit switch (electrical/mechanical). <br> Accessories include:- <br> (i) 125 mm 3 -jaw self centring chuck and backplate <br> (ii) 150 mm 4 -jaw independent chuck and backplate <br> (iii) Rear splash guard for cabinet base <br> (iv) Drill chuck 12.5 mm capacity <br> (v) Set of toolholders for 4-way toolpost | 1 |
| 40 | Double-ended grinder <br> bench type, spindle speed at $2,100 \mathrm{rpm}$ approx.; 200 dia . Grinding wheels; wheel guards made from heavy steel plate, adjustable tool rests, safety eye shields; 560 W motor, push button overload and no-volt release starter, suitable for $380 \mathrm{~V}, 3$ phase, 50 Hz A.C. supply. (To comply with E\&M standard specifications and F \& I U Ord. \& Reg.) <br> (E) HAND TOOLS | 1 |
| 41 | Bench hook ${ }^{\text {Beech, size } 150 \times 250 \mathrm{~mm}}$ | 20 |
| 42 | ‘Carborundum' stone <br> silicon carbide, rectangular type, one side coarse and one side fine | 1 |
| 43 | Abrasive wheel dresser <br> suitable for dressing up to 510 mm dia. Dia of cutters 33 mm | 1 |
| 44 | Adjustable tap wrench <br> bar type 6-12 mm | 2 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 45 | Adjustable tap wrench | 2 |
|  | bar type 1.5-6mm |  |
| 46 | Bevel | 2 |
|  | Sliding blade 188 mm , hardwood stock with brass protected ends and brass lever locking nut |  |
| 47 | Bit | 2 |
|  | countersink rosehead, 13 mm dia. straight shank dia. 5 mm |  |
| 48 | Bit | 1 |
|  | forstner, straight shank 19 mm dia |  |
| 49 | Bit | 1 |
|  | forstner, straight shank 13 mm dia |  |
| 50 | Bit | 2 |
|  | countersink rosehead, 10 mm dia. straight shank dia. 5 mm |  |
| 51 | Bit | 1 |
|  | forstner, straight shank 25 mm dia |  |
| 52 | Brace | 2 |
|  | ratchet 200 mm sweep, alligator jaws, ball-bearing head. |  |
| 53 | Brace bit | 1 |
|  | Centre, fast cutting 25 mm dia., square shank |  |
| 54 | Brace bit | 1 |
|  | Centre, fast cutting 19 mm dia., square shank |  |
| 55 | Brace bit | 1 |
|  | Centre, fast cutting 16 mm dia., square shank |  |
| 56 | Brace bit | 1 |
|  | centre, fast cutting 13 mm dia., square shank |  |
| 57 | Brace bit | 1 |
|  | centre, fast cutting 10 mm dia., square shank |  |
| 58 | Brace bit | 1 |
|  | solid centre auger (Jenning Pat.) 16 mm dia |  |
| 59 | Brace bit | 1 |
|  | solid centre auger (Jenning Pat.) 13 mm dia |  |
| 60 | Brace bit | 1 |
|  | solid centre auger (Jenning Pat.) 10 mm dia |  |
| 61 | Brace bit | 1 |
|  | solid centre auger (Jenning Pat.) 6 mm dia |  |
| 62 | Brace bit | 1 |
|  | solid centre auger (Jenning Pat.) 19 mm dia |  |
| 63 | Bract bit | 1 |
|  | Centre, fast cutting 22 mm dia., square shank |  |
| 64 | Bradawl | 4 |
|  | 38 mm blade, with pinned end size, hardwood handle |  |
| 65 | Calipers | 1 |
|  | outside firm joint, 200 mm |  |
| 66 | Calipers | 1 |
|  | inside 150 mm , firm joint |  |
| 67 | Calipers | 3 |
|  | outside 150 mm , firm joint |  |
| 68 | Centre punch | 10 |
|  | 5 mm point dia x 100 mm long, round head |  |
| 69 | Chisel | 10 |
|  | bevel edge 25 mm , plastic handle |  |
| 70 | Chisel | 10 |
|  | bevel edge, 19 mm blade, plastic handle |  |
| 71 | Chisel | 10 |
|  | bevel edge 16 mm , plastic handle |  |
| 72 | Chisel | 10 |
|  | bevel edge 13 mm , plastic handle |  |
| 73 | Chisel | 10 |
|  | bevel edge 10 mm , plastic handle |  |
| 74 | $\underline{\text { Chisel }}$ | 10 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 75 | bevel edge 6 mm , plastic handle |  |
|  | Chisel | 20 |
|  | square edge, firmer, 19 mm ash handle |  |
| 76 | Chisel | 20 |
|  | square edge, firmer, 13 mm ash handle |  |
| 77 | Chisel | 20 |
|  | square edge, firmer, 6 mm ash handle |  |
| 78 | Chisel | 5 |
|  | sash mortice, 13 mm blade, beech handle |  |
| 79 | Chisel | 10 |
|  | sash mortice, 8 mm blade, beech handle |  |
| 80 | Chisel | 20 |
|  | sash mortice, 6 mm blade, beech handle |  |
| 81 | Cold chisel | 2 |
|  | flat, octagon steel, 12 mm blade width $\times 150 \mathrm{~mm}$ long |  |
| 82 | Cold chisel | 1 |
|  | cross cut, octagon steel, 6 mm blade width $\times 150 \mathrm{~mm}$ long |  |
| 83 | Compasses | 2 |
|  | wing 200 mm |  |
| 84 | Cork | 4 |
|  | rubbing block |  |
| 85 | Cramp | 12 |
|  | 'G' ribbed, 150 mm |  |
| 86 | Cramp | 12 |
|  | 'G' ribbed, 100 mm |  |
| 87 | Cramp | 12 |
|  | 'G' ribbed, 50 mm |  |
| 88 | Cramp | 4 |
|  | 'G' ribbed, 200 mm |  |
| 89 | Cramp | 4 |
|  | sash, 900 mm length out of steel bar |  |
| 90 | Cramp | 4 |
|  | sash, 600 mm length out of steel bar |  |
| 91 | Die stocks for circular die | 2 |
|  | 21 mm , O.D. |  |
| 92 | Die stocks for circular die | 2 |
|  | 25 mm , O.D. |  |
| 93 | Dividers | 2 |
|  | 150 mm quick solid nut, spring type |  |
| 94 | Set of drill morse | 2 |
|  | twist, straight shank, H.S.S |  |
| 95 | Drill | 2 |
|  | hand, 8 mm capacity, machine cut gears and pinion, double pinion with all bright parts plated |  |
| 96 | Enamel trough | 1 |
|  | $152 \times 250 \times 50 \mathrm{~mm}$ |  |
| 97 | Engineer steel square | 10 |
|  | 150 mm |  |
| 98 | Engineers' combination pliers | 2 |
|  | 150 mm |  |
| 99 | Engineers' H.S.S. hand taps | 2 |
|  | metric M3 x 0.5 (set of 3) |  |
| 100 | Engineers' H.S.S. hand taps | 2 |
|  | metric M5 x 0.8 (set of 3) |  |
| 101 | Engineers' H.S.S. hand taps | 2 |
|  | metric M6 x 1 (set of 3) |  |
| 102 | Engineers' H.S.S. hand taps | 2 |
|  | metric M8 x 1.25 (set of 3) |  |
| 103 | Engineers' H.S.S. hand taps | 2 |
|  | metric M10 x 1.5 (set of 3) |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 104 | Face shield | 2 |
|  | for general eye and face protection, with 200 mm adjustable clear vizor and adjustable crown strap |  |
| 105 | File card | 6 |
|  | 50 mm wide, 100 mm long. |  |
| 106 | File | 6 |
|  | taper, saw, slim, 150 mm |  |
| 107 | File | 6 |
|  | taper, saw, extra slim 100 mm |  |
| 108 | File | 5 |
|  | half round, $2^{\text {nd }}$ cut, 200 mm |  |
| 109 | File | 5 |
|  | round, $2^{\text {nd }} \mathrm{cut}, 200 \mathrm{~mm}$ |  |
| 110 | File | 5 |
|  | square, $2^{\text {nd }} \mathrm{cut}, 200 \mathrm{~mm}$ |  |
| 111 | File | 2 |
|  | surform, 250 mm blade, plastic handle |  |
| 112 | File | 20 |
|  | hand, safe edge, bastard, 250 mm |  |
| 113 | File | 10 |
|  | hand, safe edge, $2^{\text {nd }}$ cut, 200 mm |  |
| 114 | Gauge | 1 |
|  | cutting, beechwood head and half round stock, brass facing strips and plastic thumbscrew |  |
| 115 | Gauge | 20 |
|  | marking, beechwood head plastic thumbscrew and stock |  |
| 116 | Gauge | 2 |
|  | mortice, rosewood head and stock, brass facing strips on stock, thumbscrew operated slide, knurled screw for fixing stock |  |
| 117 | Gloves | 1 |
|  | leather |  |
| 118 | Hacksaw | 20 |
|  | adjustable, 230 mm telescopic pattern, depth of bow 90 mm , hard wood handle |  |
| 119 | Hammer engineers' ball pein | 1 |
|  | ash handle, 900 g |  |
| 120 | Hammer | 1 |
|  | claw, 450 g Adze eye |  |
| 121 | Hammer | 5 |
|  | Warrington, 226 g , ash handle |  |
| 122 | Hand lever operated shear | 1 |
|  | length of blade 180 mm for cutting plate and round steel. |  |
| 123 | $\underline{\text { Hand riveter }}$ | 2 |
|  | capable of riveting $2.4,3.2,4$ and 4.8 mm diameter rivets by means of inter-changeable nose-pieces |  |
| 124 | Hand vice | 2 |
|  | 50 mm width x 125 mm drop forged steel, bright jaws, spring type |  |
| 125 | $\underline{\text { Knife }}$ | 10 |
|  | marking, plastic handle, steel blade 150 mm overall length |  |
| 126 | Letter stamps | 1 |
|  | 5 mm (27 in case) |  |
| 127 | $\underline{\text { Level }}$ | 2 |
|  | spirit, multi-view, plastic body, 230 mm long |  |
| 128 | Machine vice | 2 |
|  | 100 mm jaw width, 32 mm depth of jaw, jaw opening 75 mm . Suitable for holding round and square sections, with knurled handle. |  |
| 129 | Mechanic vice | 20 |
|  | 100 mm jaws, with plastic vice grips |  |
| 130 | Machinist scriber | 10 |
|  | 115 mm long |  |
| 131 | Machinists screwdriver | 1 |
|  | 267 mm overall, chrome vanadium blade, 8 mm square x 150 mm long securely pinned in handle |  |
| 132 | Mallet | 20 |
|  | carpenter, beechwood head and handle 125 mm |  |
| 133 | $\underline{\text { Mitre block }}$ | 1 |



| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 166 | coping, 163 mm coping saw blade, pinned ends, depth of bow 120 mm . |  |
|  | Saw | 1 |
|  | cross cut, 600 mm skewback, 8 T.P.I. beech handle |  |
| 167 | Saw | 1 |
|  | keyhole, hardwood handle |  |
| 168 | Saw | 2 |
|  | keyhole, blades, 250 mm , fine |  |
| 169 | Saw | 1 |
|  | panel, 500 mm 10 T.P.I. beech handle |  |
| 170 | Saw | 1 |
|  | rip, $650 \mathrm{~mm}, 6$ T.P.I. beech handle |  |
| 171 | Saw | 20 |
|  | tenon, brass back 250 mm , beech handle. |  |
| 172 | Saw | 10 |
|  | piercing |  |
| 173 | Screwdriver | 6 |
|  | cabinet pattern, 150 mm blade. |  |
| 174 | Screwdriver | 2 |
|  | cabinet pattern, 200 mm blade |  |
| 175 | Screwdriver | 6 |
|  | engineer fluted, plastic handle 100 mm |  |
| 176 | Screwdriver | 6 |
|  | engineer fluted, plastic handle 75 mm |  |
| 177 | Sheetmetal bender | 1 |
|  | bench type hand-operated, capable of bending steel sheets 0.6 mm thick and aluminum sheets 1.5 thick |  |
| 178 | Spanner set | 2 |
|  | double end type, $6 \mathrm{~mm}-24 \mathrm{~mm}$ |  |
| 179 | Spokeshave | 5 |
|  | metal, flat bottom, adjustable iron, 250 mm long 50 mm cutter |  |
| 180 | Spokeshave | 5 |
|  | metal, round bottom, adjustable iron, 250 mm long 50 mm cutter |  |
| 181 | Square | 2 |
|  | mitre combination, 300 mm |  |
| 182 | Tape measuring | 5 |
|  | 3 m long, high impact electroplated chrome finish case, automatic rewind with locking switch |  |
| 183 | Tinmen's boxwood mallets | 4 |
|  | 75 mm , ash handle |  |
| 184 | Tinmen's groove punches | 1 |
|  | 3 mm |  |
| 185 | Tinmen's groove punches | 1 |
|  | 5 mm |  |
| 186 | Tinmen's groove punches | 1 |
|  | 6 mm |  |
| 187 | Tinmen's rivet sets | 1 |
|  | 3 mm |  |
| 188 | Tinmen's rivet sets | 1 |
|  | 5 mm |  |
| 189 | Tinmen's rivet sets | 1 |
|  | 6 mm |  |
| 190 | Tinmen's snips | 4 |
|  | straight blade 250 mm |  |
| 191 | Tinmen's snips | 4 |
|  | curved blade 250 mm |  |
| 192 | Trysquare | 1 |
|  | 300 mm rosewood stock faced with brass, blade secured with brass diamonds |  |
| 193 | Trysquare | 20 |
|  | 150 mm rosewood stock faced with brass, blade secured with brass diamonds. |  |
| 194 | Tweezers | 8 |
|  | pointed, stainless steel, 200 mm |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 195 | Universal surface gauge <br> one pillar, height 300 mm base length 75 mm , base width 75 mm | 1 |
| 196 | Vee-blocks and clamp <br> cast iron, $50 \mathrm{~mm} \times 40 \mathrm{~mm}$ sq., 40 mm dia. <br> Capacity, two $90^{\circ}$ vees having different capacities, vees truly centre | 1 |
| 197 | 3D Printer <br> Using FDM / SLA printing technology or equivalent Minimum print volume 150x150x150mm | 1 |
| 198 | 3D scanner <br> Depth Precision $\pm 0.05 \mathrm{~mm}$ <br> Minimum scan volume 100x100x100mm | 1 |
| 199 | Vinyl cutter <br> Minimum cutting width 290 mm | 1 |
|  | Total Cost for D\&T | 448,600 |

Reference List of Furniture and Equipment
for Secondary School
Subject : Home Economics (Room I)

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | FURNITURE |  |
| 1 | First-aid cabinet | 1 |
| 2 | Student chair | 1 |
| 3 | Stool | 24 |
| 4 | Work table | 11 |
| 5 | Trolley | 2 |
|  | EQUIPMENT |  |
|  | Appliances - Gas |  |
| 6 | Cooker | 7 |
|  | Domestic, Asian style, free standing, consists of 4 burners ( 2 middle burners and 2 big burners with inner and outer rings), automatic ignition, height 200 mm approx., with flame failure devices. |  |
| 7 | Cooker | 5 |
|  | Domestic, full size, completed with automatic ignition, consists of a separate grill compartment, 4 - burner hotplate of 2 sizes, with flame failure devices for the burners and the oven. <br> Appliances - Electrical |  |
| 8 | Cooker | 1 |
|  | Domestic, consists of 4 radiant rings with 2 economy mini/maxi rings, with control panel for different functions, i.e. grill and oven, oven temperature in degree <br> Celsius ranged from $150^{\circ} \mathrm{C}-250^{\circ} \mathrm{C}$, should be suitable for use on $200-220 \mathrm{Volts}, 50 \mathrm{~Hz}$., 60 Ampere power supply. <br> Dish Washer | 1 |
| 9 | with a capacity of washing 12 culinary sets, 2 washing temperatures and $4-6$ washing programmes, stainless steel tub, adjustable basket. Dryer, Tumble | 1 |
| 10 | capable of drying $3-5 \mathrm{~kg}$ dry weight of wash with 2 temperature settings, loading of heaters shall be of $2,000 \mathrm{~W}$ approx. | 1 |
| 11 | Hot Water Pot | 1 |
|  | Electric, with a capacity of 3 litres, water level indicator, boil and reboil function, detachable lid with power of $600-700 \mathrm{~W}$. |  |
| 12 | Induction Cooker | 1 |
|  | On/Off switch with different power level control, ceramic top plate, overheat sensor, protection fuse with power of 1,300-1,600W. Iron | 2 |
| 13 | electric, steam with thermostat, loading of 1,200W or above. |  |
| 14 | Mixer |  |
|  | electric : |  |
|  | (a) Egg beater | 6 |
|  | 3-5 speed control with 2 beaters and 2 dough hooks, with/without stand and bowl with power of $150-180 \mathrm{~W}$. |  |
|  | (b) Liquidizer | 6 |
|  | 2-4 speed control switch, glass container with 1-1.5 litre capacity, detachable blades with power of 400-750W. |  |
| 15 | Multi-purpose Food Preparation Machine | 1 |
|  | stainless steel bowl (approximately 4.3 litre capacity), with special attachments : e.g. Dough hook, Whisk, K-beater, Pasta Extruder, Multi-Mill and Mincer with power of 600-700 W. |  |
| 16 | Oven, Microwave | 2 |
|  | electric, oven capacity of approximately 23 litre, loading of 900 W , fully automatic with timer, safety door lock and at least 3 microwave settings. |  |
| 17 | Processor, Food | 2 |
|  | stainless steel blade with different functions, e.g. slicing, shredding, grating, chopping with safety lock device, bowl volume of at least 1litre capacity, with blender and juice extractor attachments with power of 500-700W. |  |
| 18 | Refrigerator | 2 |
|  | Net capacity of 300-450 litres, frost-free type |  |
| 19 | Rice Cooker | 3 |
|  | electric, medium (capacity for 6-8 persons), automatic release button, hinge spring for auto lid opening, with power of 600-650W. <br> Rice Cooker | 3 |
| 20 | electric, small, (capacity for 2-4 persons) automatic release button, hinge spring for auto lid opening, with power of 300-450W. |  |
| 21 | Washing Machine | 1 |
|  | fully automatic with selectable programmes for washing and spin drying, capable of washing 5 kg dry weight of wash, front loading, provided with a cold and hot water washing facility. <br> MISCELLANEOUS |  |
| 22 | Blanket | 1 |
|  | Fire Fighting |  |
| 23 | Board |  |
|  | Ironing, metal : |  |
|  | (a) Sleeve | 2 |
|  | (b) Standard | 2 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 24 | Drying Equipment | 2 |
|  | portable, indoor, durable steel frame with rust proof and rounded drying line fittings, adjustable multi-position, additional rubber fittings on the feet for improved stability. |  |
| 25 | Water Purifier | 7 |
|  | free standing or built in type with replaceable filter, contain filter cartridge life checker and safety valve to prevent damage to purifier. <br> SMALL EQUIPMENT |  |
|  | Bamboo-Wooden-Cane Utensils |  |
| 26 | Board | 13 |
|  | Chopping, 30 cm to 33 cm dia. 4 cm approx. |  |
| 27 | Board | 13 |
|  | Chopping, Oblong, $35 \mathrm{~cm} \times 22 \mathrm{~cm} \times 2.5 \mathrm{~cm}$ approx. |  |
| 28 | Cake Mould | 6 |
|  | small |  |
| 29 | Cake Mould | 6 |
|  | medium |  |
| 30 | Chopsticks | 23 |
|  | Bamboo |  |
| 31 | Chopsticks | 23 |
|  | Bamboo, extra long |  |
| 32 | Panstand | 24 |
| 33 | Pin | 13 |
|  | Rolling, Wooden, Chinese |  |
| 34 | Pin | 13 |
|  | Rolling, Wooden, Western |  |
| 35 | Spoon | 24 |
|  | Wooden, small |  |
| 36 | Steamer | 13 |
|  | Bamboo with cover, 14 cm dia. |  |
| 37 | Steamer | 6 |
|  | Bamboo with cover, 28-30 cm dia. |  |
| 38 | Tray | 3 |
|  | Service |  |
|  | Metal (aluminum, stainless steel etc.)/Plastic Utensils |  |
| 39 | Board | 13 |
|  | Chopping, Plastic, $18 \mathrm{~cm} \times 25 \mathrm{~cm}$ approx. |  |
| 40 | Board | 13 |
|  | Chopping, Plastic, $35 \mathrm{~cm} \times 20 \mathrm{~cm}$ approx. |  |
| 41 | Bowl | 24 |
|  | Washing-up, Plastic, 35 cm dia. approx. |  |
| 42 | Bucket | 7 |
|  | Plastic with lid, 10-13 litres |  |
| 43 | Colander | 13 |
|  | Plastic, Chinese |  |
| 44 | Colander | 13 |
|  | Stainless Steel |  |
| 45 | Container | 2 |
|  | Storage, Plastic, (set of 3) |  |
| 46 | Container | 3 |
|  | Stainless Steel for oil, 1-1.5 litres |  |
| 47 | Container | 13 |
|  | Cutlery, Plastic |  |
| 48 | Cutters | 12 |
|  | Pastry (set) - assorted sizes/shapes |  |
| 49 | Cutters | 12 |
|  | Pastry (set) - fluted/plain |  |
| 50 | Dish | 7 |
|  | Soap, Plastic |  |
| 51 | Dredger | 13 |
|  | Flour |  |
| 52 | Dust pan | 1 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 53 | with handle |  |
|  | Grater | 13 |
|  | combining 3 sizes of teeth |  |
| 54 | Jug | 2 |
|  | Water, Plastic, with cover |  |
| 55 | $\underline{\text { Kettle }}$ | 7 |
|  | Stainless steel, 2 litres to 4.5 litres |  |
| 56 | Ladle | 13 |
|  | Draining, Stainless Steel, 12.5 cm dia. approx. |  |
| 57 | $\underline{\text { Ladle }}$ | 2 |
|  | Soup, Stainless Steel, horizontal handle |  |
| 58 | $\underline{\text { Ladle }}$ | 6 |
|  | Soup, Stainless Steel, vertical handle |  |
| 59 | Ladle | 6 |
|  | Rice, Stainless Steel |  |
| 60 | Mould | 46 |
|  | Jelly, Plastic, small |  |
| 61 | Mould | 6 |
|  | Jelly, 0.5 litre |  |
| 62 | $\underline{\text { Pan }}$ | 13 |
|  | Stainless Steel, 1 litre, 12.5 cm dia. approx. |  |
| 63 | Pan | 12 |
|  | Stainless Steel, 1.7 litre, 15 cm dia. approx. |  |
| 64 | Pan | 12 |
|  | Stainless Steel, 2.5 litre, 18 cm dia. approx. |  |
| 65 | Pan | 12 |
|  | Stainless Steel, 3 litre, 20 cm dia |  |
| 66 | Pan | 7 |
|  | Milk, Non- stick/Stainless Steel, 12.5 cm dia. approx. |  |
| 67 | Pan | 1 |
|  | Stainless Steel, Heavy Quality Machine Base, 1 litre, 12.5 cm dia. approx. |  |
| 68 | Pan | 1 |
|  | Stainless Steel, Heavy Quality Machine Base, 2 litres, 15 cm dia. approx. |  |
| 69 | Pan | 1 |
|  | Stainless Steel, Heavy Quality Machine Base, 3 litres, 18 cm dia. approx. |  |
| 70 | Pan | 2 |
|  | Stainless Steel, Heavy Quality Machine Base, with basket for deep frying, 5.7 litres , 22 cm dia. approx. |  |
| 71 | Pan | 13 |
|  | Frying, Flat, good quality, $17 \mathrm{~cm} / 20 \mathrm{~cm}$ dia. approx. |  |
| 72 | Plate | 34 |
|  | Stainless Steel, 17 cm dia. approx. |  |
| 73 | Plate | 34 |
|  | Stainless Steel, 22 cm dia. approx. |  |
| 74 | Scale | 5 |
|  | Weighing, Electronic, for kitchen use, with maximum capacity of 2 kg , readability of 1 g , Battery or D.C. supply. |  |
| 75 | Scale | 3 |
|  | Weighing, Kitchen, 2 kg approx. |  |
| 76 | Scraper | 13 |
|  | Plastic |  |
| 77 | Sieve | 13 |
|  | with handle, 18 cm dia. approx. |  |
| 78 | Sink Tidy | 7 |
|  | Plastic |  |
| 79 | Slicer | 6 |
|  | Egg |  |
| 80 | Slice | 13 |
|  | Fish, Small |  |
| 81 | Spoon | 13 |
|  | Measuring (set of 3-4) |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 82 | Sprinkler | 2 |
|  | for laundry |  |
| 83 | Steamer | 6 |
|  | Stainless Steel (set of 3 \& cover), 30 cm dia. approx. |  |
| 84 | Strainer | 2 |
|  | Tea, with stand |  |
| 85 | Tin | 6 |
|  | Baking, Loaf |  |
| 86 | $\underline{\text { Tin }}$ | 12 |
|  | Baking, Oblong |  |
| 87 | $\underline{\text { Tin }}$ | 12 |
|  | Baking, Oblong, shallow, 28 cm x 18 cm approx. |  |
| 88 | $\underline{\text { Tin }}$ | 24 |
|  | Baking, Round, 17 cm approx. |  |
| 89 | Tin | 6 |
|  | Baking, Round, deep, 15 cm dia. approx. |  |
| 90 | $\underline{\text { Tin }}$ | 6 |
|  | Baking, Round, deep, 20 cm dia. approx. |  |
| 91 | $\underline{\text { Tin }}$ | 12 |
|  | Baking, Sheet |  |
| 92 | $\underline{\text { Tin }}$ | 24 |
|  | Baking, 6/9 holes, medium |  |
| 93 | $\underline{\text { Tin }}$ | 12 |
|  | Baking, 12 holes, small |  |
| 94 | $\underline{\text { Tin }}$ | 24 |
|  | Baking, 12 holes, medium |  |
| 95 | Tin | 6 |
|  | Baking, Square, shallow, $20 \mathrm{~cm} \times 20 \mathrm{~cm}$ approx. |  |
| 96 | Tray | 12 |
|  | aluminum, oblong, $28 \mathrm{~cm} \times 21 \mathrm{~cm}$ approx. |  |
| 97 | Tray | 18 |
|  | aluminum, small, $35 \mathrm{~cm} \times 25 \mathrm{~cm}$ approx. |  |
| 98 | Tray | 13 |
|  | aluminum, medium, $45 \mathrm{~cm} \times 33 \mathrm{~cm}$ approx. |  |
| 99 | Tray | 13 |
|  | aluminum, large, 48 cm x 38 cm approx. |  |
| 100 | Tray | 25 |
|  | Cooling, Wire |  |
| 101 | Tripod | 13 |
|  | for steaming |  |
| 102 | Turntable | 2 |
|  | cake |  |
| 103 | Whisk | 13 |
|  | Egg, Spiral |  |
| 104 | Whisk | 4 |
|  | Egg, Rotary |  |
| 105 | Wok | 13 |
|  | Stainless Steel, $33 \mathrm{~cm} / 35 \mathrm{~cm}$ dia. |  |
| 106 | Wok Chaan | 13 |
|  | Stainless Steel, with wooden handle |  |
| 107 | Wok Cover | 13 |
|  | aluminum/ Stainless Steel, $30 \mathrm{~cm} / 32.5 \mathrm{~cm}$ dia. approx. (N.B. All pans, kettles etc. should have non-conductive handles) Brushes |  |
| 108 | Broom | 1 |
|  | Sweeping |  |
| 109 | Brush | 2 |
|  | Clothes |  |
| 110 | Brush | 13 |
|  | Nail, Plastic, single-sided |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 111 | Brush | 26 |
|  | Pastry |  |
| 112 | Brush | 13 |
|  | Scrubbing, 15 cm length |  |
| 113 | Brush | 25 |
|  | Vegetable |  |
| 114 | Mop | 1 |
|  | Floor, complete with handle |  |
|  | China and Glasswarel |  |
| 115 | Basin | 13 |
|  | Pudding, 0.5 litre |  |
| 116 | Bottle | 12 |
|  | Soya Sauce, small |  |
| 117 | Bottle | 6 |
|  | Soya Sauce, large |  |
| 118 | Bowl | 13 |
|  | Mixing, 23 cm dia. approx. |  |
| 119 | Bowl | 13 |
|  | Mixing, 26 cm dia. approx. |  |
| 120 | Bowl | 38 |
|  | Utility, 11 cm dia. approx. |  |
| 121 | Bowl | 38 |
|  | Utility, 15 cm dia. approx. |  |
| 122 | Casserole | 13 |
|  | with Lid, Heatproof Glass, round, 0.5 litre |  |
| 123 | Casserole | 13 |
|  | with Lid, Heatproof Glass, round, 1 litre |  |
| 124 | Chinese Pattern, Chinaware (Plain/Rice): |  |
|  | (a) Bowl, Tea | 24 |
|  | (b) Bowl, small, 9 cm dia. approx. | 24 |
|  | (c) Bowl, large, 11 cm dia. approx. | 24 |
|  | (d) Dish, 7 cm dia. approx. | 24 |
|  | (e) Dish, Bone, 9 cm dia. approx. | 24 |
|  | (f) Dish, 9 cm dia. approx. (for soya sauce) | 6 |
|  | (g) Dish, 13 cm dia. approx. | 24 |
|  | (h) Plate, 18 cm dia. approx. | 12 |
|  | (i) Plate, 23 cm dia. approx. | 12 |
|  | (j) Plate, Oval, 20 cm long approx. | 6 |
|  | (k) Serving Bowl, deep, 15 cm dia. approx. | 6 |
|  | (1) Serving Bowl, shallow, 16 cm dia. approx. | 12 |
|  | (m) Spoon, Serving | 6 |
|  | (n) Spoon, Soup, small | 24 |
| 125 | Coloured Glazed Earthenware/Chinaware |  |
|  | (a) Basin, Sugar | 3 |
|  | (b) Jug, Milk | 3 |
|  | (c) Pot, Coffee, 0.8 litre approx. | 2 |
|  | (d) Pot, Tea, 0.4 litre approx. | 1 |
|  | (e) Pot, Tea, 0.7 litre approx. | 1 |
|  | (f) Pot, Hot water | 2 |
|  | (g) Cup, Tea, with Saucer | 24 |
|  | (h) Plate, 18 cm dia. approx. | 24 |
|  | (i) Plate, 23 cm dia. approx. | 12 |
|  | (j) Plate, 25 cm dia. approx. | 12 |
| 126 | Container | 6 |
|  | Oil with lid |  |
| 127 | Dinner Set | 1 |
|  | for 6 persons, Chinese style |  |
| 128 | Dish | 6 |
|  | Pie, Heatproof Glass, 0.25 litre |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 129 | Dish | 6 |
|  | Pie, Heatproof Glass, 0.5 litre |  |
| 130 | Dish | 12 |
|  | Pie, Oblong/Oval, 0.5 litre |  |
| 131 | Dish | 24 |
|  | Souffle, 0.25 litre |  |
| 132 | Glass Cookware |  |
|  | heatproof |  |
|  | (a) saucepan, small 1.5 litres | 1 |
|  | (b) saucepan, medium, 2.5 litres | 1 |
|  | (c) saucepan, large, 3.5 litres | 1 |
| 133 | Jug | 26 |
|  | Measuring, heatproof glass, 300 ml |  |
| 134 | Jug | 8 |
|  | Measuring, heatproof glass, 600 ml |  |
| 135 | Jug | 4 |
|  | Measuring, heatproof glass, 1 litre |  |
| 136 | Jar | 8 |
|  | Storage, Glass, with black plastic lid, 2-3 kg |  |
| 137 | Jar | 18 |
|  | Storage, Glass, small with black plastic lid |  |
| 138 | Mould | 28 |
|  | heatproof glass |  |
| 139 | Shaker | 6 |
|  | Pepper, Glass, |  |
| 140 | Spoon | 24 |
|  | Chinese, White Porcelain, small |  |
| 141 | Squeezer | 4 |
|  | Lemon, Glass |  |
| 142 | Tea Set | 1 |
|  | for 6 persons, Western |  |
| 143 | Tumbler | 24 |
|  | Glass |  |
|  | Cutlery and Bladed Tools |  |
| 144 | Chopper | 23 |
|  | Meat, 22 cm blade, 7 cm narrow end approx. |  |
| 145 | Chopsticks | 23 |
|  | Plastic (table use) |  |
| $\begin{aligned} & 146 \\ & 147 \end{aligned}$ | Fork | 26 |
|  | $\underline{\text { Knife }}$ | 4 |
|  | Bread |  |
| 148 | $\underline{\text { Knife }}$ | 23 |
|  | Kitchen, Cook's, 18 cm blade approx. |  |
| 149 | $\underline{\text { Knife }}$ | 23 |
|  | Kitchen, Paring, with or without serrated edge, $7.5 \mathrm{~cm} / 10 \mathrm{~cm}$ blade approx. |  |
| 150 | $\underline{\text { Knife }}$ | 13 |
|  | Kitchen, Utility, $13 \mathrm{~cm} / 18 \mathrm{~cm}$ blade |  |
| 151 | Knife | 13 |
|  | Palette, small |  |
| 152 | $\underline{\text { Knife }}$ | 13 |
|  | Palette, large |  |
| 153 | Knife | 26 |
|  | Round Ended, steel handle |  |
| 154 | Knife | 1 |
|  | Sharpener |  |
| 155 | One Set of Cutlery |  |
|  | for serving 6 persons as follows : |  |
|  | (a) Fork, Table (this includes 2 extra for serving) | 8 |
|  | (b) Fork, Dessert | 6 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 156 | (c) Knife, Table | 6 |
|  | (d) Knife, Dessert | 6 |
|  | (e) Spoon, Table (For serving) | 4 |
|  | (f) Spoon, Dessert | 6 |
|  | (g) Spoon, Soup | 6 |
|  | (h) Spoon, Tea | 6 |
|  | Opener | 6 |
|  | Tin |  |
| 157 | Scissors | 13 |
|  | Kitchen |  |
| 158 | Spoon | 25 |
|  | Dessert |  |
| 159 | Spoon | 25 |
|  | Table |  |
| 160 | Spoon | 25 |
|  | Tea |  |
| 161 | Vegetable Peeler | 13 |
|  | Miscellaneous - Cloths, etc. |  |
| 162 | Cloth | 38 |
|  | Dish-net |  |
| 163 | Cloth | 8 |
|  | Glass, Linen, $50 \mathrm{~cm} \times 75 \mathrm{~cm}$ approx. |  |
| 164 | Cloth/Gloves | 13 |
|  | Oven |  |
| 165 | Cloth | 32 |
|  | Kitchen |  |
| 166 | Cloth | 6 |
|  | Table, Plastic |  |
| 167 | Duster | 6 |
|  | Yellow |  |
| 168 | Furnishing Fabric | 1 |
|  | for curtain, laundry equipment, sewing machines, including making |  |
| 169 | Towel | 14 |
|  | Hand, $55 \mathrm{~cm} \times 38 \mathrm{~cm}$ approx. |  |
|  | Total Cost for Hm Econ Rm I | 196,700 |

Note: Items $116,117,126,137$ and 139 above are intended for use with Item 97 (Tray), making 6 sets. The tray contains two small soya sauce bottles, one large soya sauce bottle, one oil container, three storage jars and one pepper shaker.

## Reference List of Furniture and Equipment

for Secondary School

Subject : Home Economics (Room II)

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | FURNITURE |  |
| 1 | First-aid Cabinet | 1 |
| 2 | Student Chair | 37 |
| 3 | Teacher Chair | 1 |
| 4 | Stool | 8 |
| 5 | Teacher Desk | 2 |
| 6 | Needlework Table | 6 |
|  | EQUIPMENT <br> Appliances - Electrical |  |
| 7 | Microcomputer workstation | 1 |
| 8 | Printer or printer cum scanner (small) | 1 |
| 9 | Iron | 4 |
|  | steam with thermostat, loading of $1,200 \mathrm{~W}$ or above. |  |
| 10 | Machine, Sewing | 1 |
|  | Interlock, Domestic, portable, sews with 3-4 threads, power driven with a safety switch |  |
| 11 | Machine, Sewing | 10 |
|  | power driven, portable with hard carrying case, finger guide/needle guard |  |
| 12 | Machine, Sewing* | 1 |
|  | Computerised, power driven, portable with hard carrying case, finger guide/needle guard, built-in light and LCD display screen MISCELLANEOUS |  |
| 13 | Board |  |
|  | Ironing, metal : |  |
|  | (a) Sleeve | 6 |
|  | (b) Standard | 6 |
| 14 | Dress Form | 1 |
|  | ladies' version, small dress size, (small petite to size 8 ), full/round shoulders, foam back fabric/nylon cover, stainless steel support stand with adjustable height. |  |
| 15 | Dress Form | 1 |
|  | ladies' version, medium dress size, (size 10 to size 14), full/round shoulders, foam back fabric/nylon cover, stainless steel support stand with adjustable height. |  |
| 16 | Dress Form | 1 |
|  | men's version, small or medium dress size, full/round shoulders, foam back fabric/nylon cover, stainless steel support stand with adjustable height. |  |
| 17 | Microscope, binocular | 2 |
|  | Eyepieces : pairs of 10x, 15 x <br> Objectives : 4x, 10x, 40x, 100x onquadruple revolving nosepiece with click stop. <br> Focus control : Coarse and fine adjustments, with safety stop. <br> Stage : Rectangular stage surface with built-in graduated mechanical stage. <br> Condenser : Abbe condenser and Iris diaphragm with filter tray. <br> Illumination : Built-in low voltage illuminator with adjustable brightness <br> Supplied with dust cover, eyepiece dust cap, cabinet with lock and key. <br> SMALL EQUIPMENT |  |
| 18 | Awl | 7 |
| 19 | Broom | 1 |
|  | sweeping |  |
| 20 | Counting Glass | 12 |
| 21 | Dressmaking Ruler |  |
|  | (a) French Curves | 24 |
|  | (b) Metre Sticks | 24 |
|  | (c) Set Squares | 12 |
| 22 | Equipment for Experiments : |  |
|  | (a) Beaker, heatproof, 50 ml | 13 |
|  | (b) Beaker, heatproof, 100 ml | 13 |
|  | (c) Beaker, heatproof, 250 ml | 13 |
|  | (d) Bench mat | 2 |
|  | (e) Boiling tube, heatproof, $10-12 \mathrm{~cm}$ long, 150 ml | 26 |
|  | (f) Bunsen burner with tubing | 2 |
|  | (g) Cylinder, measuring, 10 ml | 13 |
|  | (h) Cylinder, measuring, 25 ml | 13 |
|  | (i) Cylinder, measuring, 50 ml | 26 |
|  | (j) Flask, heatproof, 50 ml | 7 |



## Reference List of Furniture and Equipmen

for Secondary School

Subject: Science (S1-3)

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | (A) Equipment (Items 1-167) |  |
|  | Ammeter | 24 |
|  | 0-2.5 A for d.c. measurements only. Accuracy $\pm 2 \%$ at f.s.d. Scale 50 mm long, is set at a convenient reading angle in plastic case 100 x $90 \times 100$ (height) mm. With a pair of colour-coded 4 mm socket terminals and zero adjustment. |  |
| 2 | Balance, compression | 1 |
|  | Light-duty, with a clearly marked dial, protected by a strong plastic lens. Circular scale, 100 mm diameter or over. <br> Capacity : $1,000 \times 5 \mathrm{~g}$ <br> Dimension : Overall (excluding pan) <br> about $150 \times 130 \times 160 \mathrm{~mm}$ (length x width x height) <br> Pan: About $300 \times 200 \times 25 \mathrm{~mm}$ (length x width x height) |  |
| 3 | Balance, electronic | 10 |
|  | Readibility 0.01 g . Electronic, capacity 200 g . Taring range 100 g or above. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. |  |
| 4 | Balance, lever | 1 |
|  | Single pan, with two ranges reading $0-250 \mathrm{~g} \mathrm{x} 1 \mathrm{~g}$ and $0-1,000 \mathrm{gx} 10 \mathrm{~g}$. |  |
| 5 | Balance, spring | 10 |
|  | Measurement range: $0-10 \mathrm{~N} \times 0.1 \mathrm{~N}$. In flat form metal case with zero adjustment, suspension ring and load hook, calibrated in newton. |  |
| 6 | Balance, triple beam | 1 |
|  | Single pan (stainless steel, diameter 150 mm ), low form balance. Comprising 3 notched weighting beams with centre-indicating sliding masses. Beam graduated $0-500 \mathrm{~g} \mathrm{x} 100 \mathrm{~g}, 0-100 \mathrm{~g} \mathrm{x} 10 \mathrm{~g}$, and $0-10 \mathrm{gx} 0.1 \mathrm{~g}$. Capacity about 2.5 kg . Sensitivity 0.1 g with supplementary masses $2 \times 1,000 \mathrm{~g}, 1 \times 500 \mathrm{~g}$. |  |
| 7 | Balloon puck | 10 |
|  | To study layer of air reducing friction. A square piece of plastic sheet of side 100 mm , with a hole drilled through the centre of the sheet and a rubber bung. The rubber bung is fixed firmly on a plastic holder. Balloons are provided. |  |
| 8 | Bar and gauge | 2 sets |
|  | For illustrating expansion by heating and contraction by cooling. Comprising a steel/iron bar approximately $110 \times 12 \mathrm{~mm}$ (length x diameter), mounted at its point on a support rod fitted with a wooden handle; overall length approximately 200 mm . The gauge sliding fit over ends of bar and with a hole of bore diameter same as that of bar. |  |
| 9 | Barrier tape ${ }^{\text {® }}$ | 8 rolls |
|  | PVC tape, non-adhesive backing, for highlighting hazard/restricted areas, $50 \mathrm{~mm} \times 3 \mathrm{~m}$. |  |
| 10 | Basin, evaporating ${ }^{\text {® }}$ | 20 |
|  | Porcelain, round bottom, shallow form, with spout, glazed, capacity $75 \mathrm{ml}, 80 \mathrm{~mm} \times 30 \mathrm{~mm}$ (diameter x depth). |  |
| 11 | Beaker |  |
|  | Squat form with spout, with two or more graduation marks showing approximate capacities. |  |
|  | (a) Pyrex or equivalent, $50 \mathrm{ml}{ }^{\circledR}$ | 40 |
|  | (b) Pyrex or equivalent, $100 \mathrm{ml}^{\text {® }}$ | 40 |
|  | (c) Pyrex or equivalent, $250 \mathrm{ml}{ }^{\text {® }}$ | 40 |
|  | (d) Pyrex or equivalent, $500 \mathrm{ml}{ }^{\text {® }}$ | 20 |
|  | (e) Polypropylene, graduated, 100 ml | 20 |
|  | (f) Polypropylene, graduated, 250 ml | 20 |
| 12 | Bell jar | 4 |
|  | Socket top, without stopper or stopcock, approximately $300 \times 200 \mathrm{~mm}$ (height x diameter). |  |
| \# 13 | Bench mat | 20 |
|  | Make of glass reinforced cement, asbestos free, about $300 \times 300 \mathrm{~mm}, 4.5 \mathrm{~mm}$ thick. |  |
| 14 | Bicycle dynamo assembly | 5 |
|  | Bicycle dynamo mounted on wooden base and provided with two sets of gears driven by hand crank. Two 4 mm socket terminals are provided for the dynamo output, connected in parallel with an M.E.S. lamp holder and 2.5 V bulb. |  |
| 15 | Bimetallic strip (with handle) | 2 |
|  | For demonstrating the differential expansion of two metals by curvature produced on heating. Fitted with wooden handle. |  |
| 16 | Body Fat Meter | 1 |
|  | For measurement of body fat percentage and body fat mass. Measurement: Body fat in percentage and body fat mass in Kg . Power Source: DC battery Dimension: Compact design |  |
| 17 | Borer, cork | 1 set |
|  | Set of 6 from 4 to 10 mm . Plated metal. Cutting tube mounted with safety under-flange in shaped handle ensuring that operator cannot be injured by a dislodged tube. With rod for clearing borers. |  |
| 18 | Borer sharpener, cork | 1 |
|  | Plated metal cone with hinged cutter blade set in slot and metal handle. Circular shape of borer maintained by cone. Edge cut to correct angle by depressing blade using thumb pressure button and rotating borer. |  |
| 19 | Bottle, narrow mouth | 60 |
|  | With dust proof stopper, clear glass, 250 ml . |  |
| 20 | Bourdon gauge and footpump |  |
|  | (a) Bourdon gauge | 1 |
|  | For measurement of absolute gaseous pressure. This instrument comprises a circular gauge having an overall diameter of 106 mm and a depth of 40 mm . The dial reads 0 to 150 kPa actual pressure and the case has a clear perspex back so that the working parts may be seen. <br> (b) Footpump and adapter | 1 |
|  | For use with Bourdon gauge. This foot pump is a standard car pattern with an integral pressure gauge calibrated 0 to 0.4 MPa . With nonreturn valve and rubber hose to connect to Bourdon gauge. |  |
| 21 | Brain, human (anatomical model) | 1 |



| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | (a) Interscale demonstration meter <br> Sensitivity of 5 mA f.s.d. at d.c. 100 mV . <br> (b) Current and Voltage range scales <br> - d.c. current, range 2.5-0-2.5 mA <br> - d.c. current, range 0-100 mA <br> - d.c. current, range 0-1 A <br> - d.c. current, range 0-5 A <br> - d.c. current, range $0-5 \mathrm{~V}$ | 4 2 |
| 37 | Desiccator <br> Borosilicate glass, with knob cover and perforated disc. 200 mm top internal diameter, 190 mm disc diameter, 85 mm depth of disc below flange. | 1 |
| 38 | Digital blood pressure monitor <br> Automatic measurement. Digital display of systolic and diastolic blood pressure reading and heart rate Measurement range: <br> - Pressure $20-280 \mathrm{mmHg} \pm 3 \mathrm{mmHg}$ <br> - Pulse 40-200 beats/min $\pm 5 \%$ | 1 |
| 39 | Digital Camera for Microscope <br> Digital camera composed of colour CCD with eyepiece mount, USB connection, for use in colour photography and video, Windows / Mac / Linus compatible. | 1 |
| 40 | Dissecting board <br> Wooden board of approximately $550 \times 380 \mathrm{~mm}$, (length x width) made of selected timber so that awls can be pressed in without hammering. | 2 |
| 41 | Dissecting dish <br> White enamelled, steel, rounded corner supplied with white wax. Dimension about $300 \times 250 \times 45 \mathrm{~mm}$ (length x width x depth). | 10 |
| 42 | Dissecting instrument set <br> In box/plastic wallet, comprising : <br> - 1 pair of forceps, 130 mm straight, blunt ends <br> - 1 pair of forceps, 130 mm straight, pointed ends <br> - 2 needles, stainless steel in metal handle <br> - 1 pair of scissors, stainless steel, straight, with one blunt and one pointed ends, overall length about 110 mm <br> - 1 pair of scissors, stainless steel, straight, pointed, open shanks, overall length about 110 mm <br> - 1 scalpel blade holder, stainless steel. No. 3 or No. 4 <br> - 5 scalpel blades, length 38 mm <br> - 5 scalpel blades, length 45 mm <br> - 1 section lifter <br> - 1 seeker, stainless steel in metal handle | 2 sets |
| 43 | DNA double helix model At least 12 base pairs | 1 set |
| 44 | Drill, electrical band (pistol pattern) | 1 |
| ** | (For detailed specifications, please refer to footnote.) |  |
| 45 | Drill stand | 1 |
| 46 | Converts electric drill into a vertical drill press. <br> Drills, twist | 1 set |
|  | High speed steel, for use in electric drill, set of eight, 1.59 to 7.15 mm |  |
| 47 | Ear, human (anatomical model) <br> Inner ear opens to show semicircular canals and cochlea with stapes attached, which is removable. Incus and malleus are attached to tympanum, which is removable. Enlarged approximately 5 times. | 1 |
| 48 | Electric bell <br> With detachable 'snap-on' plastic cover and metal thread terminals. Dome gong diameter 70 mm approximately. For use on 3 to 8 V a.c./d.c. supplies. | 2 |
| 49 | Electric bell in vacuum <br> For use on pump plate to show that sound is not transmitted in a vacuum with fine coiled wire connections to terminals mounted in rubber bung sealing the bell jar. Diameter of the electric bell is about 100 mm . Operating on 3 to 8 V a.c./d.c. | 1 |
| 50 | Electromagnetic Radiation Meter <br> For measurement of electromagnetic radiation from low frequency electrical sources including TV sets, computers, photocopiers and outdoor power lines. The meter screen has 10 LED lights, each denoting a level of exposure from 1 to 24 milliGauss <br> Detection frequency: 20 to 1200 Hz <br> Display Range: 0 to 24 milliGauss <br> Power source: DC battery <br> Size: portable | 1 |
| 51 | Energy conversion kit <br> The kit comprises : <br> (a) 1 Motor / Generator unit <br> For use as a driving unit or dynamo in conjunction with other units, with a pulley approximately 15 mm diameter. Operates on 2 to 6 V d.c. <br> (b) 1 Switch unit <br> A double-pole, double-throw change-over switch with 3 pairs of 4 mm sockets labelled battery, motor and lamp respectively. <br> (c) 1 Lamp unit <br> Comprises three M.E.S. lamp-holders connected in parallel with two 4 mm sockets. Complete with three lamps $1.25 \mathrm{~V}, 0.25 \mathrm{~A}$. <br> (d) 1 Line shaft unit <br> For showing the conversion of electrical energy to potential energy and vice versa. Comprises an approximately 6 mm steel shaft with a pulley, 60 mm diameter approximately, the other end of the shaft overhangs the wooden base. <br> (e) 1 Flywheel unit <br> Comprises an iron/steel flywheel, approximately 100 mm diameter and 1 kg mass, with pulley, 40 mm approximately. <br> (f) 1 Steam engine unit <br> Superheated, double-action oscillating cylinder type operating on tablets of solid fuel. With safety valve, drain cock/overflow plug, whistle and flywheel with approximately 25 mm diameter pulley. Engine, with large capacity copper boiler, is of non-ferrous construction to avoid corrosion. Complete with fuel burner, supply of fuel tablets, spring driving belt and instructions. <br> (g) 1 Turbine/Pump unit <br> With pump chamber fitted with inlet and outlet tubes and impeller linked with pulley, 20 mm diameter approximately the transparent front cover, with ' 0 ' - ring seal, has integral inlet for use when pumping. A short length of tubing with tubing clip closes this inlet during turbine operation. <br> (h) 1 Head of water unit | 1 kit |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 52 | Comprises upturned standard base acting as reservoir and fitted with stand for supporting outlet tube from pump above reservoir and bar for holding inlet tube to pump in reservoir. <br> (i) 1 Storage battery unit <br> Glass jar, capacity approximately 250 ml with plastic screw cap, bearing externally two 4 mm socket terminals and supporting two lead plates. <br> (j) 1 Handwheel drive unit <br> The unit has a pulley of 70 mm diameter approximately with a handle, driving a smaller pulley of 20 mm diameter approximately through a plastic belt. The small driven pulley has another large pulley of 70 mm diameter approximately on the outer end of its shaft, from which a belt drive may be taken to any other suitable unit. | 2 |
|  | Eye wash unit <br> Equipped with an eye wash bottle. With dust cap for eye bath and side tube for draining of contaminated water. The bottle is clipped into a moulded panel on which simple but complete instructions are printed. The panel has holes for wall hanging. |  |
| 53 | Eye, human (anatomical model) <br> Dissectible, showing the structure and position of the iris, pupil, lens, retina and optic nerve. Mounted on a pedestal or stand. Enlarged five times approximately. | 1 |
| 54 | Fibre optics kit <br> The kit contains the following components for building a fibre optic transmitter and receiver to demonstrate the transmission of radio signals through a fibre-optic link. <br> - 1 fibre optic receiver <br> - 1 fibre optic transmitter <br> - 5 m optic fibre <br> - 1 tuned circuit <br> - 1 radio receiver <br> - 1 power amplifier <br> - 2 battery connector <br> - 6 Alphalink, Central <br> - 1 Alphalink, Offset <br> - 14 mm stackable lead black, 10 cm <br> - 14 mm stackable lead red, 50 cm <br> - 14 mm stackable lead black, 50 cm <br> - 1 loudspeaker | 1 kit |
| 55 | Filter paper ${ }^{\text {® }}$ | 2 packs |
|  | 125 mm diameter, Whatman No. 1, pack of 100. |  |
| 56 | Flask |  |
|  | Pyrex or equivalent |  |
|  | (a) Round bottom, 250 ml | 20 |
|  | (b) Conical, 100 ml | 20 |
|  | (c) Conical, 250 ml | 20 |
| 57 | Fleming's apparatus set | 1 set |
|  | To show that force can be produced by a magnet on a wire carrying an electric current. Metal roller, moving along two parallel non-magnetic rails carrying terminal sockets. Rails supported about 16 mm apart on transparent box channel. For supplies up to 6V, 3A dc. Supplied with steel magnet yoke and the associated magnets. |  |
| 58 | Forceps |  |
|  | Stainless steel, straight, length 130 mm . |  |
|  | (a) Blunt end | 20 |
|  | (b) Fine end | 20 |
| 59 | Funnel, filter |  |
|  | (a) Glass, 75 mm top diameter, 75 mm stem length. ${ }^{\text {© }}$ | 20 |
|  | (b) Polypropylene, 240 mm top diameter. | 4 |
| 60 | Funnel stand | 20 |
|  | Hard wood, single type. Dimension of base approximately $200 \times 100 \mathrm{~mm}$. Funnel holders are slotted for ease of funnel entry. |  |
| 61 | Galvanometer <br> $3.5-0-3.5 \mathrm{~mA}$, moving-coil type. With scale, 50 mm long with anti-parallax mirror, set at a convenient reading angle in plastic case, and with a pair of colour coded 4 mm socket terminals and zero adjustment. | 4 |
| 62 | G-clamp | 8 |
|  | Malleable iron, with ball-end steel screw and socket swivel head, enamelled finish, approximately 100 mm opening. Gas jar, with cover |  |
| 63 | With base and ground top flange, glass, $200 \times 50 \mathrm{~mm}$ (height x diameter), with circular glass cover, ground one side, 75 mm diameter. | 40 |
| 64 | Glass block, rectangular | 20 |
|  | For refraction experiments, size $114 \times 63 \times 19 \mathrm{~mm}$ approximately. |  |
| 65 | Glass rod ${ }^{\text {® }}$ | 1 kg |
|  | Soda lime glass, in length of about $1.5 \mathrm{~m}, 6 \mathrm{~mm}$ diameter. |  |
| 66 | Gloves |  |
|  | (a) Animal handling, leather type with cuffs that reach to the upper arm. <br> (b) Chemical resistant, for handling acids, alkalis and common organic solvents, long cuff, with special finishing for excellent wet grip. ${ }^{@}$ <br> (c) Heat / Cold resistant, made of non-flammable non-asbestos material, with low thermal conductivity, high strength and high abrasion resistance gives no dermatological problems; for furnace and hotplate work in the laboratory; gauntlet length. <br> (d) Surgical, lightweight disposable latex rubber gloves. Close fitting and with high finger sensitivity. ${ }^{@}$ Pack of 50 pairs. | 1 pair <br> 2 pairs <br> 1 pair <br> 4 packs |
| 67 | Hand lens | 20 |
|  | Magnification $\times 5$ to $\times 10$ with metal / plastic frame and handle. |  |
| 68 |  | 3 packs |
|  | Self-adhesive yellow labels $25 \times 25 \mathrm{~mm}$ printed with various black hazard symbols plus the appropriate hazard wording. Sheets of mixed symbols cover chemical hazards of toxic, harmful, corrosive, irritant, explosive, flammable and oxidizing. Pack of about 100 symbols each. Hose clip |  |
| 69 | For use on Bunsen burner tubing. | 100 |
| 70 | Hot air drier <br> A low noise hair drier suitable for rapid drying of laboratory glassware, chromatograms, etc. A detachable nozzle is provided and there is an adjustable heat/speed setting. For use on $220-240 \mathrm{~V}$ ac supply. | 1 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 71 | Infra-red detector | 2 |
|  | A phototransistor which responds to near infra-red light and to visible light. Enclosed in plastic case. Case has battery holder and 4 mm sockets for connection to 100 mA or 1 mA meter. The unit will supply a current of several mA when used with a 10 V d.c. supply. |  |
| 72 | Jar, specimen |  |
|  | Clear glass, cylindrical, with foot and grip stopper. |  |
|  | (a) $150 \times 50 \mathrm{~mm}$ (height x diameter) | 20 |
|  | (b) $250 \times 100 \mathrm{~mm}$ (height x diameter) | 20 |
| 73 | Kilowatt-hour meter | 1 |
|  | A 20 A domestic 'consumer unit', which is a watt-hour meter, is mounted on a wood baseboard, provided with a 13A switched socket and 0.5 m of mains cable. The meter can be read to the nearest 0.1 kW or 100 joules, and estimated to 50 joules. Alternatively, the number of revolutions of the rotating disc can be counted each minute, etc. |  |
| 74 | Kinetic motion (theory) model | 1 |
|  | Comprises : |  |
|  | A plastic tube approximately $30 \mathrm{~cm}^{2}$, height not less than 380 mm , terminated at upper end by loose-fitting cover and lower end by stretched rubber diaphragm. |  |
|  | - Two expanded polystyrene pistons. |  |
|  | - Metal spheres approximately 3 mm diameter. |  |
|  | - Vibrator unit : 4-6 V d.c. electric motor mounted on wood/plastic base, external connector through two 4 mm terminals.Vibrator unit 4-6 V d.c. electric motor |  |
| 75 | Lamp, desk/table | 20 |
| *** | (For detailed specifications, please refer to footnote.) |  |
| 76 | Lens, cylindrical |  |
|  | Clear glass with ground ends and optically worked faces. $50 \times 50 \mathrm{~mm}$. |  |
|  | (a) Plano-concave lens -17D | 10 |
|  | (b) Plano-convex lens +17D | 10 |
| 77 | Lens, spherical |  |
|  | 50 mm diameter |  |
|  | (a) Focal length 10 cm | 20 |
|  | (b) Focal length 20 cm | 20 |
| 78 | Lens holder | 40 |
|  | For lens of diameter 50 mm . |  |
| 80 | Magdeburg hemisphere | 1 |
|  | Plastic or casted iron, about 100 mm diameter. |  |
| 81 | Magnetic puck kit | 2 sets |
|  | For the investigation of linear and two-dimensional dynamics under conditions of negligible friction. Comprising two 25 mm circular magnetic pucks, 10 g polystyrene beads and a $300 \times 300 \times 40 \mathrm{~mm}$ (length x width x depth) transparent acrylic tank. |  |
| 82 | Mass hanger with slotted masses |  |
|  | (a) Hanger 100 g and 9 slotted weights of 100 g each. Slot designed to prevent masses sliding off hanger. | 20 sets |
|  | (b) Hanger 500 g and 9 slotted weights of 500 g each. Slot designed to prevent masses sliding off hanger. | 2 sets |
| 83 | Materials kit | 1 |
|  | A variety of materials in the form of rectangular blocks intended to familiarise the student with the appearance, "feel", texture, hardness and density of a range of common substances. The kit comprises two of each of seventeen blocks as below: <br> Blocks, $50 \times 40 \times 30 \mathrm{~mm}$ |  |
|  | Softwood, hardwood, paraffin wax, aluminum, iron, foamed polystyrene. |  |
|  | - Blocks, $20 \times 20 \times 100 \mathrm{~mm}$ |  |
|  | Perspex, glass, slate, aluminum, softwood, marble. |  |
|  | - Blocks, other sizes |  |
|  | Lead $50 \times 50 \times 20 \mathrm{~mm}$, aluminum $50 \times 50 \times 80 \mathrm{~mm}$, hardwood $50 \times 50 \times 200 \mathrm{~mm}$, brass $20 \times 20 \times 50 \mathrm{~mm}$, iron $40 \times 40 \times 20 \mathrm{~mm}$. |  |
| 84 | Measuring tape | 1 |
|  | 2 m long. |  |
| 85 | Mechanical vice | 1 |
|  | Jaw opening to 65 mm . |  |
| 86 | Menstrual cycle model | 1 |
|  | Model depicts changes that take place in female reproductive system during the 28 -day cycle. Cross-section of uterus in four stages shows growth of ovum and ejection into the uterus and through Fallopian tubes. A dial relates changes in uterus to day in cycle. |  |
| 87 | Microscope, monocular | 10 |
|  | Vertical monocular body. Inclinable. Two eye-pieces : Huyghens $x 4$ (or x5) and x 10 (or x15). Four objectives : x5, x10 and x40 (or x45) on nosepiece. Coarse and fine adjustments, with limit stop. Abbe condenser NA 1.25 and iris diaphragm with filter tray. Built-in mechanical stage. Equipped with a halogen/tungsten or LED illuminator with intensity control fitted to base. Supplied with cabinet with lock and key. Microscope slide ${ }^{@}$ | 2 packs |
| 89 | Standard, non-corrosive, hard-glass, $76 \times 25 \mathrm{~mm}$ (length x width) and thickness not exceeding 1.2 mm . Pack of 100 . Microslides |  |
|  | (a) Cheek cell, human, W.M. | 2 |
|  | (b) Ileum, mammal, T.S., showing villi. | 2 |
|  | (c) Mammalian egg (Section of ovary with distinct mature eggs is acceptable as an alternative.) | 2 |
|  | (d) Mammalian sperm, W.M. | 2 |
| 90 | Mirror, plane | 20 sets |



| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 112 | Display range: approximately 0.7 to $6.5 \mathrm{~V} / \mathrm{m}$ Power source: DC battery Size: portable |  |
|  | Ray box kit |  |
|  | (a) Ray box | 20 |
|  | With triple slit aperture and 12 V 24 W line filament lamp and lamp holder. |  |
|  | (b) Cylindrical convex lens | 20 |
|  | Glass, focal length 75 mm , used in ray box. |  |
| 113 | Refrigerator | 1 |
| 114 | Reproductive system, human, female (anatomical model) | 1 |
|  | Model shows the features of female reproductive organs as shown in cross-section view of pelvic area. Ovaries, oviduct, uterus and vagina demonstrate organ of ovum to be fertilised. |  |
| 115 | Reproductive system, human, male (anatomical model) | 1 |
|  | Model shows the features of male reproductive organs as shown in models of pelvic area: postate gland, testicles and penis, demonstrating place of origin and discharge of sperm. |  |
| 116 | Respirator with filter cartridge |  |
|  | (a) Respirator | 1 |
|  | Moulded rubber body with anodised aluminum screw retainer. Fitted with two relief valves and an adjustable elastic band. |  |
|  | (b) Filter cartridge ${ }^{\text {e }}$ | 3 pairs |
|  | For use in presence of common organic vapours and acid gases. |  |
| 117 | Retort stand with bosshead and clamp. | 40 |
|  | '- Retort stand base : Iron with corrosion resistant finish, minimum size $160 \times 100 \mathrm{~mm}$. <br> - Stand rod : Cadmium plated mild steel/bright aluminum alloy. Approximately $500 \times 12 \mathrm{~mm}$ (length x diameter). <br> - Clamp : Enables articles from 2 to 90 mm diameter to be clamped securely. Design for the jaw ensures a firm grip at all angles of opening. The cork liners for the jaws are well secured. With 8 mm diameter rod suitable for use in bosshead. <br> - Bosshead : With offset jaws for rods up to 16 mm diameter. |  |
| 118 | Rheostats | 10 |
|  | Variable up to $20 \Omega$ at 4.5 A rating. Sliding contact, for use as series resistor or potentiometer. Open type with windings on an insulating, heat-resistance tube approximately $200 \times 40 \mathrm{~mm}$ (length x diameter), three 4 mm socket terminals and slotted end plates for screw mounting. For use at voltage up to 50 V . |  |
| 119 | Rubber teat ${ }^{\text {® }}$ | 6 dz . |
|  | For teat pipettes. |  |
| 120 | Ruler |  |
|  | Graduated at one edge, in cm and mm divisions, |  |
|  | (a) hardwood, 0.5 m | 20 |
|  | (b) hardwood, 1 m | 2 |
| 121 | Safety goggles | 1 |
|  | Splash-proof. With single replaceable wide-angle clear polycarbonate lens, indirectly ventilated, flexible clear PVC frame for all-round vision. Fitted with adjustable headband with retained ends. |  |
| 122 | Safety screen | 2 |
|  | Transparent polycarbonate, comprising central panel $610 \times 300 \times 3 \mathrm{~mm}$ (height x width x thickness) connected to outer panels $610 \times 230 \times$ 3 mm (height x width x thickness) on each side by full height hinges. |  |
| 123 | Safety spectacles ${ }^{\text {® }}$ | 90 |
|  | Constructed of polycarbonate, spectacle type with side shields giving all round protection. Top guard and lip prevents spillage into eyes. May be worn over prescription spectacles. |  |
| 124 | Scalpel | 20 |
|  | - Blade: stainless steel, length $35-45 \mathrm{~mm}$. |  |
|  | - Handle: nickel-plated, length $100-120 \mathrm{~mm}$. |  |
| 125 | Scissors, dissecting |  |
|  | Nickel plated steel/stainless steel |  |
|  | (a) Straight, fine points, open shanks. Overall length 110-120 mm. | 20 |
|  | (b) Straight, blunt ends, close shanks. Overall length 120-130 mm. | 20 |
| 126 | Screwdriver | 12 |
|  | Electrician's, with insulated handle, length of blades about 150 mm . |  |
| 127 | Seeker | 20 |
|  | Stainless steel in metal handle. Overall length $120-140 \mathrm{~mm}$. |  |
| 128 | Shield, face | 1 |
|  | With curved hard plastic visor which can be raised from the face when not required, with adjustable headband. |  |
| 129 | Signal generator with loudspeaker | 1 |
|  | (a) Signal generator, low impedance output |  |
|  | Frequency Range : |  |
|  | 10 Hz to 100 kHz in 5 decades and reads on linearly calibrated scale, with $\pm 2 \%$ accuracy. The frequency control should have slow motion reduction gear drive. |  |
|  | Output waveform: |  |
|  | Sinewave with less than $0.5 \%$ T.H.D. Square wave with 1:1 mark/space ratio. Triangular wave if available. |  |
|  | Output coupling : a.c. |  |
|  | Output power : |  |
|  | 2 W r.m.s. into 3 W with volume control additional 600 W output adjustable from 0 V to 10 V will be an advantage. |  |
|  | Power: |  |
|  | a.c. $220 \mathrm{~V}-240 \mathrm{~V}, 50 \pm 1 \mathrm{~Hz}$, single phase or a.c./d.c. with built-in a.c. adaptor. |  |
|  | (b) Loudspeaker unit |  |



| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 152 | Hardwood, 300 mm long, having 3 low-loss-bearing wheels and fitted spring-loaded impulse rod. Rod has three positions to provide different impulses and is triggered by a release pin. |  |
|  | Trough | 4 |
|  | Glass, $250 \times 125 \mathrm{~mm}$ (diameter x depth). |  |
| 153 | Tubing, Bunsen burner ${ }^{\text {® }}$ | 30 |
|  | Rubber, with indication of Approval Mark \& Expiry Date of Service Life on hose surface. About 9 mm internal bore, not more than 2 m length, for either town gas or liquefied petroleum gas depending on the supplied. |  |
| 154 | Tubing, glass ${ }^{\text {® }}$ |  |
|  | (a) Soda lime glass, in length of about 1.5 m . External diameter 5-6 mm. | 45 m |
|  | (b) Soda lime glass, in length of about 750 mm , diameter of about 40 mm , for water filtration columns. | 2 |
| 155 | Tubing, rubber ${ }^{\text {® }}$ |  |
|  | (a) Normal wall, $5 \times 1.5 \mathrm{~mm}$ (bore x wall thickness) | 20 |
|  | (b) Normal wall, $8 \times 1.5 \mathrm{~mm}$ (bore x wall thickness) | 20 |
| 156 | Tuning fork | 4 sets |
|  | Boxed set of 13, blue steel, from $\mathrm{C}(256)$ to $\mathrm{C}(512)$ with frequencies marked. |  |
| 157 | Ultra-violet lamp with cover | 1 |
|  | To demonstrate characteristics of U-V radiation. The UV lamp should be enclosed in a cylindrical metal lamphouse with an aperture in its side and a simple ventilation system in its upper end. The UV lamp is 6 W , E.S. cap. For operation on $220-240 \mathrm{~V}$ a.c., 50 Hz , single phase supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. |  |
| 158 | UV Index Meter | 1 |
|  | For measurement of UV index to provide information for accumulative UV exposure Response: 280 to 400 nm (UVA \& B) <br> Index range: 0 to 24 <br> Display: LCD <br> Power source: DC battery |  |
| 159 | UV Transmission Tester | 1 |
|  | For comparison of UV blocking capability of various materials including sunglasses and sun-block lotions, and for measurement of UV transmission for various materials including window film. <br> Response: 280 to 400 nm (UVA \& B) <br> Irradiance range: 0 to $100 \mathrm{~W} / \mathrm{m} 2$ <br> Display: LCD <br> Power source: DC battery |  |
| 160 | Vacuum flask | 2 |
|  | Domestic type with wide mouth for storing ice. Capacity about 1 litre. |  |
| 161 | Voltmeter | 24 |
|  | 0-5 V d.c. moving coil type for d.c. measurement only, accuracy $\pm 2 \%$ at f.s.d. Scale, 50 mm long with anti-parallax mirror, is set at a convenient reading angle in plastics case $100 \times 90 \times 100 \mathrm{~mm}$. With pair of colour-coded 4 mm socket terminals and zero adjuster. Resistance $1,000 \mathrm{~W} / \mathrm{V}$. |  |
| 162 | Wash bottle | 40 |
|  | White translucent, flexible, with screw cap and bent tube, polyethene, 250 ml capacity. |  |
| 163 | Watch glass |  |
|  | Thin glass, with ground edge, |  |
|  | (a) 50 mm diameter | 40 |
|  | (b) 100 mm diameter | 40 |
| 164 | White tiles | 10 |
| 165 | Wire gauze | 40 |
| \# | Ceramic centred, asbestos free, $150 \times 150 \mathrm{~mm}$. |  |
| 166 | Wire stripper | 2 |
|  | Adjustable for different wire or cable sizes, also serves as a wire cutter. |  |
| 167 | Worcester circuit board | 20 sets |
|  | A base-board with terminals, a set of metal connection pillars and a number of clip-on flexible connection strips and accessory units. Each board comprises: <br> 18 flash lamp bulbs $1.25 \mathrm{~V}, 0.25 \mathrm{~A}$ <br> 12 plain connectors <br> 1 connector with rheostat <br> 1 resistor <br> 2 flexible leads with 4 mm plug and crocodile clip <br> 1 rectifier <br> 2 flexible leads with crocodile clips <br> 2 crocodile clips <br> 2 mounted bell pushes <br> 2 soft iron nails, 50 mm , square head <br> 1 length bare copper wire 20 s.w.g. <br> 1 length bare Eureka wire 34 s.w.g. <br> 1 length plastic covered copper wire, 26 s.w.g. <br> 1 hardboard disc, drilled <br> 4 pencil leads <br> 1 piece copper foil <br> 1 piece steel wool <br> 9 connectors with lamp holders |  |
| 168 | Y-piece | 2 |
|  | $\begin{aligned} & \text { Glass, } 6 \mathrm{~mm} \text { bore. } \\ & \text { (B) Chemicals }{ }^{\text {(B) }} \end{aligned}$ |  |
| 169 | Protein test paper (bottle of 50) | 6 bottles |
| 170 | Aluminum foil | 250 g |
| 171 | Ammonia solution, 0.88 | 2.5 L |
| 172 | Anti-bumping stones | 100 g |
| 173 | Calcium carbonate, marble chips | 2 kg |
| 174 | Calcium carbonate, precipitated | 500 g |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 175 | Calcium chloride, anhydrous | 1 kg |
| 176 | Calcium hydroxide | 500 g |
| 177 | Calcium hypochlorite (benching powder) | 500 g |
| 178 | Calcium oxide | 1 kg |
| 179 | Calcium turnings | 250 g |
| 180 | Casein powder | 100 g |
| 181 | Charcoal, animal | 1 kg |
| 182 | Charcoal, wood, powder | 500 g |
| 183 | Charcoal block, 70 mm | 10 |
| 184 | Citric acid | 500 g |
| 185 | Clinistix (bottle of 50) | 6 bottles |
| 186 | Cobalt chloride paper | 10 books |
| 187 | Copper foil | 500 g |
| 188 | Copper wire, 22 s.w.g. | 250 g |
| 189 | Copper(II) nitrate | 500 g |
| 190 | Copper(II) oxide | 250 g |
| 191 | Copper(II) sulphate-5-water | 2 kg |
| 192 | Cresol red | 5 g |
| 193 | Crude oil | 500 ml |
| 194 | Dettol | 1 L |
| 195 | Ethanoic acid, glacial | 1 L |
| 196 | Ethanol, 95\% | 2.5 L |
| 197 | Ethyl ethanoate (ethyl acetate) | 0.5 L |
| 198 | Glucose | 100 g |
| 199 | Glycerol (Glycerine) | 250 ml |
| 200 | Hydrochloric acid | 2.5 L |
| 201 | Hydrogen peroxide, 20 volume | 500 ml |
| 202 | Iodine, resublimed | 250 g |
| 203 | Iron filings, coarse | 1 kg |
| 204 | Iron filings, fine clean | 1 kg |
| 205 | Iron wire, 30 s .w.g., reel of 28 g | 1 reel |
| 206 | Lead shot, 3 mm | 1 kg |
| 207 | Lead(II) oxide | 250 g |
| 208 | Litmus paper, blue | 10 books |
| 209 | Litmus paper, red | 10 books |
| 210 | Magnesium ribbon, reel of 25 g | 4 reels |
| 211 | Manganese(IV) oxide | 250 g |
| 212 | Methylene blue (alkaline) | 100 ml |
| 213 | Nickel-chromium wire, $20 \mathrm{~s} . \mathrm{w} . \mathrm{g}$. , reel of 125 g | 2 reels |
| 214 | Nickel-chromium wire, $32 \mathrm{~s} . \mathrm{w} . \mathrm{g}$., reel of 125 g | 2 reels |
| 215 | Nitric acid | 2.5 L |
| 216 | pH paper | 4 rolls |
| 217 | Potassium aluminum sulphate | 1 kg |
| 218 | Potassium chromate(VI) | 500 g |
| 219 | Potassium iodide | 500 g |
| $220 \dagger$ | Potassium manganate(VII) | 250 g |
| 221 | Potassium nitrate | 1 kg |
| 222 | Rocksil | 500 g |
| 223 | Soda lime, granules, non-hydroscopic | 500 g |
| 224 | Sodium carbonate, anhydrous, pure | 1 kg |
| 225 | Sodium chloride, fine | 2 kg |
| 226 | Sodium hydrogencarbonate | 500 g |
| 227 | Sodium hydroxide, pellets | 1 kg |
| 228 | Starch, soluble | 500 g |
| 229 | Stearic acid | 250 g |
| 230 | Sulphur, crushed | 1 kg |
| 231 | Sulphuric acid, conc. | 2.5 L |
| 232 | Thymol blue | 5 g |
| 233 | Tin foil | 250 g |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 234 | Universal indicator（ $\mathrm{pH} 3-11$ ） | 250 ml |
| 235 | Vaseline | 100 g |
| 236 | Wood splint bundles | 6 bundles |
| 237 | Zinc foil | 250 g |
| 238 | Zinc，granulated | 500 g |
|  | （C）Furniture for Science（S1－3）Laboratories |  |
| 239 | Box，first aid | 2 |
|  | Single door， $250 \mathrm{~mm} \times 170 \mathrm{~mm} \times 360 \mathrm{~mm}$（width $\times$ depth $\times$ height）． |  |
| 240 | Stool | 90 |
|  | Wooden or plastic seat，approx．dimensions of $300 \mathrm{~mm} \times 300 \mathrm{~mm}, 530 \mathrm{~mm}$ height |  |
| 241 | Movable bench | 10 |
|  | $1,525 \mathrm{~mm} \times 760 \mathrm{~mm} \times 840 \mathrm{~mm}$（length x width $\times$ height），with acid and heat resistant plastic laminate on top． |  |
| 242 | Blackout curtains | 2 sets |
|  | －flameproof，preshrunk，thick and light proof material <br> － 2 pieces for each window unit with rails rufflette tape and hooks to fit windows <br> （D）Storage cupboard and Trays for chemical wastes |  |
| 243 | Chemical Waste Storage Cupboard | 2 |
| $\dagger$ | Overall dimension 910 mm （W）x 460 mm （D）$\times 1830 \mathrm{~mm}$（H）Steel，double door，fitted with 3－point locking espagnolette bolt，controlled by 6－level lock with one adjustable shelf．With words＂CHEMICAL WASTES 化學廢物＂（not less than 60 mm in height）printed clearly and boldly in red on a white background on the left door． 4 ventilation holes on each side．Rust proof finish． |  |
| 244 | Stainless Steel Spill Catcher Tray | 6 |
| $\dagger$ | Overall dimension 380 mm （W）x 145 mm （D）$\times 380 \mathrm{~mm}$（H）． |  |
| 245 | Heavy－duty Plastic Spill Catcher Tray | 6 |
|  | Overall dimension 380 mm （W）x 362 （D）x 380 mm （H）． |  |
|  | Total Cost for Subject | 418，400 |

## Footnotes：

（a）Consumable item．
\＃－The asbestos－free requirement should be clearly specified when purchasing the item．As a safeguarding measure，schools may consider requesting suppliers to provide evidence（e．g．laboratory testing report）authenticating their products are free of asbestos －School may also consider using other alternatives e．g．stainless steel bench mat if suppliers fail to authenticate their products are free of asbestos．
\＃\＃－The asbestos－free requirement should be clearly specified when purchasing the item．As a safeguarding measure，schools may consider requesting suppliers to provide evidence（e．g．laboratory testing report）authenticating their products are free of asbestos．
－School may also consider using other alternatives e．g．wire gauze without the ceramic center if suppliers fail to authenticate their products are free of asbestos．
\＃\＃\＃－The asbestos－free requirement should be clearly specified when purchasing the item．As a safeguarding measure，schools may consider requesting suppliers to provide evidence（e．g．laboratory testing report）authenticating their products are free of asbestos．
＊Specifications of Centralized low voltage power supply unit
This equipment is designed to provide a source of low voltage a．c．or d．c．Power supplies simultaneously to distribution points with output controlled from the unit；for general use in school laboratories with provision for charging secondary batteries．A single phase a．c．supply is taken from an outlet with fused plug and is connected to the double pole isolator which disconnects the supply completely from all components immediately when the front panel is opened．From the isolator，power is taken through the input circuit breaker to the variable ratio auto－transformer．The input circuit is protected against both surge or steady overload by the input circuit breaker．Input current and voltage are indicated by the input ammeter and input voltmeter at the top of the front panel．The output from the variable ratio auto－transformer is taken to the primary of a fixed ratio，step down，double wound，main transformer．The secondary of this main transformer is taken to the rotary selector switch．To provide a．c．sources，the secondary output is fed via the output ammeter，output voltmeter and output circuit breaker to the output terminals．The output circuit breaker designed to withstand heavy current arcs safeguards the output circuit．To provide d．c． sources，the low voltage alternating current is fed into the selenium cell full wave bridge connected rectifier and then via the output meters and output circuit breaker to the output terminals．The d．c．output is unsmoothed and the polarity is indicated by terminal colour．All the measuring instruments are of the moving iron type．The input and output circuit breakers are both of the magnetic terminal release type and are adjusted to trip at 5 and 50 A respectively．For inspection purposes，the front panel is hinged at the bottom to allow it to be opened through 140 o ．The internal wiring is colour coded，with green for a．c．and red／black for d．c．When opening，the supply is automatically disconnected making the wiring＂dead＂and perfectly safe to touch．

## For laboratory use

The output from the unit is taken via a ring main circuit to at most 13 distribution points in the laboratory．The output voltage and／or current may be kept constant or varied by adjustment of the auto－transformer．

Maximum outputs are：
$0-14 \mathrm{~V}$ at 40 A a．c．or d．c．
$14-18 \mathrm{~V}$ at 32 A a．c．or d．c．

For battery charging，the cells should be connected in series with the positive and negative terminals connected to the output terminals of like polarity．The maximum number of 2 V cells that can be charged is 6 and the maximum charging current advised by the battery manufacturer should not be exceeded．The unit is rated at 580 VA ．Overall dimensions approximately $540 \times 310 \times 740 \mathrm{~mm}$（length x width x height）．For use on $220-240 \mathrm{~V}$ ， 50 Hz ，single phase，a．c． supplies．Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B．S．S．plug．
＊＊Specifications of Drill，electrical band（pistol pattern）
（a）General：
The drill offered shall be of the medium duty type．
（b）Capacity：
The drill shall have a capacity to drill holes in steel up to approximately 8 mm or in wood up to approximately 20 mm ．
（c）Dimensions \＆Requirements：
（i）The drill shall be fitted with a drill chuck of suitable size complete with adjustment key．
（ii）The drill shall be fitted with speed change by means of external gear box with speed change levers．
（iii）The drive motor shall be designed for a $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$ ，single phase，a．c．supply，shall be complete with an ON／biased OFF switch so as to cause minimum operator fatigue during long period of use．The related power shall be approximately 400 W ．
（iv）The drill shall be designed for variable speeds from 0 to 3400 r．p．m．at no load．Nine constant speeds may be selected from the variable speed control（a
useful feature when drilling brittle surfaces such as tiles or glass).
(v) The drive unit should have overload protection to help prevent motor burn-out and the unit is double-insulated.
(d) Construction:
(i) The drill shall be robustly constructed for laboratory use, with cast iron/steel drill head, gear box if fitted and motor mount.
(ii) All drill head power transmission components shall be accurately manufactured from high grade steel to ensure durability and drilling accuracy. All shafts shall be heavy duty ball and/or roller bearing mounted.
(e) Electrics:
(i) The electrical equipment fitted conform to the applicable British Standard Specifications, or shall be of equivalent quality and capacity.
(ii) The equipment shall be either (1) bonded to earth through 3 core supply cable fitted with 3 pin B.S.S. appropriately fused plug; or (2) properly double insulated, and with 2 core supply cable fitted with 3 pin B.S.S. appropriately fused plug.
(f) Maintainability:

The drill shall be designed for durability easy maintenance.

## *** Specifications of Lamp, desk/table

Single bulb type.
(a) General:
(i) The lamp shall be of modern design to give optimum illumination and good appearance.
(ii) It shall be suitable for use with lamp bulbs of up to 60 W .
(iii) A dimmer control is not required
(b) Construction:
(i) The stem between the base and the bulb holder and shade shall be of the flexible type
(ii) The lamp base, stem and shade should be of all metallic construction. The materials used shall be affected by atmospheric corrosion, or shall be suitably treated and/or painted for life protection against it and shall be of ample thickness to withstand heavy duty use and occasional accidents.
(iii) The lamp base shall be sufficiently heavy to ensure good stability.
(iv) The lamp shade shall be well ventilated.
(v) There shall be no external sharp edges, or any internally in way of the electric cable to the lamp holder
(vi) The ON/OFF switch should be located in the lamp base. A rotary type ON/OFF switch located at the rear of the lamp shade may be accepted. Pendent operated switches will not be accepted. See also clause (c) (iii) below.
(c) Electrics:
(i) All electrical components and cabling shall be designed for heavy duty usage and their quality should be equal to that designed to British Standard Specifications.
(ii) All electrical components and metallic parts of the lamp shall be bonded to earth by a soldered, or bolted, connection to the earth wire of a 3 core supply cable and 3 rectangular pin fused plug. The cable shall be grommetted at the point of entry to the base.
(iii) The ON/OFF switch shall be of the heavy duty type and will preferably have a spring assisted toggle action. The "ON" and "OFF" positions should be marked.
(iv) The lamp bulb fitted shall be designed for 220 V a.c.
(d) Finish:
(i) Any chromium-plated parts shall be of good quality.
(ii) All painted parts shall be finished with an abrasion resistant, durable, materials. The lamp shade finish material shall also be heat resistant and high gloss internally.
(iii) The lamp shade interior shall be white, or silver.
(e) Warranty:

The lamp shall be guaranteed against faulty material and workmanship for a period of 1 year from the date of acceptance.
$\dagger$ Potassium manganite (VII) is regarded as one of the controlled chemicals under the Control of Chemicals Ordinance. Schools wishing
to acquire potassium manganite (VII) for experimental purpose must apply for a Storage Approval from Customs and Excise
Department (Tel. 2541 4383). For more information about the controlled chemicals, please refer to the website
http://www.customs.gov.hk/en/trade_facilitation/chemicals/index.html
$\dagger$ The facilities for the storage of chemical wastes have already been included in the Chemistry Standard Equipment and Furniture List (Secondary 4-6).
Schools which do not offer Chemistry course, such as prevocational schools, special schools, etc., should acquire a set of these facilities for storing chemical wastes pending collection by the Chemical Wastes Treatment Centre for disposal.
It should be noted that each school should only acquire ONE set of these storage facilities.

## Reference List of Furniture and Equipment

for Secondary School
Subject : Computer Subject Room

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | COMPUTER EQUIPMENT ITEMS |  |
| 1 | Microcomputer workstation | 26 |
| 2 | Projection system with screen | 1 |
| 3 | Printer or printer cum scanner (small) | 2 |
| 4 | Web camera | 10 |
| 5 | Digital video camera | 10 |
| 6 | Diagnostic toolkit | 1 |
| 7 | Web page development tool <br> (for at least 21 concurrent users) | 1 |
| 8 | Graphics package | 1 |
|  | (for at least 21 concurrent users) |  |
| 9 | PDF Editor | 1 |
|  | FURNITURE \& EQUIPMENT ITEMS |  |
| 10 | Dehumidifier | 2 |
| 11 | Student chair | 20 |
| 12 | Teacher chair | 1 |
|  | Total Cost for Subject | 202,400 |

## Reference List of Furniture and Equipmen

for Secondary School
Subject : SS Biology

| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 1 | ABO simulated blood typing kit | This kit simulates the classic agglutination reaction for blood typing. Each kit contains at leas four blood samples (simulated or aseptic) and anti-sera A and B, and other accessories for performing at least 50 blood typing tests. Complete with notes and instructions. Preference will be given to kits which can be used to do the Rh typing as well. | 2 |
| 2 | Air pump, aquarium | Quiet running diaphragm type. Metal/tough plastic body with rubber/foam rubber base. Supplied with spare diaphragm. | 1 |
| 3 | Aquarium | Glass/Transparent plastics, $600 \times 300 \times 300 \mathrm{~mm}$ (length $\times$ width $\times$ depth). | 1 |
| 4 | Arm model (demonstration model) | Made of durable plastic to demonstrate muscular extension and flexion by moving the lower arm. The biceps and triceps are simulated with elastics attached to the base of the upper arm. | 1 |
| 5 | Awl | With wooden/plastic handle and stout steel spike, length about 50 mm . | 50 |
| 6 | Balance, electronic, capacity up to 110 g | Readability 0.1 mg , powered. | 1 |
| 7 | Balance, electronic, capacity up to 200g | Readability 0.1 g , powered. | 5 |
| 8 | Barrier tape | PVC tape, strong adhesive, ideal for highlighting hazard/restricted areas, $50 \mathrm{~mm} \times 3 \mathrm{~m}$. | 4 rolls |
| 9 | Beaker, 100 mL | Pyrex or equivalent, squat form with spout, with two or more graduation marks showing approximate capacities. | 20 |
| 10 | Beaker, 250 mL | Pyrex or equivalent, squat form with spout, with two or more graduation marks showing approximate capacities. | 30 |
| 11 | Beaker, 500 mL | Pyrex or equivalent, squat form with spout, with two or more graduation marks showing approximate capacities. | 30 |
| 12 | Beaker, 1000 mL | Pyrex or equivalent, squat form with spout, with two or more graduation marks showing approximate capacities. | 2 |
| 13 | Bell jar | Moulded glass, socket top, $300 \times 200 \mathrm{~mm}$ (height x internal diameter). | 2 |
| 14 | Bell jar model (demonstration model) | An easy-to-use model to demonstrate the role of diaphragmatic contraction in causing the lung to inflate. Complete with a transparent heavy-duty plastic bell jar (about $200 \mathrm{~mm} \times 200 \mathrm{~mm}$ ), a metal Y-tube, 2 balloons and a rubber 'diaphragm' with hand grip. | 1 |
| 15 | Bench mat | Make of glass reinforced cement, asbestos free, $300 \times 300 \mathrm{~mm}, 4.5 \mathrm{~mm}$ thick. | 15 |
| 16 | Blender | A domestic blender for blending biological materials into fine suspensions. Motor housed in a heavy metal/plastic case with rubber feet/pad. Supplied with grinding mill for dry grinding of peas and beans into fine particles. | 1 |
| 17 | Bone cutter forceps | Nickel-plated carbon steel/stainless steel with spring handles and closing clip, blade length 20 -40 mm . | 1 |
| 18 | Bottle stand | Wooden with six holes for 60 mL dropping bottles. | 12 |
| 19 | Bottle, dropping | A three-piece pipette section comprising a stout glass dropper, high-density polythene stopper with dust-proof head and vinyl teat, fitted to a reagent bottle. Capacity 60 mL . | 40 |
| 20 | Bottle, narrow mouth (a) 100 mL | Clear glass, with dust-proof stopper. | 20 |
| 21 | Bottle, narrow mouth (b) 250 mL | Clear glass, with dust-proof stopper. | 40 |
| 22 | Bottle, narrow mouth (c) 500 mL | Clear glass, with dust-proof stopper. | 20 |
| 23 | Bottle, wide mouth | Clear glass, with dust-proof stopper. Capacity 250 mL . | 20 |
| 24 | Brain, human (anatomical model) | Life size or slightly larger than life size, detachable parts, made of durable plastics, mounted on stand/base. Complete with key card. | 1 |
| 25 | Brown mount) alga, thalloid (demonstration | Demonstration mount of Laminaria (or any other thalloid brown alga) showing small entire plant complete with holdfast, mounted on plastic slip in screw capped jar. | 1 |
| 26 | Burette | With teflon stopcock, 50 mL with 0.1 mL graduations. | 10 |
| 27 | Burette clamp | Fitting all retort stand rod up to 13 mm diameter. Comprises strong light weight metal frame with spring grips covered with replaceable rubber to give a safe and firm grip. | 10 |
| 28 | Burner, Bunsen | For *town gas/liquefied petroleum gas/natural gas supply. Nickel-plated burner tube with rotatable air regulator and tapering, riffled connector, mounted on an enamelled pressed-steel base. Burner tube $100 \times 13 \mathrm{~mm}$ (height x diameter), base 80 mm diameter, connector 10 mm mean outer diameter. *Schools should specify the type of gas supply used in their laboratories and delete whichever is inapplicable. | 14 |
| 29 | Bunsen burner tubing | Rubber, with indication of Approval Mark \& Expiry Date of Service Life on hose surface. About 9 mm internal bore, not more than 2 m length, for either town gas or liquefied petroleum gas depending on the supplied. | 20 |
| 30 | Cell (model) | Three dimensional, made of durable plastics. Showing the following main cell organelles nucleus, endoplasmic reticulum, mitochondria, ribosomes, Golgi apparatus and centriole. On a stand with base. Height of model not less than 200 mm . | 1 |
| 31 | Cell to embryo model | For the study of the menstrual cycle, fertilisation and formation of the embryo. Enlarged sections to show cross-section of ovary emitting ovum into uterus and into path of sperm, ovum being fertilised, initial cell division, and beginning shape of human embryo. | 1 |
| 32 | Centrifuge | Single speed bench centrifuge for general purpose. The centrifuge is driven by a quiet running single speed motor, speed 2,500 r.p.m. and is controlled by a biased off rotary switch. With four-place swing-out head for $100 \times 16 \mathrm{~mm}$ test tubes. Lid with safety interlock to prevent the motor being started unless the lid is properly closed. Housed in a robust sheet metal case with rubber feet. Timer is not required. Supplied with 4 plastic adaptors for $75 \times 10 \mathrm{~mm}$ test tubes. | 1 |
| 33 | Chart, Ishihara | For testing colour blindness. | 5 |
| 34 | Chromatography paper | Whatman Grade No. 1 (CHR), width 20 mm . In roll of 100 m . | 1 roll |
| 35 | Clinostat | For demonstration of phototropism and geotropism. About 100 mm diameter, cork table rotated by an electric motor at 4 revolutions per hour, provided with plastic cover and adjustable to any angle from vertical to horizontal. Mounted on heavy base case. Supplied with or without plant pot holder. | 2 |
| 36 | Clip, Hoffman | Plated metal, with clamp screw and hinged bottom plate, width between bars 20 mm . | 30 |
| 37 | Clip, Hose | For use on Bunsen burner tubing. | 30 |
| 38 | Clip, Mohr | Plated metal, maximum diameter of tubing accepted 15 mm . | 30 |
| 39 | Cork | Tapered, assorted sizes, pack of 144. | 1 pack |
| 40 | Cork borer | Set of 6 from 4 to 10 mm . Plated metal. Cutting tube mounted with safety underflange in shaped handle ensuring that operator cannot be injured by a dislodged tube. With rod for clearing borers. | 5 sets |
| 41 | Cork borer sharpener | Plated metal cone with hinged cutter blade set in slot and metal handle. Circular shape of borer maintained by cone. Edge cut to correct angle by depressing blade using thumb pressure button and rotating borer. | 1 |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 42 | Counting cell | A transparent plastic slide with central cell $50 \times 20 \times 1 \mathrm{~mm}$ ruled in 1 mm squares, with cover glass to contain 1 mL of liquid. For use in water analysis and particle analysis. | 20 |
| 43 | Cover glass | Square glass cover slip for microscope slides. Size 18 mm square. Thickness $0.13-0.16 \mathrm{~mm}$. In box of 100 . | 2 boxes |
| 44 | Cylinder, graduated, glass / plastics, with spout, (a) 10 mL |  | 20 |
| 45 | Cylinder, graduated, glass / plastics, with spout, (b) 25 mL |  | 20 |
| 46 | Cylinder, graduated, glass / <br> plastics, with spout, (c) 100 mL |  | 20 |
| 47 | Cylinder, graduated, glass / plastics, with spout, (d) 250 mL |  | 2 |
| 48 | Data logger interface | Hardware <br> The interface can log data from appropriate sensors by connecting to a microcomputer workstation / tablet through a common communication port (such as USB) and to a tablet device through a wireless connection (such as Bluetooth). <br> Software <br> Runs on operating system for microcomputer workstation / tablets; displays and analyses data in the forms of digits, meter, graph and table. | 5 5 |
| 49 | (a) Data logger sensor, carbon dioxide | For measuring carbon dioxide gas concentration in open or closed system. The sensor should be fully compatible with the interface above. | 5 |
| 50 | (b) Data logger sensor, colorimeter | For measuring transmittance ( $30 \%-90 \%$ ) of light ( $400-700 \mathrm{~nm}$ ) through a solution, with cuvettes and caps. The sensor should be fully compatible with the interface above. | 5 |
| 51 | (c) Data logger sensor, conductivity | For measuring conductivity ( $0-20,000 \mu \mathrm{H} / \mathrm{cm}$ ) in aqueous solutions. | 5 |
| 52 | (d) Data logger sensor, heart rate | For measuring heart rate of human. | 5 |
| 53 | (e) Data logger sensor, dissolved oxygen | For measuring aqueous oxygen concentrations. | 5 |
| 54 | (f) Data logger sensor, flow rate | For measuring flow rate of streams. | 5 |
| 55 | (g) Data logger sensor, humidity | For measuring relative humidity, ranging 5-95\%. | 5 |
| 56 | (h) Data logger sensor, low pressure sensor | For measuring gas pressure ranging from 0 to 10 kPa . | 5 |
| 57 | (i) Data logger sensor, pH | For measuring pH values ranging from $0-14$ with an accuracy of $\pm 2 \%$. | 5 |
| 58 | (j) Data logger sensor, respiration rate | For measuring respiration rate. | 5 |
| 59 | (k) Data logger sensor, sound | For measuring sound level ranging from 50 to 100 db , the overall frequency response within the range heard by human ear. | 5 |
| 60 | (l) Data logger sensor, temperature | For measuring temperature ranging from $-10^{\circ} \mathrm{C}$ to $+110^{\circ} \mathrm{C}$, with an accuracy of $\pm 1^{\circ} \mathrm{C}$. | 5 |
| 61 | Desiccator | Borosilicate glass with knob cover and perforated disc. 200 mm top internal diameter, 190 mm disc diameter, 85 mm depth of disc below flange. | 2 |
| 62 | Dialysis tubing | 14 mm inflated diameter, $30 \mathrm{~m} /$ pack. | 1 pack |
| 63 | Digital blood pressure monitor | Automatic measurement. Digital display of systolic and diastolic blood pressure reading and heart rate. Measurement range: Pressure $20-280 \mathrm{mmHg} \pm 3 \mathrm{mmHg}$, pulse $40-200$ beats/ min $\pm 5 \%$. | 10 |
| 64 | Display tray | Plastic tray. Dimension: $400 \times 300 \times 100 \mathrm{~mm}$ (length x width x depth). | 20 |
| 65 | Dissecting board | Wooden board of approximately $560 \times 380 \mathrm{~mm}$ (length x width), made of selected timber so that awls can be pressed in without hammering. | 20 |
| 66 | Dissecting instrument set | In box/plastic wallet, comprising <br> -1 pair of forceps, blunt, stainless steel, straight, length about 130 mm <br> -1 pair of forceps, pointed, stainless steel, straight, length about 130 mm <br> -2 needles, stainless steel in metal handle <br> -1 pair of scissors, stainless steel, straight with one blunt and one pointed ends, overall length about 110 mm <br> -1 pair of scissors, stainless steel, straight, pointed, open shanks, overall length about 110 mm -1 scalpel blade holder, stainless steel, No. 3 or No. 4 <br> -5 scalpel blades, length 38 mm <br> -5 scalpel blades, length 45 mm <br> -1 section lifter <br> -1 seeker, stainless steel in metal handle | 1 set |
| 67 | Dissecting needle | Stainless steel in metal handle. Overall length $120-140 \mathrm{~mm}$. | 20 |
| 68 | Dissecting pin | Plated steel with about 15 mm 'T' shaped head. Overall length about 50 mm . In boxes of 400 . | 1 box |
| 69 | Drier, hot air and cool air output | A low noise hair drier suitable for rapid drying of laboratory glassware, chromatograms,etc. A detachable nozzle is provided and there is an adjustable heat/cool/speed setting. | 10 |
| 70 | Ear, human (anatomical model) | Enlarged at least 3 times, made of durable plastics. Inner ear can be opened to show semicircular canals and cochlea with stapes attached, which is removable. Incus and malleus are attached to tympanum which is removable. | 1 |
| 71 | Eye wash unit | Equipped with an eye wash bottle. For emergency treatment of the eye affected by liquids, dust or flying particles. By squeezing the bottle, a fountain of wash is directed into the eye via the eye bath. Contaminated wash drains through the side tube, so that a continual flow of clean wash reaches the eye. When not in use, eye bath is covered by a dust cap. The bottle is clipped into a moulded panel on which simple but complete instructions are printed. The panel has holes for wall hanging. | 1 |
| 72 | Eye, human (anatomical model) | Dissectible, enlarged 4 or 5 times, made of durable plastics, to show vitreous humour, blind spot, lens, ciliary processes, iris, pupil, optic nerve, retina and sclerotic coat. Mounted on a pedestal or stand. | ${ }^{1}$ |
| 73 | Filter paper | Whatman No. 1, 125 mm diameter. In box of 200. | 6 boxes |
| 74 | Flask, conical | Narrow mouth, Pyrex or equivalent. | 40 |
| 75 | Flask, flat bottom | Medium neck, Pyrex or equivalent. | 20 |
| 76 | Flask, round bottom | Pyrex or equivalent. | 20 |
| 77 | Flask, volumetric, 1000 mL | Pyrex or equivalent. | 5 |
| 78 | Flask, volumetric, 250 mL | Pyrex or equivalent. | 10 |
| 79 | Flask, volumetric, 500 mL | Pyrex or equivalent. | 10 |
| 80 | Forceps, blunt | Stainless steel, straight, length about 130 mm . | 20 |
| 81 | Forceps, fine | Stainless steel, straight, length about 130 mm . | 20 |
| 82 83 | Funnel, dropping | Cylindrical, open top, with interchangeable glass/Teflon stopcock, borosilicate glass, 100 mL . 150 mm top diameter, plain, soda-lime glass or plastic | 4 |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 84 | Funnel, filter, 75 mm top diameter | 75 mm top diameter, plain, soda-lime glass or plastic. | 20 |
| 85 | Funnel, thistle | With straight stem, soda-lime glass, overal length 300 mm . | 4 |
| 86 | Gene model kit | Comprising of pot-it beads, DNA support rods, hydrogen bonds, amino acids units and centromeres for demonstration of self-conservative replication of DNA, transcription, translation, mitosis, meiosis and genetic engineering. Complete with illustrated teaching notes. | 5 sets |
| 87 | Genetic maize ear, dihybrid inheritance | One whole ear showing dihybrid inheritance of surface and aleurone colour in kernels. | 5 |
| 88 | Genetic maize ear, monohybrid inheritance | One whole ear showing monohybrid inheritance of aleurone colour in kernels. | 5 |
| 89 | Genetic maize mount, dihybrid cross | For demonstration of the dihybrid cross of surface and aleurone colour in kernels. Ears showing the parental and F1 phenotypes are mounted in clear box. | 1 |
| 90 | Genetic maize mount, monohybrid cross | For demonstration of the monohybrid cross of aleurone colour in kernels. Ears showing the parental and F1 phenotypes are mounted in clear box. | 1 |
| 91 | Genetics study kit, dihybrid inheritance | Each kit contains: Seeds of suitable plants (e.g. tomato) of the relevant parental types; the resulting F1 generation, at least 100 seeds of the F2 progeny, and at least 100 seeds of the backcross progeny, for illustrating dihybrid inheritance of stem colour and leaf shape (or any other two discrete characters) Ratios of $9: 3: 3: 1$ and 1:1:1:1 should be illustrated. | 2 sets |
| 92 | Genetics study kit, monohybrid inheritance | Each kit contains: Seeds of suitable plants (e.g. tomato) of the relevant parental types; the resulting F1 generation, at least 100 seeds of the F2 progeney, and at least 100 seeds of the back-cross progeny, for illustrating monohybrid inheritance of stem colour (or any other discrete character) Ratios of 3:1 in the F2 and 1:1 in the back-cross generation should be illustrated. | 2 sets |
| 93 | Glass plate | Square for bell jar, ground one side, $250-300 \mathrm{~mm}$. | 2 |
| 94 | Glass rod | Soda-lime glass, 6 mm diameter, in length of about 1.5 m . | 10 |
| 95 | Gloves, animal handling | Leather type with cuffs that reach to the upper arm. | 1 pair |
| 96 | Gloves, chemical resistant | For handling acids, alkalis and common organic solvents, long cuff, with special finishing for excellent wet grip. | 2 pairs |
| 97 | Gloves, heat/cold resistant | Made of non-flammable non-asbestos material, with low thermal conductivity, high strength and high abrasion resistance, gives no dermatological problems; for furnace and hotplate work in the laboratory; gauntlet length. | 1 pair |
| 98 | Gloves, surgical | Lightweight disposable latex rubber gloves. Close fitting and with high finger sensitivity. 50/box. | 1 box |
| 99 | Hand lens | Magnification $\times 5$ to $\times 10$ with metal/plastic frame and handle. | 10 |
| 100 | Heart, human (anatomical model) | Enlarged approximately 2 times, made of durable plastics. Dissectible into two parts showing atria, ventricles, bicuspid valve, tricuspid valve, semilunar valves and entry of blood vessels Mounted on a pedestal or stand | 1 |
| 101 | Heater, aquarium | Immersion type, thermostatically controlled. Comprising a heating element encased in a plastic-coated aluminium tube and a thermostat in an upper polycarbonate sheath. The thermostat can be adjusted using an external knob and incorporates a heater indicator lamp. The whole unit is enclosed in a glass tube which is sealed to the inner tube by the outer lip of the stopper. A suction clip is provided to enable attachment to the side of aquarium. | 1 |
| 102 | Ice bucket | For the transport and short-term storage of ice. Complete with lid. Capacity about 10 to 15 litres. | 1 |
| 103 | Jar, specimen, $150 \times 50 \mathrm{~mm}$ | Clear glass, cylindrical, with foot and grip stopper. | 6 |
| 104 | Jar, specimen, $250 \times 100 \mathrm{~mm}$ | Clear glass, cylindrical, with foot and grip stopper. | 6 |
| 105 | Joint model, elbow | Accurately moulded articulated models. Elasticated to allow movement. | 1 |
| 106 | Joint model, shoulder | Accurately moulded articulated models. Elasticated to allow movement. | 1 |
| 107 | Kidney, human (anatomical model) | Enlarged 3 or 4 times, made of durable plastics. Sectioned right/left kidney showing cortex, medulla, blood vessels and a nephron (enlarged) together with ducts leading into the pelvis and ureter renal artery and vein are also included | 1 |
| 108 | Lamps, bench/desk/table |  | 10 |
| 109 | Leaf, dicot (anatomical model) | Three dimensional model showing part of leaf with stomata on epidermis, face section of longitudinal and transverse planes. Made of durable plastics. | 1 |
| 110 | Magnetic stirrer-hotplate | 1,300 r.p.m. and $450^{\circ} \mathrm{C}$ maximum, with energy regulator controlled 400 W hotplate. Mains and load indicator lamps, mains cable. With one each $20 \& 40 \mathrm{~mm}$ PTFE coated magnetic followers \& instructions but without support rod. The equipment must be designed to prevent any spillage from entering from base structure | ${ }^{1}$ |
| 111 | Micrometer graticule | Harris-type, with scale 10 mm long, numbered at 1 mm intervals with 0.1 mm sub-divisions. Supplied with instructions for cutting and mounting the scales. In pack of 10 ." | 2 packs |
| 112 | Microscope cavity slide | Single cavity, non-corrosive, hard-glass, $76 \times 26 \mathrm{~mm}$ (length x width), thickness not exceeding 1.5 mm . In pack of 50 . | 1 pack |
| 113 | Microscope slide | Standard, non-corrosive, hard-glass, $76 \times 26 \mathrm{~mm}$ (length $\times$ width), thickness not exceeding 1.2 mm . In pack of 100 . | 1 pack |
| 114 | Microscope slide box | Rack form, accommodate $76 \times 26 \mathrm{~mm}$ microscope slides. Wooden/ High-impact polypropylene with hinged lid. Slides are held in numbered slots and there is an index inside the lid. Capacity 100 slides in 2 rows. | 5 |
| 115 | Microscope slide folder | Made of strong cardboard. Holds 9 to 10 microscope slides $(76 \times 26 \mathrm{~mm})$ in one row. | 10 |
| 116 117 | Microscope, digital | Binocular head with built-in CCD/CMOS camera for still image ( $\geqq 5 \mathrm{M}$ pixels) and live video capture. USB connection to computer. Two pairs of eye-pieces : x 4 (x5) and x 10 (or x15). Four objectives: $\mathrm{x} 5, \mathrm{x} 10, \mathrm{x} 40($ or x 45$)$ and x 100 on <br> quadruple nosepiece. Coarse and fine adjustments, with limit stop. Abbe condenser NA 1.25 and iris diaphragm with filter tray. Built-in mechanical stage, movement graduated with vernier reading to 0.1 mm with low level coaxial controls. Equipped with a halogen/tungsten or LED illuminator with intensity control fitted to base. Supplied with cabinet with lock and key. Software: can be run on at least one of the following operating systems: English/Chinese Microsoft Windows 7 and 10. | 20 |
| 117 | Microscope, monocular | Vertical monocular body. Inclinable. Two eye-pieces : Huyghens x4 (or x5) and x10 (or x15). Four objectives: $\mathrm{x} 5, \mathrm{x} 10, \mathrm{x} 40$ (or x 45 ) and x 100 on quadruple nosepiece. Coarse and fine adjustments, with limit stop. Abbe condenser NA 1.25 and iris diaphragm with filter tray. Built-inmechanical stage. Equipped with a halogen/tungsten or LED illuminator with intensity control fitted to base Supplied with cabinet with lock and key. | 20 |
| 118 | Microscope, stereoscopic | Robust stand with reversible white and black plate. Paired x10 wide field eyepiece, with interpupillary adjustment. Two objectives : x1 and x2 interchangeable by rolling motion. Supplied with cabinet with lock and key. | 10 |
| 119 | Mortar and pestle | Unglazed inside, glazed outside with spout. Porcelain. External diameter 110 mm . | 12 |
| 120 | Net, aquarium | Nylon, on rectangular galvanized wire frame. About $0.15 \times 0.13 \mathrm{~m}$ with handle. | 10 |
| 121 | Net, pond | General purpose. Coarse mesh nylon net suitable for collecting macro-invertebrates, fish fry, etc. Dimensions about $0.25 \times 0.7 \mathrm{~m}$ (depth x circumference). Supplied with tough fastener for attaching net to frame, complete with frame and wooden/aluminium handle Length of handle about 1.2 m ." | 5 |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 122 123 | Neurone, human (anatomical model) | Enlarged approximately 2,500 times, made of durable plastics. Showing fine structures of cell body, axon, myelin sheath and Schwann cell. In three parts, on stand with base. <br> For interface to the data logger device. | 1 5 |
| 12 | Microcompuer wornstaion/tablets | For interface to the data logger device. | 5 |
| 124 | Oven / Incubator | Temperature range $5^{\circ} \mathrm{C}$ above ambient to $250^{\circ} \mathrm{C}$. Temperature fluctuation not more than $1^{\circ} \mathrm{C}$. Minimum capacity 30 L . Provided with at least two shelves and three shelf positions. Thermometer required. | 1 |
| 125 | Petri dish | Pyrex or equivalent, $90 \times 15 \mathrm{~mm}$ (diameter x depth). Supplied with cover. | 24 |
| 126 | Pipette filler | For use with bulb or graduated pipettes of capacity up to 10 mL . With finely adjustable thumb wheel that can avoid the sucking back of liquid into the filler. With flexible pipette holding socket to minimize possible damage to pipette and a rapid release valve. | 20 |
| 127 | Pipette, bulb form, 10 mL | Bulb form, single graduation on upper stem, capacity 10 mL . | 2 |
| 128 | Pipette, bulb form, 2 mL | Bulb form, single graduation on upper stem, capacity 2 mL . | 2 |
| 129 | Pipette, bulb form, 5 mL | Bulb form, single graduation on upper stem, capacity 5 mL . | 2 |
| 130 | Pipette, dropping | Narrow mouth, overall length about 110 mm . Supplied with rubber teats. | 24 |
| 131 | Pipette, graduated, 1 mL | Fast-flow, amber stain graduations and inscriptions, 1 mL , subdivision 0.01 mL . | 20 |
| 132 | Pipette, graduated, 10 mL | Fast-flow, amber stain graduations and inscriptions, 10 mL , subdivision 0.1 mL . | 20 |
| 133 | Pipette, graduated, 2 mL | Fast-flow, amber stain graduations and inscriptions, 2 mL , subdivision 0.02 mL . | 20 |
| 134 | Pipette, graduated, 5 mL | Fast-flow, amber stain graduations and inscriptions, 5 mL , subdivision 0.05 mL . | 20 |
| 135 | Pot, flower, 100 mm diameter |  | 2 |
| 136 | Pot, flower, 200 mm diameter |  | 2 |
| 137 | Pot, flower, 300 mm diameter |  | 2 |
| 138 | Potometer, Farmer | Consists of a central reservoir with a 3 -holes stopper holding a capillary tube graduated in mm , a funnel with stopcock and a short length of glass tubing. Dimension : reservoir $80-120 \mathrm{~mm}$ | 2 |
| 139 | Potometer, Ganong | A stopper fits the end tube for holding a plant shoot. The capillary tube is graduated in millimetre. A central reservoir is provided with a stopcock to admit water for adjusting the position of the air bubble. Height to top of reservoir about $160-180 \mathrm{~mm}$, overall length of capillary tube about $180-340 \mathrm{~mm}$; mounted on wooden/plastic base by spring clips | 10 |
| 140 | Projection system with screen |  | 1 |
| 141 | Pump, filter | body, with integral non-return valve, water inlet for flexible pressure tubing, and vacuum nozzle for about 10 mm bore tubing. | 4 |
| 142 | Quadrat, folding | Four plastic coated steel rods, each 0.5 m long, fitted together with bolts and wingnuts to form a quadrat frame. | 5 |
| 143 | Rat/rabbit (demonstration mount specimen), brain | Entire mounted on clear plastic slip so that dorsal and ventral sides are clearly visible. | 1 |
| 144 | Rat/rabbit (demonstration mount specimen), embryo | Embryo attached to placenta by umbilical cord. | 1 |
| 145 | Rat/rabbit (demonstration mount specimen), injected | Double injection of vascular system, including dissection of lung lobes and kidneys. | 1 |
| 146 | Refrigerator |  | 1 |
| 147 | Respirator | Moulded rubber body with anodized aluminium screw retainer. Fitted with two relief valves and an adjustable elastic | 1 |
| 148 | Respirator filter cartridge | Respirator filter cartridge for use in presence of common organic vapours and acid gases. | 1 pair |
| 149 | Retort stand | For use in presence of common organic vapours and acid gases. | 20 |
| 150 | Root, dicot (anatomical model) | Three dimensional, with face section in transverse, longitudinal and tangential planes. Made of durable plastics. | 1 |
| 151 | Safety goggles | Splash-proof. With single replaceable wide-angle clear polycarbonate lens, indirectly ventilated, flexible clear PVC frame for all-round vision. Fitted with adjustable headdband with retained ends. | 1 |
| 152 | Safety screen | Transparent polycarbonate, comprising central panel $610 \times 300 \times 3 \mathrm{~mm}$ (height x width x thickness) connected to outer panels $610 \times 230 \times 3 \mathrm{~mm}$ (height x width x thickness) on each side by full height hinges | 1 |
| 153 | Safety spectacles | Constructed of polycarbonate, spectacle type with side shields giving all round protection. Top guard and lip prevent spillage into eyes. May be worn over prescription | 45 |
| 154 | Sand bucket | Made of iron, with cover. Red in colour with label "FIRE BUCKET". Approximately 250 x 230 mm (Diameter x height). Half- filled with sand. | 2 |
| 155 | Scalpel | Blade : stainless steel, length $35-45 \mathrm{~mm}$. Handle : nickel plated, length $100-120 \mathrm{~mm}$. | 10 |
| 156 | Scissors, dissecting, blunt ends | Nickel-plated steel/Stainless steel, straight, blunt ends, close shanks, overall length about 120 -130 mm . | 20 |
| 157 | Scissors, dissecting, fine points | Nickel-plated steel/Stainless steel, straight, fine points, open shanks, overall length about 110120 mm . | 20 |
| 158 | Scissors, general purpose | Nickel plated steel/Stainless steel, with one pointed and one rounded blade. Overall length about $150-180 \mathrm{~mm}$. | 2 |
| 159 | Sealing film | Parafilm-type, stretchable, self-adhesive and water-proof plastic sheet for sealing flasks, test tubes, etc. In roll of 38 m , interleaved with paper to prevent sticking. Width 10 cm . | 1 roll |
| 160 | Seeker | Steel handle, blunt end stainless steel, overall length about $120-140 \mathrm{~mm}$. | 20 |
| 161 | Shield, face | With curved hard plastic visor which can be raised from the face when not required, with adjustable headband. | 1 |
| 162 | Skeleton, human (anatomical model) | Life size, made of durable plastic material, showing anatomical details of bone structure, with dust proof case mounted upright on a roller stand. Detachable skull showing full set of permanent teeth on both jaws, removable cranium. Joints mounted, all movable joints should be demonstrated. | 1 |
| 163 | Skeleton, rabbit, adult, articulated | Articulated, mounted on base with perspex cover. | 1 |
| 164 | Skeleton, rabbit, adult, disarticulated |  | 6 sets |
| 165 | Skin, human (anatomical model) | Enlarged approximately 70 times, made of durable plastics. Vertical section, large scale to show hair, sweat gland, sebaceous gland, blood vessel and sensory receptors. | 1 |
| 166 | Spatula | Heavyweight, with one spatula and one spoon end. Stainless steel. Overall length about 150 mm . | 20 |
| 167 | Spill pack | The spill pack is made up of six containers each with enough absorbent material to absorb a spillage of up to $500 \mathrm{~cm}^{3}$. In addition to the absorbent material, two packets of soda ash are provided so that acid spills, once absorbed and collected, can be neutralised and made safe for disposal. Ten stout polytheme bags are also provide for disposal of spillage. | 1 pack |
| 168 | Spinal cord, human (anatomical model) | Enlarged 7 times, made of durable plastics. Cross section of spinal cord in a vertebra showing the H -piece, dorsal and ventral roots, spinal ganglion, and spinal nerve. | 1 |
| 169 | Spirit level | For horizontal use. | 5 |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 170 | Spot plate | For observing colour changes. Porcelain : $150 \times 150 \mathrm{~mm}$ with 12 cavities of 5 mm deep. | 20 |
| 171 | Stem, dicot (anatomical model) | Three dimensional, with face section in transverse, longitudinal and tangential planes. Made of durable plastics. | 1 |
| 172 | Stethoscope | Diaphragm type, Dual purpose chestpiece for monitoring heart beat and respiratory movements with the larger side ( $45-50 \mathrm{~mm}$ diameter), and for listening to the pulse in the arm with the small one (about 30 mm diameter). Earpieces plastic/metal, fitted with replaceable ear plugs. | 10 |
| 173 | Stopper, rubber, one hole | Assorted sizes. | 24 |
| 174 | Stopper, rubber, one-hole, 24 mm diameter. | One-hole, for test-tube of 24 mm diameter. | 24 |
| 175 | Stopper, rubber, solid | Without hole, assorted sizes. | 24 |
| 176 | Stopper, rubber, solid,24 mm diameter. | Without hole, for test-tube of 24 mm diameter. | 24 |
| 177 | Stopper, rubber, two-holes | Assorted sizes. | 24 |
| 178 | Stopper, rubber, two-holes, 24 mm diameter. | Two-hole, for test-tube of 24 mm diameter. | 24 |
| 179 | Stopwatch | Analog or digital display, reads up to 60 minutes, accuracy at least 0.2 s , with start, stop and reset buttons. | 20 |
| 180 | Syringe, 10mL | Disposable, clear polystyrene barrel, graduated, with plastic fitting. | 20 |
| 181 | Syringe, 5mL | Disposable, clear polystyrene barrel, graduated, with plastic fitting. | 20 |
| 182 | Test tube brush, diameter of head 15 mm | Nylon, with fan shaped end and galvanized wire handle. | 12 |
| 183 | Test tube brush, diameter of head 30 mm | Nylon, with fan shaped end and galvanized wire handle, for tubes of diameter 16 to 25 mm . | 12 |
| 184 | Test tube holder | Wood with steel spring, to take tubes up to 19 mm diameter, length about 185 mm . | 20 |
| 185 | Test tube rack, aluminium/stainless steel, stackable Z-pattern | With five 28 mm , six 19 mm and eight 13 mm diameter holes arranged in three rows. | 12 |
| 186 | Test tube rack, hard wood | Wood with 12 pegs, 10 holes of 22 mm diameter, 2 holes of 32 mm diameter. | 12 |
| 187 | Test tube rack, nylon coated steel wire | For use in water bath, with about 12 holes to take tubes up to 24 mm in diameter. | 4 |
| 188 | Test tube, $100 \times 16 \mathrm{~mm}$ (length x diameter) | Soda-lime glass, with rim, for use in centrifuge. | 20 |
| 189 | Test tube, $125 \times 16 \mathrm{~mm}$ (length x diameter) | Pyrex or equivalent, medium wall with rim. | 20 |
| 190 | Test tube, $150 \times 24 \mathrm{~mm}$ (length x diameter) | Pyrex or equivalent, medium wall with rim. | 20 |
| 191 | Test tube, $75 \times 10 \mathrm{~mm}$ (length x diameter) | Soda-lime glass, with rim, for use in centrifuge. | 20 |
| 192 | Thermometer | Red spirit filled, $-10^{\circ} \mathrm{C}$ to $110^{\circ} \mathrm{C} \times 1^{\circ} \mathrm{C}$, with reinforced bulb and permanent graduations. | 30 |
| 193 | Tong, crucible | Stainless steel, straight with flatened hinge, length about 200 mm . | 12 |
| 194 | Tooth, human (anatomical model) | Enlarged about 8 times, made of durable plastics. Dissectible to show structures of tooth and occurrence of caries. Mounted on a pedestal or stand. | 1 |
| 195 | Torso, human (anatomical model) | Life size, head and trunk, mounted on a base with interchangeable male and female reproductive organs. Made of unbreakable plastic materials, dissectible into at least 20 parts. Head features: Detachable, one side of the head opened to reveal half brain, eye, teeth and jaw. Neck features: Opened to show trachea. <br> Thorax features: With chest cover showing mammary gland, muscle and ribs, removable to show internal organs, dissectible lungs and heart. <br> Abdomen features: Removable liver, stomach, pancreas, small and large intestine, kidney. Interchangeable male and female reproductive organs. Urinary system and all major blood vessels present. All anatomical features should have an accompanying key. | 1 |
| 196 | Tripod stand | Triangular top, cast iron, with splayed steel legs, $150 \times 210 \mathrm{~mm}$ (length of side x height). | 14 |
| 197 | Trolley, apparatus | Apparatus, four wheels, tubular enameled steel frame, two enameled and plated trays of size $760 \times 460 \mathrm{~mm}$, height to top tray about 900 mm , height between trays about 350 mm . | 1 |
| 198 | Trough | Glass, $300 \times 150 \mathrm{~mm}$ (diameter x depth). | 2 |
| 199 | Tubing connector, T-shaped | Polypropylene, autoclavable, of suitable O.D. to fit rubber tubing of bore diameter about 8 mm. | 20 |
| 200 | Tubing, capillary | Glass, external diameter x bore approximately $6 \times 0.5 \mathrm{~mm}$, in length of about $1.2-1.5 \mathrm{~m}$. | 5 |
| 201 | Tubing, glass | Soda-lime glass, external diameter approximately 6 mm , in length of about 1.5 m . | 10 (1 pack) |
| 202 | Tubing, rubber, normal wall, 5 x 1.5 mm (bore x wall thickness) |  | 10 m (1 pack) |
| 203 | Tubing, rubber, normal wall, 8 x 1.5 mm (bore x wall thickness) |  | 10 m (1 pack) |
| 204 | Tubing, rubber, transparent, with terylene mesh reinforced wall | Suitable for moderate pressure or vacuum applications. Made of PVC, bore 6.5 mm . | 10 m (1 pack) |
| 205 | Vacuum flask | Capacity about 500 mL . | 4 |
| 206 | Vermiculite | A highly absorbent and non-flammable material suitable for plant culture without soil. Maximum particle size 3 mm . In pack of 14 kg (or 110 litres). | 1 pack |
| 207 | Vertebra, human lumbar (anatomical model) | Life size, made of durable plastics, showing details of basic structures of a human vertebra. | 1 |
| 208 | Vial, plastic, $50 \times 20 \mathrm{~mm}$ | Approximately $50 \times 20 \mathrm{~mm}$ (height $\times$ diameter). Made of clear plastic and supplied with polyethylene snap-on caps, in pack of 144 . | 1 pack |
| 209 | Vial, plastic, $80 \times 30 \mathrm{~mm}$ | Approximately $80 \times 30 \mathrm{~mm}$ (height x diameter). Made of clear plastic and supplied with polyethylene snap-on caps, in pack of 144. | 1 pack |
| 210 | Vial, plastic, $80 \times 50 \mathrm{~mm}$ | Approximately $80 \times 50 \mathrm{~mm}$ (height x diameter). Made of clear plastic and supplied with polyethylene snap-on caps, in pack of 144. | 1 pack |
| 211 | Wash bottle | White translucent, flexible, with screw cap and bent tube, polyethene, 250 mL capacity. | 12 |
| 212 | Watch glass, 100 mm | Ground edge, diameter 100 mm . | 12 |
| 213 | Watch glass, 50 mm | Ground edge, diameter 50 mm . | 12 |
| 214 | Water bath | Capacity about 8-14 litres. Temperature ranges $5^{\circ} \mathrm{C}$ above ambient to about $100^{\circ} \mathrm{C}$. Sensitivity $0.5^{\circ} \mathrm{C}$. With thermostat and heater at the bottom of a polypropylene tank, under a perforated stainless steel tray. A clip is provided to hold a thermometer. Polypropylene tank in protected metal outer case. Protection against low water level or thermostat failure is provided by either a thermal fuse or a fixed-temperature cutout Heating rate is about $05^{\circ} \mathrm{C}$ per minute. | 2 |
| 215 | Windmeter | Portable and hand-held for measuring wind speed. The wind speed is indicated by a small sphere moving in narrow tube against a twin scale reading from 2 to 10 mph and from 4 to 66 mph . Supplied in waterproof plastic case with maintenance kit for cleaning tube and instructions for use | 5 |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 216 | Wire gauze <br> Microslides | Ceramic centred, asbestos free, $150 \times 150 \mathrm{~mm}$. | 14 |
| 217 | Allium , W.M. onion bulb scale leaf epidermis |  | 10 |
| 218 | Allium /Vicia , root tip L.S., showing stages of mitosis. |  | 10 |
| 219 | Amoeba, in binary fission. |  | 10 |
| 220 | Artery and vein, mammal, 1.S. |  | 10 |
| 221 | Blood, human, smear, Giemsa |  | 10 |
| 222 | Buxus (or any dicot.), W.M. of leaf lower epidermis, showing stomata. |  | 10 |
| 223 | Cheek cell, human, W.M.. |  | 10 |
| 224 | Culex (or Anopheles), W.M. female/male head and mouthparts. |  | 2 |
| 225 | Cucurbita, L.S. stem for sieve tubes. |  | 2 |
| 226 | Cucurbita , T.S. stem for sieve plates. |  | 2 |
| 227 | Empetrum , T.S. leaf, showing xerophytic structures. |  | 2 |
| 228 | Erica, T.S. leaf, showing xerophytic structures. |  | 2 |
| 229 | Fagus, sections of sun and shade leaves. |  | 2 |
| 230 | Ficus, T.S. leaf, showing xerophytic structures. |  | 2 |
| 231 | Giant chromosome, squash made from salivary glands of |  | 10 |
| 232 | Hakea, T.S. leaf, showing xerophytic structures. |  | 2 |
| 233 | Helianthus (or any dicot.), T.S. |  | 20 |
| 234 | Helianthus (or any dicot.), T.S. old stem |  | 20 |
| 235 | Helianthus (or any dicot.), T.S. young roots |  | 20 |
| 236 | Helianthus (or any dicot.), <br> T.S. stem, showing interfascicular cambium. |  | 20 |
| 237 | Helianthus (or any dicot.), L.S. young stem. |  | 10 |
| 238 | Helianthus (or any Dicot.), T.S. young stem |  | 10 |
| 239 | Hydrilla (or any hydrophyte), T.S. stem |  | 10 |
| 240 | Ileum, mammal, T.S., injected to show capillaries in villi. |  | 10 |
| 241 | Ileum, mammal, T.S., showing villi, triple stain. |  | 10 |
| 242 | Leaf types, hydrophyte, mesophyte and xerophyte. |  | 10 |
| 243 | Lilium , T.S. bud, showing stages of meiosis. |  | 20 |
| 244 | Locust/Grasshopper testis squash, acetic orcein stain, showing stages of meiosis. |  | 10 |
| 245 | Nerium, T.S. leaf, showing xerophytic structure. |  | 10 |
| 246 247 | Nerve cell, mammal, isolated, smear from spinal cord. Nymphaea, , 1.s. floating leat. |  | 10 10 |
| 248 | Ovary, mammal, T.S., showing |  | 10 |
| 249 | Paramecium, E., differentially stained to show detailed structures. |  | 10 |
| 250 | Paramecium, in binary fission. |  | 20 |
| 251 | Pelargonium , T.S. leaf, showing xerophytic structure. |  | 2 |
| 252 | Pollen, flowering plant, |  | 10 |
| 253 | Potamogeton, T.S. submerged |  | 10 |
| 254 | Ribes, T.S. stem, showing cork cambium. |  | 10 |
| 255 | Sambucus, T.S. bark with lenticel. |  | 10 |
| 256 | Skin, V.S., showing hair insertion and sebaceous gland, triple stain. |  | 10 |
| 257 | Skin, V.S., showing sweat glands. |  | 10 |
| 258 | Spermatozoa, human, smear. |  | 10 |
| 259 | Spinal cord, T.S. |  | 10 |
| 260 | Spirogyra, E. vegetative |  | 10 |
| 261 | Striated muscle, L.S., triple stain for striations and nuclei. |  | 10 |
| 262 | Striated muscle, T.S. |  | 10 |
| 263 | Vicia , root tip squash showing mitosis. |  | 10 |
| 264 | Yeast, budding. |  | 10 |
| Chemicals |  |  |  |
| 265 | Acetic acid (Ethanoic acid), glacial |  | 500 mL |
| 266 | Agar powder |  | 500 g |
| 268 | Amylase, alpha, free from reducing sugars |  | 25 g |
| 269 | Ascorbic acid tablets, in bottle of |  | 1 bottle |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
|  | 100 tablets |  |  |
| 270 | Benedict's solution |  | 500 mL |
| 271 | Bile salt (sodium tauroglycocholate) |  | 10 g |
| 272 | Bromothymol blue |  | 10 g |
| 273 | Calcium carbonate (marble chips) |  | 500 g |
| 274 | Calcium hydroxide |  | 500 g |
| 275 | Casein powder |  | 100 g |
| 276 | Citric acid |  | 100 g |
| 277 | Cobalt chloride paper (heat sensitive) |  | 10 books |
| 278 | Copper (II) sulphate-5-water |  | 500 g |
| 279 | Cresol Red |  | 5 g |
| 280 | Dichlorophenol-indophenol (DCPIP) |  | 5 g |
| 281 | Eosin B |  | 25 g |
| 282 | Eosin Y, yellowish |  | 25 g |
| 283 | Ethyl alcohol (Ethanol), absolute |  | 500 mL |
| 284 | Ethyl alcohol (Ethanol), 95\% |  | 1 L |
| 285 | Glucose |  | 100 g |
| 286 | Glycerine |  | 250 mL |
| 287 | Hydrogen peroxide solution, 20 vols |  | 250 mL |
| 288 | Invertase |  | 50 mL |
| 289 | Iodine, resublimed |  | 100 g |
| 290 | Methylene blue, alkaline (Loeffler), nuclear stain |  | 10 g |
| 291 | Orcein acetic (Aceto-orcein) |  | 10 g |
| 292 | Paraffin oil |  | 500 ml |
| 293 | Pepsin |  | 25 g |
| 294 | Peptone, bacteriological |  | 50 g |
| 295 | pH paper, range 1-14, in book of 20 |  | 10 books |
| 296 | Phloroglucinol |  | 25 g |
| 297 | Potassium dihydrogenphospate |  | 250 g |
| 298 | di-Potassium hydrogenphospate |  | 250 g |
| 299 | Potassium iodide |  | 250 g |
| 300 | Pumice stone |  | 200 g |
| 301 | Pyrogallol, resublimed |  | 50 g |
| 302 | Safranine, water and alcohol |  | 25 g |
| 303 | Soda-lime, granulated |  | 250 g |
| 304 | Sodium acetate, anhydrous |  | 500 g |
| 305 | Sodium chloride |  | 250 g |
| 306 | Sodium citrate |  | 100 g |
| 307 | Sodium hydrogencarbonate |  | 500 g |
| 308 | Sodium hydroxide, pellets. |  | 500 g |
| 309 | Sodium thiosulphate, ANALAR |  | 500 g |
| 310 | Starch, soluble, free of reducing sugar |  | 500 g |
| 311 | Sucrose |  | 500 g |
| 312 | Thymol blue |  | 5 g |
| 313 | Urea |  | 500 g |
| 314 | Urease |  | 25 g |
| 315 | Vaseline |  | 500 g |
| Suggested equipment and consumerable for conducting practical work related to microbiology |  |  |  |
| 316 | Autoclave | Not less than 12L capacity, with temperature and pressure gauges. | 1 |
| 317 | Autoclave bags | $300 \times 610 \mathrm{~mm}$, pack of 100 | 5 packs |
| 318 | Bottle for media | glass, autoclavable caps, 100 mL . | 50 |
| 319 | Culture bottles | sterile plastic, 30 mL . | 50 |
| 320 | Culture tubes | glass | 40 |
| 321 | Inoculating loops | nichrome | 10 |
| 322 | Inoculating loops, sterile, disposable | sterile, disposable with $10 \mu \mathrm{l}$ loop at one end with a needle for stab culture. 500 in a pack. | 1 pack |
| 323 | L-shaped spreader | sterile, disposable, 500 in a pack. | 1 pack |
| 324 | Petri dishes, diameter 55 mm | depth 15 mm , sterile, dispoable clear plastic. | 500 |
| 325 | Petri dishes, diameter 90 mm | depth 15 mm , sterile, dispoable clear plastic. | 500 |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 326 | Sterile indicator tape, roll, 25 mm wide, 55 m length | roll, 25 mm wide, 55 m length. | 10 rolls |
| 327 | Swabs, sterile, rayon tipped, for spreading bacterial | sterile, rayon tipped, for spreading bacterial culture. | 100 |
| 328 | Disinfectant, concentrate |  | 4 L |
| 329 | Gram stain kit | for studying the morphology of Gram-positive and Gram-negative bacteria. | 1 set |
| 330 | Nutrient agar, powder | 500 g | 500 g |
| 331 | Nutrient broth, powder | 500 g | 500 g |
| 332 | Yeasts | 100 g | 100 g |

Suggested equipment and consumerable for conducting practical work related to biotechnology

| 333 | Adjustable volume micropipettes, 2-20 $\mathrm{\mu l}$ |  | 10 |
| :---: | :---: | :---: | :---: |
| 334 | Adjustable volume micropipettes, 20-200ul |  | 10 |
| 335 | Adjustable volume micropipettes, 100-1,000 ul |  | 5 |
| 336 | DNA Gel electrophoresis tank | with casting tray and 8 wells comb. | 10 |
| 337 | Microcentrifuge | w/PCR tube adaptor, max. speed $\geqq 14,000 \mathrm{rpm}(16,000 \mathrm{xg}$ ), capacity: 18 -place rotor for 1.5 and 2.0 ml tubes. | 1 |
| 338 | Microwave oven, domestic | $800 \mathrm{~W}-1000 \mathrm{~W}$ with digital timer. | 1 |
| 339 | Mini centrifuges | maximum speed: $\geqq 6,000 \mathrm{rpm}(2,000 \times \mathrm{g})$, capacity $\geqq$ $\geqq 6 \times 2.0 \mathrm{ml}$ tubes. | 5 |
| 340 | PCR thermal cycler | Capacity: 96 wells, holds $96 \times 0.2 \mathrm{ml}$ tubes, speed of ramping: $\geqq 2.5^{\circ} \mathrm{C} / \mathrm{sec}$, temperature range: $4-100^{\circ} \mathrm{C}$. | 1 |
| 341 | Power supply for gel electrophoresis tank | Output range: 10-300 V, fully adjustable in 1 V steps $4-400 \mathrm{~mA}$, fully adjustable in 1 mA steps 75 W maximum, 3-4 pairs of output terminals. | 3 |
| 342 | Rocking platform | Speed range: $8-40 \mathrm{rpm}$, motion tilting: $\pm 7^{\circ}$, maximum load: $\geqq 4.5 \mathrm{~kg}(10 \mathrm{lb})$. | 2 |
| 343 | Vortexer | Speed range: 0-3,000 rpm, operation modes: continuous operation or touch control. | 2 |
| 344 | Flip-top tubes, 1.5 ml | 500 /pack | 1 |
| 345 | PCR tubes, 0.2 ml | 1000/pack | 1 pack |
| 346 | Pipettes tips (1-200ヶl) | 200 tips/rack | 10 racks |
| 347 | Pipettes tips ( $100-1000 \mu \mathrm{l}$ ) | 100 tips/rack | 5 racks |
| 348 | Pipettes tips (2-20 $\mu \mathrm{l}$ and $20-200 \mu \mathrm{l}$ ) | 200 tips/rack | 10 racks |
| 349 | Restriction analysis kit | containing DNA samples, restriction enzymes, and other related materials for performing DNA digestion and conducting agarose gel electrophoresis. | 1 set |
| 350 | PCR Experiment Kit | containing required materials for conducting experiment using PCR to study polymorphism in genotype in Human. | 1 set |
| 351 | Forensic DNA fingerprinting kit | containing DNA samples and other related materials for simulation of the Forensic DNA fingerprinting. | 1 set |
| Furniture for the Biology laboratory |  |  |  |
| 352 | Bench, movable | $1,525 \mathrm{~mm} \times 760 \mathrm{~mm} \times 840 \mathrm{~mm}$ (length x width x height), with acid and heat resistant plastic laminate on top. | 10 |
| 353 | Box, First aid | Single door, approx. dimensions of $280 \times 280 \times 110 \mathrm{~mm}$ (width $\times$ depth $\times$ height) | 1 |
| 354 | Stool | Wooden or plastic seat, approx. dimensions of $300 \mathrm{~mm} \times 300 \mathrm{~mm}, 530 \mathrm{~mm}$ height | 45 |
| Furniture for the Biology preparation room |  |  |  |
| 355 | Blackout Curtains | flameproof, preshrunk, thick and light proof material 2 pieces for each window unit with rails rufflette tape and hooks to fit windows | 1 set |
|  | Total cost for Subject |  | 578,600 |

Reference List of Furniture and Equipment
for Secondary School

Subject : $\underline{\text { SS Chemistry }}$

| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 1 | EQUIPMENT |  |  |
|  | Absorption tube ${ }^{\text {e }}$ | (a) Straight, $145 \times 17 \mathrm{~mm}$. | 2 |
|  |  | (b) U-form with side tube. | 2 |
| 2 | Alcohol lamp | Glass, with plastic cap and wick, volume of approx. 150 mL | 12 |
| 3 | Aspirator bottle | With stopcock and plastic screw cap, polyethene. |  |
|  |  | (a) 5 L | 4 |
|  |  | (b) 10 L | 2 |
|  |  | (c) 20 L | 2 |
| 4 | Atomic model | (a) Skeletal | 1 set |
|  |  | Comprises plastic spheres and flexible connectors representing atoms and bonds respectively. The spheres are in a variety of colours, and are number and/or letter coded for easy identification. There should be at least the following numbers and types of spheres (representing atoms of different elements, with oxidation states indicated in parentheses) for building a wide range of open type models: <br> 14 metal(I, II, III, IV, VI), 8 halogen(I), 22 oxygen(I, II, IV), 13 sulphur(II, IV, VI), 10 nitrogen(III, V), 6 carbon(IV), 7 phosphorus(III, IV, V) and 14 hydrogen(I, II). <br> The connectors should be of two different lengths (at least 50 medium and 36 long) for building the open structures. The set contains a storage box and an instruction booklet for building simple organic and inorganic structures. <br> (b) Lattice Set | 1 set |
|  |  | Contains 380 atom centres. With 8 to 12 coordinate atom centres to allow construction of complex models. Instructions cover construction of 7 crystal systems, diamond, graphite, metals, sodium chloride, zinc blend and wurtzite, 8 coordinated ionic structures rutile ice and layer structures <br> Electronic, capacity 200 g . Taring range 100 g or above. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. <br> (a) Readability 0.01 g | 2 |
| 5 | Balance | (b) Readability 1 mg | 1 |
|  |  | (c) Readability 0.1 mg | 1 |
| 6 | Barrier tape ${ }^{\text {e }}$ | PVC tape, non-adhesive backing, for highlighting hazard/restricted areas, $50 \mathrm{~mm} \times 3 \mathrm{~m}$. | 2 rolls |
| 7 | Basin, evaporating ${ }^{\text {e }}$ | Porcelain, shallow form with spout and glazed. |  |
|  |  | (a) 75 mL capacity, $80 \times 30 \mathrm{~mm}$. (diameter x depth) | 24 |
|  |  | (b) 225 mL capacity, $110 \times 45 \mathrm{~mm}$. (diameter x depth) | 12 |
| 8 | Beaker ${ }^{\text {® }}$ | Squat form, with spout, with two or more graduation marks showing approximate capacities. <br> (a) Pyrex or equivalent 50 mL | 45 |
|  |  | (b) Pyrex or equivalent, 100 mL | 90 |
|  |  | (c) Pyrex or equivalent, 250 mL | 90 |
|  |  | (d) Pyrex or equivalent, 600 mL | 12 |
|  |  | (e) Pyrex or equivalent, 1 L | 3 |
|  |  | (f) Polypropene or equivalent, 250 mL | 90 |
|  |  | (g) Polypropene, 2 L | 4 |
| 9 | Beehive shelf | Earthenware, glazed, 75 mm diameter. | 12 |
| 10 | Bench mat ${ }^{*}$ | Make of glass reinforced cement, asbestos free, about $300 \times 300 \mathrm{~mm}, 4.5 \mathrm{~mm}$ thick. |  |
| 11 | Bottle, dropping | A three-piece pipette section comprising a stout glass dropper, high density polyethene stopper with dust-proof head and vinyl teat fitted to a bottle of <br> (a) Clear glass, 100 mL | 60 |
|  |  | (b) Amber glass, 100 mL | 60 |
| 12 | Bottle, narrow mouth | With dust-proof stopper. |  |
|  |  | (a) Clear glass, 250 mL | 30 |
|  |  | (b) Amber glass, 250 mL | 90 |
|  |  | (c) Clear glass, 500 mL | 20 |
|  |  | (d) Amber glass, 500 mL | 15 |
| 13 | Bottle, wide mouth | With dust-proof stopper. |  |
|  |  | (a) Clear glass, 250 mL | 60 |
|  |  | (b) Amber glass, 250 mL | 20 |
| 14 | Bottle top dispenser | Bottle top and digital, with alternative adaptors for different bottle sizes, accuracy within $1 \%$. | 3 |
| 15 | Brush | (a) For test tubes of diameter 10 to 12 mm . Nylon, diameter of head 15 mm . | 12 |
|  |  | (b) For test tubes of diameter 16 to 25 mm . Nylon, diameter of head 30 mm . | 12 |
|  |  | (c) For burette of capacity 50 mL . Nylon, diameter of head 19 mm , overall length 750 mm . | 12 |

\begin{tabular}{|c|c|c|c|}
\hline Item No \& Item \& Description \& Quantity \\
\hline 16 \& Burette \& With teflon stopcock, 50 mL in 0.1 mL graduations. \& 45 \\
\hline 17 \& Burette clamp \& Fitting retort stand rod up to 13 mm diameter. \& 45 \\
\hline \multirow[t]{2}{*}{18} \& \multirow[t]{2}{*}{Burner} \& (a) Bunsen \& 24 \\
\hline \& \& \begin{tabular}{l}
For either town gas or liquefied petroleum gas depending on the type supplied. Nickel plated burner tube with rotatable air regulator and tapering, riffled connector, mounted on an enamelled pressed-steel base. Burner tube \(100 \times 13 \mathrm{~mm}\) (height x diameter), base 80 mm diameter, connector 10 mm mean outer diameter \\
(b) Teclu \\
For either town gas or liquefied petroleum gas depending on the type supplied. Nickelplated burner tube with a threaded disc valve for adjustment of air/gas mixture. Burner tube \(105 \times 13 \mathrm{~mm}\) (height \(\times\) diameter), base 80 mm diameter, connector 10 mm mean outer diameter
\end{tabular} \& 1

1 <br>
\hline 19 \& Chromatography column \& Borosilicate glass for gravity elution, quickfit, $400 \times 20 \mathrm{~mm}$ (length x diameter). \& 1 <br>
\hline \multirow[t]{3}{*}{20} \& \multirow[t]{3}{*}{Clips} \& (a) Mohr, plated metal, accepts tubing of maximum diameter 15 mm . \& 12 <br>

\hline \& \& | (b) Hoffman, plated metal, with clamp screw and hinged bottom plate, width between bars 20 mm . |
| :--- |
| (c) Crocodile, small. ${ }^{\text {© }}$ | \& 12

60 <br>
\hline \& \& (d) Joint clip, made of PTFE, for retaining glassware having Quickfit conical joints with joint size 14/23. \& 36 <br>
\hline 21 \& Cobalt glass \& For flame test, $25 \times 50 \mathrm{~mm}$. \& 12 <br>
\hline 22 \& Colorimeter \& With seven or more colour filters for wavelength range 400-700 nm, filter holder and tube cover. Absorbance range 0-2. Digital or analog display. Data output 0-1V. Accommodates 10 mm cuvettes or 16 mm test tubes. Battery operated or for use on 220$240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B S S plug \& ${ }^{6}$ <br>
\hline 23 \& Combustion tube ${ }^{\text {® }}$ \& Borosilicate glass, open both ends, $300 \times 20 \mathrm{~mm}$ (length x external diameter). \& 12 <br>
\hline 24 \& Cork ${ }^{\text {® }}$ \& Tapered, assorted sizes, pack of 144. \& 1 pack <br>
\hline 25 \& Cork borer set \& Borer, set of 6 from 4 to 10 mm . Plated metal. Cutting tube mounted with safety underflange in shaped handle ensuring that operator cannot be injured by a dislodged tube. With rod for clearing borers. Sharpener, plated metal cone with hinged cutter blade set in slot and metal handle. Circular shape of borer maintained by cone. Edge cut to correct angle by depressing blade using thumb pressure button and rotating borer. \& 1 set <br>
\hline 26
27 \& Crucible ${ }^{\text {e }}$

Cylinder, graduated \& | Porcelain, squat form, glazed inside and outside, unglazed base, with lid, $43 \times 23 \mathrm{~mm}$ (diameter x depth). |
| :--- |
| With spout. | \& 24 <br>

\hline \multirow{7}{*}{27} \& \multirow{7}{*}{Cylinder, graduated} \& (a) Glass or plastic, 10 mL \& 12 <br>
\hline \& \& (b) Glass or plastic, 25 mL \& 12 <br>
\hline \& \& (c) Glass or plastic, 50 mL \& 12 <br>
\hline \& \& (d) Glass or plastic, 100 mL \& 24 <br>
\hline \& \& (e) Glass or plastic, 500 mL \& 2 <br>
\hline \& \& (f) Glass or plastic, 1 L \& 1 <br>
\hline \& \& (g) Polypropene, 3 L (graduated pitcher) \& 1 <br>
\hline \multirow[t]{2}{*}{28} \& \multirow[t]{2}{*}{Data logger interface} \& Hardware: \& 5 <br>

\hline \& \& | The interface can log data from appropriate sensors by connecting to a Windowscompatible computer through a common communication port, such as serial port, parallel port and USB. It has also remote data logging capability without a computer. Provided with a combination of at least 3 analog and digital I/O channels. Analog and digital inputs can be recorded simultaneously. Sampling rates: 16 kHz or above. |
| :--- |
| Power supply: both battery operated and for mains voltage of $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies; provided with Software: |
| Runs on operating system for notebook computer / tablet PC; displays and analyses data in the forms of digits, meter, graph and table. |
| The sensors should be fully compatible with the data logger interface. | \& <br>

\hline \multirow{6}{*}{29} \& \multirow{6}{*}{Data logger sensors} \& (a) Colorimeter sensor: For measuring transmittance ( $30 \%-90 \%$ ) of light ( $400-700 \mathrm{~nm}$ ) through a solution, with cuvettes and caps. \& 5 <br>
\hline \& \& (b) Conductivity sensor: For measuring conductivity $(0-20,000 \mathrm{mS} / \mathrm{cm})$ in aqueous solutions. \& 5 <br>
\hline \& \& (c) Temperature sensor: For measuring temperatures ranging from $-35^{\circ} \mathrm{C}$ to $+135^{\circ} \mathrm{C}$, with an accuracy of $\pm 0.5^{\circ} \mathrm{C}$. \& 5 <br>

\hline \& \& | (d) Light sensor: For measuring light intensity level, suitable for indoor and outdoor experiments with spectral response: $400-1,000 \mathrm{~nm}$. |
| :--- |
| (e) pH sensor: For measuring pH values ranging from 0 -14 with an accuracy of $\pm 2 \%$. | \& 5 <br>

\hline \& \& (f) Pressure sensor: For measuring gas pressure ranging from 0 to 500 kPa . \& 5 <br>
\hline \& \& (g) Voltage/Current sensor: For measuring a.c. and d.c. currents/voltage. Voltage range: $\pm 10$ volts. Current range: $\pm 1 \mathrm{amp}$. \& 5 <br>

\hline 30 \& Deioniser \& | (a) Wall mounting or bench standing. With battery operated water purity meter. For use with disposable mixed bed resin. Output: 100 to $1,000 \mathrm{~L}$ of tap water depending on hardness. Flow rate: up to $100 \mathrm{~L} / \mathrm{hr}$. Effluent quality: conductivity $2 \mathrm{mS} / \mathrm{cm}$ residual solid <10 0 ppm pH 6-7. |
| :--- |
| (b) Cartridge of mixed bed ion-exchange resin. | \& 1

1 <br>
\hline 31 \& Desiccator \& Glass, with knob cover and perforated metal/porcelain disc, 210 mm top internal diameter, 190 mm disc diameter, 85 mm depth of disc below flange. \& 2 <br>
\hline 32 \& Digital thermometer \& Digital display, stainless steel probe, $-50^{\circ} \mathrm{C}$ to $150^{\circ} \mathrm{C} \times 0.1^{\circ} \mathrm{C}$, battery operated, probe sheath. \& 12 <br>
\hline 33 \& Drier, with hot air and cold air output \& A low noise hair drier suitable for rapid drying of laboratory glassware, chromatograms, etc. A detachable nozzle is provided and there is an adjustable heat/speed setting. \& 1 <br>
\hline \multirow[t]{2}{*}{34} \& \multirow[t]{2}{*}{Electrode} \& (a) Carbon, $100 \times 5 \mathrm{~mm}$ (length x diameter). ${ }^{\text {e }}$ \& 48 <br>
\hline \& \& (b) Platinum foil, mounted in glass tube with 4 mm socket. \& 12 <br>
\hline 35 \& Electrode holder \& Plastic holder about $80 \times 20 \times 12 \mathrm{~mm}$ (length x width x height) with two crocodile clips for holding rod/foil electrodes. \& 12 <br>
\hline
\end{tabular}

| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 36 | Electrolysis cell | Comprises stout open ended glass tube, the lower end of which accommodates a tight-fitting rubber stopper fitted with two tapered carbon electrodes. Connection made by crocodile clips. Short-circuiting of electrodes is prevented by a strip of insulating material set into the rubber between the leads | 12 |
| 37 | Eye wash unit | Equipped with an eye wash bottle. With dust cap for eye bath and side tube for draining of contaminated water. The bottle is clipped into a moulded panel on which simple but complete instructions are printed. The panel has holes for wall hanging. | 1 |
| 38 | Filter Paper ${ }^{\text {e }}$ | (a) Whatman No.1, 7 cm diameter. | 2 packs |
|  |  | (b) Whatman No.1, 12.5 cm diameter. | 5 packs |
| 39 | Flask, Buchner | Conical form with heavy wall for vacuum filtration, capacity 250 mL . |  |
| 40 | Flask, conical ${ }^{\text {® }}$ | Narrow mouth, pyrex or equivalent. |  |
|  |  | (a) 100 mL | 12 |
|  |  | (b) 250 mL | 90 |
| 41 | Flask, flat bottom ${ }^{\text {e }}$ | Medium neck, pyrex or equivalent. |  |
|  |  | (a) 250 mL | 2 |
|  |  | (b) 500 mL | 2 |
| 42 | Flask, volumetric | Graduated one mark, with inter-changeable plastic stopper, pyrex or equivalent. |  |
|  |  | (a) 100 mL | 45 |
|  |  | (b) 250 mL | 45 |
|  |  | (c) 1 L | 4 |
|  |  | (d) 2 L | 1 |
|  |  | (e) 5 L | 1 |
| 43 | Forceps | Blunt ends, stainless steel, length 130 mm . | 12 |
| 44 | Funnel | (a) Buchner, porcelain, for filter paper of 70 mm diameter. | 12 |
|  |  | (b) Dropping, cylindrical, open top, with interchangeable teflon stopcock, borosilicate glass, 100 mL . | 3 |
|  |  | (c) Filter, plain, soda lime glass, 75 mm top diameter. ${ }^{\text {® }}$ | 45 |
|  |  | (d) Filter, plain, soda lime glass, 150 mm top diameter. ${ }^{\text {© }}$ | 3 |
|  |  | (e) Separating, conical shape, with interchangeable teflon stopcock and polypropene stopper, borosilicate glass, capacity 250 mL . <br> (f) Thistle, with straight stem, soda lime glass, overall length 300 mm . | 12 3 |
| 45 | Gas jar, with cover | With base and ground top flange, glass, $50 \times 150 \mathrm{~mm}$ (diameter x height) with circular glass cover, ground one side, 75 mm diameter. | 24 |
| 46 | Glass rod | Soda lime glass, in length of about $1.5 \mathrm{~m}, 6 \mathrm{~mm}$ diameter. | 1 kg |
| 47 | Glass tubing | Soda lime glass, in length of about $1.5 \mathrm{~m}, 8 \mathrm{~mm}$ external diameter. Pack of 25 . | 1 pack |
| 48 | Gloves | (a) Chemical resistant, for handling acids, alkalis and organic solvents, long cuff. Special finish for an excellent wet grip. ${ }^{\circledR}$ | 2 pairs |
|  |  | (b) Heat/Cold resistant, made of non-flammable non-asbestos material, with low thermal conductivity, high strength and high abrasion resistance, gives no dermatological problems. For furnace and hotplate work in the laboratory. Gauntlet length. <br> (c) Disposable nitrile gloves. Gives good resistance to abrasion, nicks and cuts and offers superior splash protection against irritating chemicals. 100 pieces a pack. | 1 pair 1 pack |
| 49 | Hand protector | Silicon rubber, capable of withstanding temperatures up to $250^{\circ} \mathrm{C}$. | 12 |
| 50 | Hazard warning labels | Self-adhesive labels printed with various hazard symbols plus the appropriate hazard wording. Sheets of mixed symbols cover chemical hazards of toxic, harmful, corrosive, irritant, explosive, flammable and oxidising. Pack of about 100 for each symbol. | 1 pack |
| 51 | Heating mantle | For round bottomed flasks up to 250 ml , maximum temperature $450^{\circ} \mathrm{C}$, fitted with earthed energy regulator screen, for use on 220-240V. | 2 |
| 52 | Hoffman voltameter with stand | Two graduated limbs, each of 50 mL capacity, integral with reservoir tube and funnelshaped bulb, with a stopcock at top of each limb, overall length approximately 650 mm , with interchangeable platinum and carbon electrodes mounted in rubber stoppers for insertion into the voltameter limbs. Supplied with stand. | 1 set |
| 53 | Hydrogen fuel cell teaching kit | A solar cell module for conversion of radiant energy of light into electrical energy. A PEM electrolyser uses the electrical energy from the solar cell module to split water into hydrogen and oxygen gases, and stored in gas cylinders. A PEM fuel cell recombines the stored gases to produce water and electricity. Load measurement module for setting of various loads (resistances, lamp, motor) and display of voltage and current in the fuel cell circuit. User manual. | 1 |
| 54 | Labels | Plain, gummed, pack of 90. | 1 pack |
| 55* | Centralized low voltage power supply unit* <br> Magnetic stirrer-hotplate | (For detailed specifications, please refer to footnote.) | 1 |
| 56 |  | 1,300 r.p.m. and $400{ }^{\circ} \mathrm{C}$ maximum, with energy regulator controlled 400 W hotplate. Mains and load indicator lamps, mains cable. With one each $20 \& 40 \mathrm{~mm}$ PTFE coated followers and instructions. Designed to prevent spillage from entering the base structure. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B S S plug. | 12 |
| 57 58 | Melting point apparatus | Electrically heated, with adjustable rate of temperature rise, built-in boost heater, accommodates three melting point tubes which can be observed simultaneously by means of full field lens. A cast aluminum case encloses the heating block and controls. Maximum temperature $360^{\circ} \mathrm{C}$. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. | 1 |
| 58 | Melting point tube, Thiele | Borosilicate glass apparatus with side tube to allow stirring by convection of heating liquid. | 12 |
| 59 | Microscale chemistry kit | ```Set comprises at least: 1 well-plate with about 2 mL and 0.3 mL wells 6 thin stemmed plastic pipets 1 syringe ( 2 mL , no needle) 1 gas lid set ( 2 pieces) 2 silicone tubes ( 4 cm x 4 mm ) 1 microburner 1 plastic microstand``` | 12 sets |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 60 61 | Mortar and pestle <br> Multimeter | 8 plastic microspatulas 1 plastic gas collection tube with lid 1 small glass rod 1 zinc and copper electrode set 1 current indicator with crocodile clip 1 glass combustion tube $(6 \mathrm{~cm} \times 4 \mathrm{~mm})$ 1 glass fusion tube 1 silicone delivery tube with U-bend Unglazed inside, glazed outside, with spout, porcelain, external diameter 160 mm. Digital display. Automatic or manual range selection. Automatic zero point compensation. Overload protection in all ranges. Measurement ranges: 200 mV to $1,000 \mathrm{~V}$ d.c. 2 V to 600 V a.c. 200 mA to 10 A d.c./a.c. 200 ohms to 2 megaohms | 12 12 |
| 62 63 | Nichrome wire <br> Microcomputer workstation | For flame test, wire length 33 mm , fused into 75 mm glass handle. | $12$ |
| 64 | Organic chemistry glassware | (a) Quickfit, joint size 14/23. <br> (i) Pear shaped flask, 50 ml <br> (ii) Still head <br> (iii) Liebig condenser <br> (iv) Screwcap adapter <br> (v) Receiver adapter <br> (vi) Dropping funnel, 50 ml , with GP Rotaflo tap <br> (vii) Stopper <br> (viii) Round bottom flask, 25 ml <br> (ix) Air condenser/drying tube <br> (b) Microscale, glass, joint size 14/10. <br> (i) Jacket condenser, threaded joint, 80 mm <br> (ii) Round bottom flask, 5 ml (x4) <br> (iii) Adapter for inlet or thermometer <br> (iv) Distillation adapter, threaded joint <br> (v) Vacuum takeoff adapter, threaded joint <br> (vi) Claisen adapter, threaded joint <br> (vii) Tube for gas collection <br> (viii) Flask, 25 ml <br> (ix) Filter funnel, 27 mm diameter <br> (x) Septum, teflon-lined silicon rubber <br> (xi) cap, with hole <br> (xii) O-ring, Viton | 12 sets |
| 65 | Oven | Drying, volume of chamber about 115 L . Temperature up to $300^{\circ} \mathrm{C}$, with thermoregulator. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. | 1 |
| 66 | Petri dishes | Clear crystal glass, polished top and bottom, $90 \times 15 \mathrm{~mm}$ (diameter x depth). | 12 |
| 67 68 | pH meter ${ }^{\text {Pipe-clay triangle }}$ | Measuring range $0-14 \mathrm{pH}$, with combination electrode and temperature compensator. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase a.c. supplies or battery operated. Digital display. Length of sides 50 mm . | 24 |
| 69 | Pipette | Bulb type, single graduation on upper stem. <br> (a) 10 mL <br> (b) 25 mL | $\begin{aligned} & 45 \\ & 45 \end{aligned}$ |
| 70 | Pipette, graduated | Fast-flow, with permanent graduations. <br> (a) 1 mL , subdivision 0.01 mL <br> (b) 5 mL , subdivision 0.05 mL <br> (c) 10 mL , subdivision 0.1 mL | $\begin{aligned} & 12 \\ & 12 \\ & 24 \end{aligned}$ |
| 71 | Pipette filler | Ear syringe, rubber | 45 |
| 72 | Pipettor | (a) Digital micropipettes, with adjustable volume from 0.1 ml to 1 ml . <br> (b) Disposable pipette tips, capacity from 0.1 ml to 1 ml , pack of 500 . | $\begin{gathered} 6 \\ 1 \text { pack } \end{gathered}$ |
| 73 | Polymer kit | Comprising 8 containers of polythene, polystyrene, perspex, PVC, polypropene, nylon, bakelite and urea methanal of 80 g each. Each kind of plastic being contained in plastic vial. | 1 kit |
| 74 | Porous pot | Cylindrical, $150 \times 50 \mathrm{~mm}$ (height x diameter). | 1 |
| 75 76 | Projection system with screen <br> Pump, vacuum | Oil-free dry pump; pumping speed approx. $15 \mathrm{~L} / \mathrm{min}$. | $12$ |
| 77 | Rack | (a) Burette, for holding 12 burettes. <br> (b) Pipette, for holding 24 pipettes. <br> (c) Test tube, for holding test tubes of 22 mm and 32 mm diameters. | $\begin{gathered} 4 \\ 2 \\ 24 \end{gathered}$ |
| 78 | Refrigerator | Please refer to the end of this list for the specifications. | 1 |
| 79 | Respirator with filter cartridge | (a) Respirator. Moulded rubber body with anodised aluminum screw retainer. Fitted with two relief valves and an adjustable elastic band. <br> (b) Filter cartridge. For use in the presence of common organic vapours and acid gases. ${ }^{\text {© }}$ | 3 pairs |
| 80 81 | Retort stand with boss and clamp Rubber bung ${ }^{\text {e }}$ | Retort stand base, iron with corrosion resistant finish, minimum size $160 \times 100 \mathrm{~mm}$. Stand rod, cadmium plated mild steel/bright aluminum alloy, $500 \times 12 \mathrm{~mm}$ (length x diameter). Clamp enables articles from 2 to 90 mm diameter to be clamped securely. Design of the jaw ensures a firm grip at all angles of opening. The cork liners for the jaws are well secured. With 8 mm diameter rod suitable for use in bosshead. Bossheads with offset jaws for rods up to 16 mm diameter. Assorted sizes. | 45 |
|  |  | (a) Single hole <br> (b) Double hole | $\begin{aligned} & 80 \\ & 80 \end{aligned}$ |


| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
|  |  | (c) Solid (without holes) | 200 |
| 82 | Safety goggles | Splash-proof. With single replaceable wide-angle clear polycarbonate lens, indirectly ventilated, flexible clear PVC frame for all-round vision. Fitted with adjustable headband with retained ends. | 2 |
| 83 | Safety screen | Transparent polycarbonate, comprising central panel about $600 \times 300 \times 3 \mathrm{~mm}$ (height x width x thickness) connected to outer panels of $600 \times 230 \times 3 \mathrm{~mm}$ (height x width x thickness) on each side by full heighthinges. | 1 |
| 84 | Safety spectacles ${ }^{\text {e }}$ | Constructed of polycarbonate, spectacle type with side shields giving all round protection Top guard and lip prevents spillage into eyes. May be worn over prescription spectacles. | 45 |
| 85 | Screw-neck tube | Glass, round bottomed, screw neck, with cap, $160 \mathrm{~mm} \times 16 \mathrm{~mm}$. | 100 |
| 86 | Separating funnel holder | Support separating funnels with a minimum diameter of 86 mm . Suitable for rods 9.5-13 mm diameter. | 12 |
| 87 | Shield, face | With curved hard plastic visor which can be raised from the face when not required, with adjustable headband. | 2 |
| 88 | Spatula | Stainless steel, overall length about 150 mm . | 36 |
| 89 | Spill pack ${ }^{\text {e }}$ | The spill pack is made up of six containers each with enough absorbent material to absorb a spillage of up to 500 mL . Two packets of soda ash are also provided for neutralization of acid spills. Supplied with instructions and ten stout polythene bags for collection of spillage | 1 pack |
| 90 | Spoon, combustion | Steel with brass flange, length 350 mm , diameter of cover about 88 mm , of cap about 18 mm. | 24 |
| 91 | Stirrer bar | Made of PTFE, 20 mm length. | 12 |
| 92 | Stop watch | Digital display, reads up to 60 minutes, accuracy at least 0.2 s , with start/stop/reset buttons. | 12 |
| 93 | Syringe | (a) Precision ground, gas tight, heat resistant glass, free- running capacity 100 mL , graduated at 1 mL intervals, outlet tube 7 mm diameter. <br> (b) Polypropene, synthetic rubber piston with tapered nozzle. Withstand temperature up to $125^{\circ} \mathrm{C}$. Capacity 50 mL , graduated in 1 mL interval. ${ }^{\oplus}$ <br> (c) Disposable, graduated, with plastic fitting, clear polystyrene barrel, 10 mL . ${ }^{\circledR}$ <br> (d) Disposable, graduated, with plastic fitting, clear polystyrene barrel, 5 mL . ${ }^{\circledR}$ | 12 12 45 45 |
| 94 | Test tube ${ }^{\circledR}$ | Medium wall, with rim. <br> (a) Pyrex or equivalent, $150 \times 24 \mathrm{~mm}$. <br> (b) Pyrex or equivalent, $150 \times 18 \mathrm{~mm}$. <br> (c) Glass, $75 \times 10 \mathrm{~mm}$. | $\begin{aligned} & 100 \\ & 900 \\ & 200 \end{aligned}$ |
| 95 | Test tube holder | With steel spring, to take tubes up to 19 mm diameter, length about 185 mm . | 45 |
| 96 | Thermometer | Non-mercury, with reinforced bulb and permanent graduations. <br> (a) $-10^{\circ} \mathrm{C}$ to $110^{\circ} \mathrm{C} \times 1^{\circ} \mathrm{C}, 305 \mathrm{~mm}$ length. <br> (b) $-10^{\circ} \mathrm{C}$ to $110^{\circ} \mathrm{C} \times 1^{\circ} \mathrm{C}, 155 \mathrm{~mm}$ length. <br> (c) $-10^{\circ} \mathrm{C}$ to $300^{\circ} \mathrm{C} \times 1^{\circ} \mathrm{C}, 305 \mathrm{~mm}$ length. | $\begin{aligned} & 12 \\ & 12 \\ & 12 \end{aligned}$ |
| 97 | Thin layer chromatography plate | Flexible silica gel plates, layer $250 \mu \mathrm{~m}$, aluminium backing, without fluorescent indicator, $20 \mathrm{~cm} \times 20 \mathrm{~cm}$. | 1 pack |
| 98 | Tile | White ceramic, $105 \times 105 \mathrm{~mm}$. | 45 |
| 99 | Tongs, crucible | Stainless steel, straight with flattened hinge, 200 mm . | 24 |
| 100 | T-piece ${ }^{\oplus}$ | Glass, 6 mm bore. | 12 |
| 101 | Tripod stand | Triangular top, cast iron, with splayed steel legs, $150 \times 210 \mathrm{~mm}$ (length of side x height). | 24 |
| 102 | Trolley | For transport of apparatus, four wheels, stainless steel frame, stainless steel trays of size about $760 \times 460 \mathrm{~mm}$, height of top tray about 900 mm , height between trays about 350 mm | 4 |
| 103 | Trough | Plastic, $350 \times 150 \mathrm{~mm}$ (diameter x depth). | 2 |
| 104 | Tube, capillary ${ }^{\text {e }}$ | For melting point determination, open at both ends, $100 \times 1.8$ to 2.0 mm (length x diameter). Pack of 100 . | 10 packs |
| 105 106 | Tubing, Bunsen / Teclu burner ${ }^{\circledR}$ Tubing, rubber ${ }^{\circledR}$ | Rubber, with indication of Approval Mark \& Expiry Date of Service Life on hose surface About 9 mm internal bore, not more than 2 m length, for either town gas or liquefied petroleum gas depending on the supplied. <br> (a) Normal wall, $3 \times 1.5 \mathrm{~mm}$ (bore x wall thickness). | 25 10 m |
|  |  | (b) Normal wall, $5 \times 1.5 \mathrm{~mm}$ (bore x wall thickness). <br> (c) Normal wall, $8 \times 1.5 \mathrm{~mm}$ (bore x wall thickness). | $\begin{aligned} & 10 \mathrm{~m} \\ & 10 \mathrm{~m} \end{aligned}$ |
| 107 | U-tube ${ }^{\text {e }}$ | Glass, $125 \times 15 \mathrm{~mm}$ (height x external diameter). | 12 |
| 108 | Wash bottle | White translucent, flexible, with screw cap and bent tube, polyethene, 250 mL capacity. | 45 |
| 109 | Watch glass ${ }^{\text {e }}$ | Ground edge, 100-120 mm diameter. | 24 |
| 110 | Water bath | (a) Bath Unit. Unstirred thermostatic bath. Made of stainless steel. Capacity 22 L. Has a sheathed immersion element incorporating a safety cut-out. Heater power 1,500 W. Temperature range ambient to $100^{\circ} \mathrm{C}$, sensitivity $\pm 0.3^{\circ} \mathrm{C}$, uniformity $\pm 0.1^{\circ} \mathrm{C}$. The bath has an illuminated ON/OFF switch and a heater indicator lamp. With stainless steel lid bearing an insulated handle. <br> (b) Stainless steel test tube racks for holding test tubes of 24 mm diameter. | 1 2 |
| 111 | Wire gauze ** | Ceramic centred, asbestos free, $150 \times 150 \mathrm{~mm}$. | 24 |
| 112 | Y-piece ${ }^{\text {e }}$ | Glass, 6 mm bore. | 5 |
| CHEMICALS (The following items are consumables) |  |  |  |
| 113 | Agar |  | 100 g |
| 114 | Aluminum foil |  | 250 g |
| 115 | Aluminum oxide |  | 500 g |
| 116 | Aluminum sulphate |  | 500 g |
| 117 | Ammonia solution, 0.880 |  | 2.5 L |
| 118 | Ammonium carbonate |  | 500 g |
| 119 | Ammonium chloride |  | 1 kg |




| Item No | Item | Description | Quantity |
| :---: | :---: | :---: | :---: |
| 238 | Sucrose |  | 250 g |
| 239 | Sulphur，crushed |  | 250 g |
| 240 | Sulphuric acid，conc． |  | 2.5 L |
| 241 | Test paper，blue litmus（ $\mathrm{pkt} / 200$ ） |  | 3 packs |
| 242 | Test paper，cobalt chloride（pkt／200） |  | 1 pack |
| 243 | Test paper，lead ethanoate（pkt／200） |  | 1 pack |
| 244 | Test paper，neutral litmus（pkt／200） |  | 3 packs |
| 245 | Test paper， pH ，range 1－14（pkt／200） |  | 12 packs |
| 246 | Test paper，red litmus（pkt／200） |  | 3 packs |
| 247 | Test paper，starch iodide（pkt／200） |  | 1 pack |
| 248 | Tin，foil |  | 100 g |
| 249 | Tin（II）chloride |  | 100 g |
| 250 | Universal indicator |  | 100 mL |
| 251 | Urea |  | 500 g |
| 252 | Vaseline |  | 100 g |
| 253 | Wooden splints（pkt／1000） |  | 1 pack |
| 254 | Zinc carbonate |  | 250 g |
| 255 | Zinc chloride |  | 250 g |
| 256 | Zinc nitrate |  | 100 g |
| 257 | Zinc sulphate－7－water |  | 500 g |
| 258 | Zinc，foil |  | 250 g |
| 259 | Zinc，granulated |  | 500 g |
| FURNITURE |  |  |  |
| 260 | Box，first－aid | Single door，approx．dimensions of $280 \times 280 \times 110 \mathrm{~mm}$（width $\times$ depth $\times$ height） | 1 |
| 261 | Stool | Wooden or plastic seat，approx．dimensions of $300 \mathrm{~mm} \times 300 \mathrm{~mm}$ ， 530 mm height | 45 |
| 262 | Chemical waste storage cupboard | Overall dimension 910 mm （W）x 460 mm （D）$\times 1830 \mathrm{~mm}$（H）Steel，double door，fitted with 3－point locking espagnolette bolt，controlled by 6－level lock with one adjustable shelf．With words＂CHEMICAL WASTES 化學廢物＂（not less than 60 mm in height） printed clearly and boldly in red on a white background on the left door． 4 ventilation holes on each side．Rust proof finish． | 2 |
| 263 | Stainless steel spill catcher tray | Overall dimension 380 mm （W）$\times 145 \mathrm{~mm}$（D）$\times 380 \mathrm{~mm}$（H）． | 6 |
| 264 | Heavy－duty plastic spill catcher tray | Overall dimension 380 mm （W）x 362 （D）$\times 380 \mathrm{~mm}$（H）． | 6 |
|  | Total cost for Subject |  | 503，000 |

Remark：
This list is for reference only．The items and the quantities to be purchased are subject to the types of practical activities planned and the size of the classes．
Potassium manganate（VII）is regarded as one of the controlled chemicals under the Control of Chemicals Ordinance．Schools wishing to acquire potassium manganate（VII）for experimental purpose must apply for a Storage Approval from Customs and Excise Department（Tel． 25414383 ）．For more information about the controlled chemicals，please refer to the website http：／／www．customs．gov．hk／en／trade＿facilitation／chemicals／index．html2，4－Dinitrophenylhydrazine solid should be kept damp or＇wetted to minimise the risk of udst／air explosion．Stand the bottle of damp solid inside a larger container that also contains a little tap water in the bottom（ $\sim 10 \mathrm{~mm}$ depth）．Label both the inner and outer containers．If solid may have become dry，do NOT attempt to open the bottle．Schools should defer the acquisition of this item until they are required for use in experiments．

## ＠Consumable items

\＃The asbestos－free requirement should be clearly specified when purchasing the item．As a safeguarding measure，schools may consider requesting suppliers to provide evidence（e．g． laboratory testing report）authenticating their products are free of asbestos．School may also consider using other alternatives e．g．stainless steel bench mat if suppliers fail to authenticate their products are free of asbestos．
\＃\＃The asbestos－free requirement should be clearly specified when purchasing the item．As a safeguarding measure，schools may consider requesting suppliers to provide evidence（e．g． laboratory testing report）authenticating their products are free of asbestos．School may also consider using other alternatives e．g．wire gauze without the ceramic center if suppliers fail to authenticate their products are free of asbestos．

## \＃\＃\＃Refrigerator

（1）Double door，with freezer and chiller compartments．
（2）Storage Capacity：net overall capacity of about 180－220 litres．
（3）Dimensions：not exceed $1,600 \mathrm{~mm}$ in height．
（4）Defrosting：frost－free．
（5）Energy rating：Two stars $\left(2^{*}\right)$ as a minimum．
（6）Freezer compartment：not higher than－12oC．
（7）Chiller compartment：not higher than 4 oC ．
（8）Ice tray of suitable design：should be provided．
（9）Refrigerant：non－toxic，non－explosive and odourless，preferably with low Global Warming Potential．
Remarks：The refrigerator should not be used to store volatile flammable liquids and alkali metel（e．g．sodium）．

## ＊Specifications of Centralized low voltage power supply unit

This equipment is designed to provide a source of low voltage a．c．or d．c．Power supplies simultaneously to distribution points with output controlled from the unit；for general use in school laboratories with provision for charging secondary batteries．A single phase a．c．supply is taken from an outlet with fused plug and is connected to the double pole isolator which disconnects the supply completely from all components immediately when the front panel is opened．From the isolator，power is taken through the input circuit breaker to the variable ratio auto－transformer．The input circuit is protected against both surge or steady overload by the input circuit breaker．Input current and voltage are indicated by the input ammeter and input voltmeter at the top of the front panel．The output from the variable ratio auto－transformer is taken to the primary of a fixed ratio，step down，double wound，main transformer．The secondary of this main transformer is taken to the rotary selector switch．To provide a．c．sources，the secondary output is fed via the output ammeter，output voltmeter and output circuit breaker to the output terminals．The output circuit breaker designed to withstand heavy current arcs safeguards the output circuit．To provide d．c．sources，the low voltage alternating current is fed into the selenium cell full wave bridge connected rectifier and then via the output meters and output circuit breaker to the output terminals．The d．c．output is unsmoothed and the polarity is indicated by terminal colour．All the measuring instruments are of the moving iron type．The input and output circuit breakers are both of the magnetic terminal release type and are adjusted to trip at 5 and 50 A respectively．For inspection
purposes, the front panel is hinged at the bottom to allow it to be opened through 140 o . The internal wiring is colour coded, with green for a.c. and red/black for d.c. When opening, the supply is automatically disconnected making the wiring "dead" and perfectly safe to touch.

For laboratory use
The output from the unit is taken via a ring main circuit to at most 13 distribution points in the laboratory. The output voltage and/or current may be kept constant or varied by adjustment of the auto-transformer.

Maximum outputs are:
$0-14 \mathrm{~V}$ at 40 A a.c. or d.c.
$14-18 \mathrm{~V}$ at 32 A a.c. or d.c.

For battery charging, the cells should be connected in series with the positive and negative terminals connected to the output terminals of like polarity. The maximum number of 2 V cells that can be charged is 6 and the maximum charging current advised by the battery manufacturer should not be exceeded. The unit is rated at 580 VA. Overall dimensions approximately $540 \times 310 \mathrm{x}$ 740 mm (length x width x height). For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase, a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug.

## Reference List of Furniture and Equipment

for Secondary School
Subject : SS Physics



\begin{tabular}{|c|c|c|}
\hline Item No \& Description \& Quantity \\
\hline \multirow[t]{2}{*}{22} \& \begin{tabular}{l}
Voltage resolution: 10 mV or better \\
Sample rate: not less than 1000 Hz \\
(m) Acceleration sensor (3-axis) and Altimeter \\
Can be used to measure and present acceleration in \(\mathrm{x}, \mathrm{y}\) and z axes, resultant acceleration as well as altitude (in metres). \\
Range of acceleration: \(\pm 10 \mathrm{~g}\) or better \\
Resolution of acceleration: \(\pm 0.01 \mathrm{~g}\) or better \\
Range of altitude: up to 7 km above sea level \\
Resolution of altitude: \(\pm 50 \mathrm{~cm}\) or better \\
Demonstration meter
\end{tabular} \& 5
2 \\
\hline \& \begin{tabular}{l}
Accepts large interchangeable plastic scales to enable the use as a demonstration a.c./d.c. ammeter or voltmeter. \\
A magnetically damped, spring-controlled moving coil movement with a pointer, housed in case with transparent front and rear panels to enable all working parts to be clearly seen. \\
With a pair of 4 mm socket terminals and a centre zero adjustment control. \\
Comprises: \\
(a) Interscale demonstration meter \\
Sensitivity of 300 A f.s.d. at d.c. 100 mV \\
(b) Current and Voltage range scales \\
- d.c. current, range \(2.5-0-2.5 \mathrm{~mA}\) \\
-d.c. current, range \(0-10 \mathrm{~mA}\) \\
- d.c. current, range \(0-100 \mathrm{~mA}\) \\
- d.c. current, range 0-1 A \\
- d.c. current, range \(0-10 \mathrm{~A}\) \\
- d.c. voltage, range \(0-1 \mathrm{~V}\) \\
- d.c. voltage, range \(0-15 \mathrm{~V}\) \\
- d.c. voltage, range \(5-0-5 \mathrm{~V}\) \\
- a.c. current, range \(0-10 \mathrm{~mA}\) \\
- a.c. current, range \(0-1 \mathrm{~A}\) \\
- a.c. current, range \(0-10 \mathrm{~A}\) \\
- a.c. voltage, range \(0-15 \mathrm{~V}\) \\
- a.c. voltage, range \(0-300 \mathrm{~V}\)
\end{tabular} \& 1 each \\
\hline \multirow[t]{2}{*}{24} \& \begin{tabular}{l}
Dice \\
Used to study the radioactive decay law by performing an analogue dice throwing simulation. \\
With 6 faces, approx. \(14 \mathrm{~mm} \times 14 \mathrm{~mm} \times 14 \mathrm{~mm}\) \\
Diffraction grating
\end{tabular} \& 100 \\
\hline \& \begin{tabular}{l}
Embedded in \(50 \times 50 \mathrm{~mm}\) slide or film mounts. \\
(a) 300 lines per mm . \\
(b) 600 lines per mm .
\end{tabular} \& \[
\begin{aligned}
\& 10 \\
\& 10
\end{aligned}
\] \\
\hline 25
26 \& \begin{tabular}{l}
Ear model \\
- An enlarged model of the ear showing pinna, auditory canal, tympanic membrane, incus, malleus, stapes, cochlea and semicircular canals isolated from surrounding tissues. \\
- Mounted on a stand so that effect of sound wave vibrations can be demonstrated. \\
- Approximate dimension: \(280 \mathrm{~mm} \times 210 \mathrm{~mm} \times 140 \mathrm{~mm}\)
\end{tabular} \& 1 set
1 set \\
\hline \multirow[t]{2}{*}{27} \& \begin{tabular}{l}
For providing a qualitative practical demonstration of Lenz's law. \\
Comprises: \\
- a copper tube (about \(320 \mathrm{~mm} \times 15 \mathrm{~mm}\) ) together with a pair of cylindrical 'plugs' (the plugs are identical in appearance and mass but one \\
is plain steel and one is a powerful neodymium plug). \\
- a pair of plastic caps to provide self contained storage. \\
Electric field Kit
\end{tabular} \& 1 set \\
\hline \& \begin{tabular}{l}
To give visual demonstration of electric fields \\
Comprises: \\
(a) Electric field apparatus \\
Comprises: \\
- 1 transparent plastic base supports a dish 90 mm diameter approx. \\
- two 4 mm socket terminals, mounted on insulating \\
pillars 30 mm high approx. \\
- 2 wire point electrodes \\
- 1 ring electrode \\
- 2 line electrodes \\
(b) Castor oll \\
(c) Semolna powder
\end{tabular} \& \[
\begin{aligned}
\& 2 \text { litres } \\
\& 40 \text { grams }
\end{aligned}
\] \\
\hline \multirow[b]{2}{*}{29

30} \& | Extra high tension (EHT) power supply unit |
| :--- |
| Outputs : 0 to 5 kV d.c. short circuit current of 3 mA 0 to 5 kV d.c. short circuit current of $60 \mu \mathrm{~A}$ |
| through $50 \mathrm{M} \Omega$ resistor. |
| 6 V a.c at approx. 2 A (for filament) |
| - The $50 \mathrm{M} \Omega$ safety resistance is built in and can be brought into use as required, and for additional safety measure there is $1 \mathrm{M} \Omega$ resistance between the voltage doubler capacitors and the metered +ve and -ve sockets. |
| - Enclosed in robust metal case with pilot light and mains switch. |
| - For use on 220-240 V a.c. 50 Hz , single phase supplies. |
| Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. | \& 1 kit <br>

\hline \& | The system comprises a transmitter, a receiver and a length of optical fibre to demonstrate long distance communication. Specifications are given as below: |
| :--- |
| (a) Transmitter: |
| 1. Light source - High intensity red LED; |
| 2. Modulation - internal or external; |
| 3. Ext Modulation - input 0 to 5 V approximately; |
| 4. Ext Modulation frequency range - d.c. to greater than 300 Hz approximately; |
| (b) Receiver: |
| 1. Input - solid state photo-detector; |
| 2. Output - high speed digital output, 0 to 5 V from below 20 Hz to above 300 kHz approximately; Other requirements; |
| 1. Optical termination - by simple push in connection for 1 mm diameter optical fibre; |
| 2. Electrical termination -4 mm sockets; |
| 3. Power requirements -5 to 6 V dc; |
| 4. Optical fibre - double layer polymer fibre of 1 mm nominal diameter. |
| Flat solenoid | \& 2 <br>


\hline 31 \& | Consists of approximately 250 turns of enamelled copper wire, wound on wood and plastic former. To be used with the current balance kit. |
| :--- |
| - Overall dimensions approximately $300 \times 260 \times 30 \mathrm{~mm}$. |
| Connections are made via 4 mm sockets. |
| Fleming apparatus |
| For demonstration of force acting on a current-carrying conductor in a magnetic field. Comprising a pair of metal rails with 4 mm socket terminals. A non-magnetic metal axle is free to rotate along the rails and completes the electrical contact between them. When the axle is | \& 1 <br>

\hline
\end{tabular}




\begin{tabular}{|c|c|c|}
\hline Item No \& Description \& Quantity \\
\hline \multirow[t]{2}{*}{59} \& Microphone, crystal \& \multirow[t]{2}{*}{- 1} \\
\hline \& \begin{tabular}{l}
Crystal microphone mounted in a box with 4 mm connections. \\
Can be used to demonstrate voice waveform on CRO. \\
Frequency response range: 50 Hz to 6 kHz (or better) \\
Impedance: approx. \(1 \mathrm{M} \Omega\) \\
Supplied complete with not less than 1.4 m coaxial cable and coaxial plug. Microwave radiation monitor
\end{tabular} \& \\
\hline 60 \& \begin{tabular}{l}
The meter is used to detect and measure microwave signal from mobile and cordless phones, antenna masts and microwave The meter shows signal levels approximately 0.7 to \(6.5 \mathrm{~V} / \mathrm{m}\). \\
Digital meter which can measure microwave signal and other EM waves is an alternative. \\
Mirror, plane
\end{tabular} \& \\
\hline \multirow{3}{*}{61} \& (a) Plane mirror strip \& 10 \\
\hline \& \begin{tabular}{l}
For use in ray optics, may be conveniently held in holders. \(150 \times 50 \mathrm{~mm}\) approximately. \\
(b) Wooden block
\end{tabular} \& 10 \\
\hline \& Wooden block, finished in matt black, with a slot in the side to accommodate plane mirror. \& \\
\hline \multirow[t]{2}{*}{62} \& Model eye apparatus \& 1 set \\
\hline \& \begin{tabular}{l}
(a) Model eye kit \\
- A 4 litre round bottom flask with cork support ring filled with fluorescein. \\
- Designed to demonstrate normal, long and short sight and the function of spectacles. \\
- With the following 50 mm diameter meniscus lenses:
\[
+5.5 \mathrm{D},+8 \mathrm{D},+11 \mathrm{D},+2.5 \mathrm{D},-3 \mathrm{D}
\] \\
(b) Compact light source \\
A very efficient 12 V 100 W quartz iodine lamp mounted in a well ventilated metal housing. Two shuttered holes are provided on two adjacent sides. \\
Motor accessory set
\end{tabular} \& 1 set \\
\hline 63 \& \begin{tabular}{l}
For demonstrating the effects of eddy currents. \\
Comprises: \\
- A pair of quadrant shaped eddy current plates, one plain, one slotted. \\
- An aluminum motor disc with a pole shading piece. \\
- A vertical support rod carries two transverse holes with clamping screws to accommodate the spindles of the quadrants ad motor Motor construction kit
\end{tabular} \& \\
\hline \& \begin{tabular}{l}
Enable the students to build their own motors from scratch. Each kit should include: \\
- 2 Magnadur magnets and a mild steel yoke \\
- armature \\
- supporting base \\
- shaft and 2 split pins \\
- 4 rivets \\
- 0.6 mm PVC tinned copper wire \\
- Sellotape \\
- 50 mm tubing, 2.5 mm bore
\end{tabular} \& 10 motors \\
\hline 65 \& \begin{tabular}{l}
Multimeter, student \\
- Analogue or digital. \\
- Accuracy: \(2 \%\) d.c. and a.c. \\
- Input impedance \(10 \mathrm{M} \Omega / \mathrm{V}\) d.c. and a.c. \\
- With audible continuity check, overload protection to 400 V r.m.s. \\
Specifications: \\
V d.c. : 200 mV to 600 V in 5 ranges \\
V ac : 200 mV to 600 V in 5 ranges \\
I d c : \(200 \mu \mathrm{~A}\) to 10 A in 5 ranges \\
I a.c. : \(200 \mu \mathrm{~A}\) to 10 A in 5 ranges \\
\(\Omega: 20 \mathrm{k} \Omega-200 \mathrm{k} \Omega-2 \mathrm{M} \Omega\) in 3 ranges
\end{tabular} \& 10 \\
\hline 66 \& Oscilloscope, dual trace \({ }^{4}\) \& 2 \\
\hline 67 \& \begin{tabular}{l}
Parallel beam projector (with bulb) \\
Comprises: \\
(a) Parallel Beam Projector \\
- Designed primarily for work on spectra. Has an integral table for prisms, gratings, etc. Can produce a light beam which is continuously adjustable to be parallel, divergent or convergent by a plano-convex lens about 50 mm (diameter) x 150 mm (focal length). \\
- A SBC/SCC lamp-holder for the filament bulb on a sliding \\
- Overall dimensions approximately 320 mm (L) x 80 mm (W) \\
x 100 mm (H) \\
- For use on 12 V a.c. or d.c. supply. \\
(b) Filament bulb \\
A 12 V 24 W axial filament bulb for the projector.
\end{tabular} \& 1 set

1 set <br>

\hline 68 \& | Photo-electric unit |
| :--- |
| For evaluation of the Planck's Constant h. The apparatus comprises a photo-emissive tube with a caesium-antimony cathode, a transistorized a.c. amplifier, a calibrated linear potentiometer and a press switch. The unit is powered by an external 9 V battery and should be used with the 3.5 mm jack plug removed. |
| Output through two 4 mm sockets. A set of six mounted colour filters is provided. The filters are fitted over the cell aperture in the panel of the unit between the locating pillars. | \& 1 set <br>


\hline 69 \& | Photo-timing gate |
| :--- |
| For use as a light operating timing gate. |
| Comprises: |
| - a fast response photo-detector and a light source each housed in a plastic case spaced 40 mm apart on a metal rod 120 mm long approx. |
| - light source houses 2.5 V 0.2 A MES bulb with 2 pairs of labelled 4 mm sockets for connection to electronic timer and 2 V a.c./d.c. power supply. | \& 2 <br>


\hline 70 \& | Plastic block (or glass block), semicircular |
| :--- |
| Clear, polished semicircular block (plastic or glass), with white back to show the path of light rays through the block, approximately 98 mm (diameter) x 16 mm (thick). | \& 10 <br>


\hline 71 \& | Power line transmission demonstration kit |
| :--- |
| This kit demonstrates how losses in transmission over long distances can be reduced by transmitting at high voltage. |
| Comprises: |
| - a step-up transformer and a bulb holder on a plastic base. |
| - a step-down transformer and bulb holders on a plastic base. |
| - thin insulated wire substitution box. |
| For safety reason the maximum a.c. voltage involved does not exceed 24 V . | \& 1

10 <br>
\hline 72

73 \& | Prism |
| :--- |
| $-45^{\circ}, 90^{\circ}, 45^{\circ}$ |
| - Approximately 35 mm (hypotenuse length) x 25 mm (height). |
| - Made of acrylic plastic. | \& 10 <br>

\hline 73 \& | Prism, high dispersion |
| :--- |
| $-60^{\circ}, 60^{\circ}, 60^{\circ}$ |
| - Extra dense flint, refractive index $=1.65$. |
| - Equilateral sides approximately 32 mm . | \& 1 <br>

\hline
\end{tabular}

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 74 | - Height approximately 32 mm . |  |
|  | Protractor, full-circle | 10 |
| 75 | $160 \times 160 \mathrm{~cm}$ approx., white plastic protractor printed with a circular scale of 0 o to $360 \mathrm{o} \times 1 \mathrm{o}$ reading and four quadrant scales $0^{\circ}$ to $90^{\circ}$ $\times 1^{\circ}$ reading. <br> Pulleys |  |
|  | (a) Single pulley | 10 |
| 76 | Suitable for bench or retort stand mountings. 51 mm diameter approximately. |  |
|  | For clamping to benches up to 25 mm thick. <br> (b) Fine strings ${ }^{\circledR}$ | 4 reels |
|  | For use on pulleys, diameter 1 mm approximately. |  |
|  | Ray box kit | 1 |
|  | (a) Ray box | 10 |
|  | With triple slit aperture and 12 V 24 W line filamentlamp and lamp holder. |  |
| 77 | (b) Cylindrical convex lens | 10 |
|  | Glass, used with ray box in (a) to produce parallel and convergent rays of light. |  |
|  | Resistance substitution box | 5 |
| 7879 | Range $100 \Omega$ to $10 \mathrm{M} \Omega$ given by 12 to 16 resistors. <br> - preferred value carbon resistors are: <br> $100,220,470 \Omega, 1,2.2,4.7,10,22,47,100,220,470 \mathrm{k} \Omega, 1,2.2,4.7$, and $10 \mathrm{M} \Omega$. <br> - Rating 0.5 W continuous, 1 W maximum. <br> - Selection is done by means of a rotary switch andexternal connection is via a pair of 4 mm sockets. <br> Rheostat | 10 |
|  | - Variable up to $10 \Omega$ at 5 A rating. <br> - Sliding contact, for use as series resistor or potentiometer. <br> - Open type with windings on an insulating, heat-resistance tube approximately 200 mm (L) $\times 40 \mathrm{~mm}$ (diameter), three 4 mm socket terminals and slotted end plates for screw mounting. <br> - For use at voltages up to 50 V . |  |
| 79 | Ripple tank assembly <br> (a) Ripple tank \& accessories <br> Plastic ripple tank, overall size of tank approximately <br> $580 \times 500 \times 80 \mathrm{~mm}$. <br> Rippler assembly : <br> Comprises a beam approximately 300 mm long drilled to receive rods of point sources and provided with two support hooks for elastic bands. Ripple motor d.c. 4-6 Vcomplete with approximately 0.9 m of flex. Rippler support rod of light alloy with clips to fit upright rods. <br> Lamp support rod of light alloy, approximately 380 mm long. <br> Accessories of the tank: <br> 2 straight obstacles approximately 130 mm long, 1 straight obstacle approximately 40 mm . Curved reflector approx. 200 mm radius all in light alloy, plastics refraction plate, wood hand wave roller, water dropper, pack of rubber bands and sponge. <br> (b) Lamp (to be used with the ripple tank) <br> - Lamp, 12 V 24 W <br> - Able to be mounted vertically above the ripple tank and illuminates the ripple patterns onto the floor for students to make observations and recordings. | 1 set |
| 80 | Scaler/Timer ${ }^{\text {S }}$ | 1 |
| 81 | Screen, translucent | 10 |
|  | For optics experiments. $80 \times 130 \mathrm{~mm}$ approx. translucent plastic screen on an aluminum or wooden base. |  |
| 82 | Search coils |  |
|  | (a) Axial search coil | 10 |
|  | Consists of 5,000 turns of 48 swg copper wire mounted axially in a plastic handle approximately 300 mm (L) $\times 22 \mathrm{~mm}$ (diameter) $\times 3$ mm (thick) with 4 mm <br> (b) Lateral search coil | 10 |
|  | Specification as the above, but with the coil mounted laterally in the plastic handle |  |
| 83 | Set of solenoids | 3 sets |
|  | Comprises of 4 square-sectioned single layer solenoids, each having a wound length of approx. 280 mm and mounted on a thin former fitted with small feet and 4 mm sockets. <br> - 2 solenoids are of approximately $2,000 \mathrm{~m}^{2}$ cross-sectional area and have about 180 and 360 turns respectively. <br> - The other 2 solenoids are similar but of approximately $4,000 \mathrm{~mm}^{2}$ cross-sectional area. <br> Signal generator with loudspeaker and vibration generator |  |
| 84 | (a) Signal generator, low impedance output ${ }^{6}$ | 10 |
|  | (b) Loudspeaker unt | 2 |
|  | A moving coil loudspeaker, diameter 64 mm approx.,impedance $3 \Omega$ <br> (c) Vibration generator \& accessories |  |
|  | (i) Vibration generator | 2 |
|  | For use with the above signal generator. A $3 \Omega$ impedance moving coil in a powerful magnetic field to produce controlled vibrations down to 1 Hz . The vibrator will accept sine or square wave inputs and can be used in any position including when clamped to a retort stand. <br> (ii) Accessories | 2 sets |
|  | Two rolls of rubber cord, one approx. $3 \mathrm{~mm} \times 3 \mathrm{~mm}$, the other approx. $1.5 \mathrm{~mm} \times 1.5 \mathrm{~mm}$ for demonstrating standing waves <br> - Three spring steel blades each approx. $210 \mathrm{~mm} \times 10 \mathrm{~mm}$ with securing holes punched at different points Single and Double Slits | 1 set |
| 85 | Comprises: <br> -10 single slits, 0.3 mm slit width, 10 mm approximately long, framed in $50 \times 50 \mathrm{~mm}$ slide mounts. <br> -10 double slits, 0.3 mm slit width, 0.6 mm separation, 10 mm approximately long, framed in $50 \times 50 \mathrm{~mm}$ slide mounts. <br> Single Slit, Adjustable | 1 |
| 86 | An adjustable slit, of length 10 mm approximately, the width can be continuously adjusted by a spring-loaded knurled knob up to a maximum width of 2.5 mm approximately. The slit assembly is mounted centrally on a black metal plate, with a central aperture 13 mm diameter approximately. <br> Slinky spring | 10 |
| 88 | For illustrating wave motion. <br> Flat section, steel line in helical coil, diameter approximately 75 mm , closed length approximately 110 mm . Slits and gratings set | 1 set |
|  | Can be used to demonstrate the inter-relationship between diffraction gratings and slits interference. All items are mounted between glass plates in a 35 mm plastic slide frame. <br> Comprises: <br> - Six slides with a progression of 1 to 6 slits embedded separately, each slit having the same width of 0.06 mm approximately and are equally separated by approximately 4 times the slit width (i.e. 0.24 mm ). <br> - Three coarse grating slides with the following parameters. |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 89 | (i) Grating 1 <br> 150 slits having the slit width of 0.06 mm approximately and the slit separations are approximately 4 times the slit width (i.e. 0.24 mm ). <br> (ii) Grating 2 <br> 150 slits having the slit width of 0.03 mm approximately and the slit separations are the same with Grating 1 above (i.e. 0.24 mm ). <br> (iii) Grating 3 <br> 300 slits having the slit width of 0.03 mm approximately and the slit separations are one half of Grating 1 above (i.e. 0.12 mm ). <br> Slotted weight hangers and weights | 10 sets |
|  | A hanger of 100 g and nine slotted weights of 100 g each. Sodium lamp | 1 |
| 90 | - Comprises a 34 W approx. sodium discharge tube, housed in a metal shield with a 28 mm approx. diameter aperture and mounted by means of a boss head on an alloy rod at the rear of the control box. <br> - Mains switch and indicator lamp are mounted on the front panel. <br> - For use on 220-240 V a.c. 50 Hz , single phase supplies. <br> Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. <br> Solar cell kit | 5 |
| 91 | Comprises: <br> (a) Solar panel <br> - Output: 2V, 200 mA (or higher) <br> - $70 \times 100 \mathrm{~mm}$ approx. <br> - Housed in a plastic case, with connectors for easy connection in laboratory. <br> (b) Solar motor <br> To be used with the solar panel in (a). Operate around the maximum power point of the solar panel under direct <br> Sound level meter | 1 |
| 92 | Shows instant response to change in noise level. Operating range is approximately 40 dB to 110 dB . The overall frequency response within the range heard by human ear. <br> Sound wave kit | 1 set |
| 93 | The kit comprises: <br> - 1 control box <br> For easy connection and phase reversal of sound sources and inputs. Having approximately 1 m of screened input lead with 4 mm plugs and 2 pairs of 4 mm output sockets. <br> - 3 transducers <br> Functioning as microphones or loudspeakers, each with at least 1 m screened lead and 4 mm plugs. <br> Spectrometer, intermediate | 1 |
| 94 | Graduated disc approximately 150 mm diameter fixed to table, double ended vernier, to read to 1 ' of arc, attached to telescope. <br> - Telescope and collimator are fitted with approximately 178 mm focal length 25 mm clear aperture achromatic objectives and have rack and pinion focusing; telescope fitted with x 8 Ramsden eyepiece and crossline graticule; collimator with adjustable slit, length 6 mm - The spectrometer table, marked with lines to assist positioning of prism in relation to leveling screws, has interchangeable clamping units for prism and diffraction grating. <br> Spectrum tube unit |  |
| 95 | (a) Spectrum tubes <br> - Hydrogen, neon, and mercury vapour tubes. <br> - Straight pattern, capillary length approx. 50 mm . <br> - Fitted with a 4 mm plug at each end. <br> (b) Power supply unit | 1 each |
|  | For operating the above spectrum tubes. <br> - Power output is 3 kV a.c. at 3 mA r.m.s. <br> - Metal top carries an ON-OFF switch, indicator lamp, fuse, rod assembly, 4 mm socket protected by plastic shield and socket for mains cable. The metal end cap of the tube is completely hidden to avoid electrical shocks from touch. The rod assembly comprises a screw-in support rod, approximately 264 mm long, carrying a horizontal rod at its upper end secured and adjusted using a lock-screw and having a 4 mm aperture for tube connection. <br> - For use on $220-240 \mathrm{~V}$ a.c. 50 Hz , single phase supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. <br> Speed of Sound Kit | 1 kit |
| 96 | (a) 1 Fast timer <br> Ranges: <br> 1 to 999 ms <br> 1 to $999 \mu \mathrm{~s}$ <br> Input controlled by light gates, microphones or mechanical switches. A change of level of at least 50 mV is needed to start or stop timing. <br> Connected via 4 mm sockets. Two sockets provide 0 and 5 V for connection to sensors if required. <br> Power : internal 9 V battery <br> (b) 2 Ceramic microphone <br> High impedance and high sensitivity. Fitted with about 90 cm screened flex, and two 4 mm plugs. <br> (c) A small hammer and a metal plate <br> For making a sharp sound. <br> Stopwatch | 10 |
| 97 | Reads $0-60$ second in 0.2 s . With start, stop and reset buttons. Stroboscope, xenon | 1 |
| 98 | - Flashing rate : <br> Range 1: 1-10 flashes per second <br> Range 2: 10-100 flashes per second <br> Range 3: 100-250 flashes per second <br> - Frequency accuracy : <br> Typically $\pm 2 \%$ of each full scale <br> - Triggering : <br> (a) by internal oscillator <br> (b) by external closing contacts <br> (c) by externally applied waveforms <br> - Maximum energy per flash : <br> Range 1:0.8 J approx. <br> Range 2:0.2 J approx. <br> Range 3: 0.1 J approx. <br> - Flash duration : <br> Approx. $12 \mu \mathrm{~s}$ on all ranges <br> - Mains supply : <br> $220-240 \mathrm{~V}$ a.c. 50 Hz , single phase <br> Sunspotter | ( |
| 99 | A wooden, folded-path, Keplerian telescope which provides a much safer and convenient way to view the brilliant light of the Sun than other normal methods. Can project a bright solar image onto a white viewing screen through an objective lens of 60 mm diameter approx. <br> Overall dimensions: $40 \mathrm{~cm} \times 37 \mathrm{~cm} \times 15 \mathrm{~cm}$ (HxLxW) approx. <br> Syringe | 1 |
| 100 | Precision-ground, gas-tight, heat-resisting glass, free-running capacity 100 mL , graduated at 1 mL intervals, outlet tube 7 mm internal diameter approximately. <br> Syringe, plastic @ | 10 |
| 101 | Disposable plastic syringe for Boyle's law experiment, capacity $60 \mathrm{~mL}, 2 \mathrm{~mL}$ graduations. |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 102 | Tank, rectangular plastic | 2 |
|  | Dimension approximately $180 \times 120 \times 50 \mathrm{~mm}$ with matt white |  |
| 103 | Tank, rectangular transparent | 1 |
|  | For use in wave motion and ray optics demonstrations, $600 \times 200 \times 75 \mathrm{~mm}$ approximately, complete with plunger on rod to act as wave generator when tank is filled with water. <br> Telescope (Refractor, Reflector or Catadioptrics) | 1 |
| 104 | - Used to view celestial objects in the night sky. <br> - Aperture size should be 6 -inches (i.e. 15 cm ) or above. <br> - Must be accommodated with a tripod stand. <br> - With equatorial mount and automatic go-to function Thermometer |  |
| 105 | - Filled with low toxic environmentally friendly liquid, with reinforced bulb and permanent graduations. <br> - With non-roll top and suspension ring. <br> (a) -10 oC to $110 \mathrm{oC} \times 1 \mathrm{oC}$ | 30 |
| 106 | Thermometer, digital | 10 |
|  | Hand held, battery operated digital thermometer with LCD display. With one Type K thermocouple input socket. Come with a general purpose probe and a flexible-wire thermocouple probe. <br> Range of measurement: -50 to $700^{\circ} \mathrm{C}$ (or better) <br> Resolution: $0.1^{\circ} \mathrm{C}$ <br> Sampling rate: 2 times per second (or better) <br> Accuracy: $\pm 0.5 \%$ (or better) <br> Thermometer, infrared | 5 |
| 107 | Gun type, takes instant temperature readings of any surface. <br> Requires no contact with surface - safely measure temperature in inaccessible or hazardous areas. <br> - Laser-sighting beam permits aiming precisely at target surface. <br> - Includes backlighting and data hold options (freezes display reading) and low-battery indicator. <br> - Display update time: $\pm 1 \mathrm{~s}$ <br> - Temperature range: -20 oC to 500 oC (or better) <br> - Resolution: 0.5 oC (or better) <br> - D/S ratio: 12:1 (or higher) <br> - Accuracy: $\pm 2 \%$ (or better) |  |
| 108 | Thermometer, wall | 1 |
|  | Bimetallic type, scale $-30^{\circ} \mathrm{C}$ to $60^{\circ} \mathrm{C}$ |  |
| 109 | Toroidal rheostats | 1 set |
|  | - Rotary action type, for use as series resistors or potentiometers with loads up to 50 W . <br> - With control knob moving over circular scale marked 0 to 100. <br> - For use on circuits below 50 V . <br> - Resistance values: $1,5,10,25,50,100,200 \& 500 \Omega$ <br> Trolley apparatus |  |
| 110 | (a) Trolley, dynamic | 10 pairs |
|  | Hard wood, approximately 300 mm long, having 3 low-loss-bearing wheels and fitted with spring-loaded impulse rod. Rod has three positions to provide different impulses and is triggered by a release pin. <br> (b) Runway | 10 |
|  | For use with trolleys, warp-resistant wood board, $2,450 \mathrm{~mm}$ (L) x 300 mm (W) x 20 mm (thick) approx., reinforced with metal angle side rails. <br> (c) Elastic cords | 10 packets |
|  | Used to accelerate dynamic trolleys. Rubber nature, 180 mm long with ends eyelet terminated. |  |
| 111 | Tuning fork | 1 set |
|  | Boxed set of 13, blue steel, from C1 $(256 \mathrm{~Hz})$ to C2 $(512 \mathrm{~Hz})$ with frequencies marked. |  |
| 112 | Ultrasonics kit | 1 set |
|  | Comprises: <br> - An ultrasound transmitter <br> Generates 40 kHz signal which can also feed to other transducer cell. <br> Dimensions: case $150 \times 95 \times 60 \mathrm{~mm}$ approx. <br> horn $75 \times 100 \mathrm{~mm}$ (mouth diameter x length) <br> - An ultrasonic receiver Identical dimensions to the transmitter. <br> A pair of 4 mm output sockets allow connection to a 1 mA meter for quantitative work. <br> A gain control is also provided so that the output from the receiver provides full-scale deflection of the meter under max. signal conditions. If speech or other audio modulation is used, the output from the receiver should be connected to an audio amplifier/loudspeaker combination. <br> Ultra-violet lamp with cover | 1 |
| 113 | T demonstrate characteristics of UV radiation or photo-electric expt. <br> The UV lamp should be enclosed in cylindrical metal lamphouse with an aperture in its side and a simple ventilation system in its upper end. The UV lamp is 6 W approx., for operation on $220-240 \mathrm{~V}$ a.c. 50 Hz , single phase supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug <br> Van de Graaff generator |  |
| 114 | (a) The generator <br> - Driven by a constant-speed motor housed in an earthed metal case with front panel, which is incorporated with earth terminal. <br> - The charge collecting rubber belt and metal charging comb could be easily adjusted for performance. <br> - A built-in heating source (optional) can help the generator to discharge spark when the relative humidity is <br> - Charge collecting sphere about 250 mm diameter. <br> - Discharging sphere about 150 mm diameter. <br> -4 mm connection sockets in dome and base. <br> - For use with $220-240 \mathrm{~V}$ a.c. 50 Hz , single phase supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused B.S.S. plug. <br> (b) Accessories for Van de Graatt generator | 1 set |
|  | Comprises: <br> - head of hair with a 4 mm connection plug. <br> - insulating plastic rod with right-angle bend approximately 240 mm high, lower end of reduced diameter to fit generator dome, upper end drilled to accommodate nylon monofilament for supporting an expanded polystyrene sphere about 25 mm diameter with conducting surface. <br> - approximately one meter of monofilament. <br> - Faraday ice pail, $100 \times 60 \mathrm{~mm}$, height x diameter approximately, with 4 mm plug in centre of base. <br> - neon lamp, MES Insulating holder, mounted on approximately 60 mm steel pin with sharp point. <br> - vibrating column to simulate ions in motion, transparent plastic container, approximately $100 \mathrm{~mm}(\mathrm{H}) \times 90 \mathrm{~mm}$ (maximum diameter), mounted on 4 mm plug with aluminum disc top and bottom, with 12 electrically conducting expanded polystyrene spheres of about 13 mm diameter. <br> Watt meter, digital | 1 |
| 115 | Measures the electric power consumption of an electric appliance connected to mains supply. <br> - Equipped with a B.S.S. 3-pin plug for connection to the wall socket. The appliance to be measured is plugged on a B.S.S. 3-pin socket on the wattage meter directly. <br> - LCD display, shows a.c. power, voltage, current and total energy consumption (in kWh ). <br> - Operating voltage: $220 \mathrm{~V}, 50 \mathrm{~Hz}$ <br> - Maximum measured current: 13 A (or better) <br> - Maximum measured power: 2000 W (or better) |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 116 | - Accuracy: $\pm 5 \%$ of measured value (or better) |  |
|  | Wind meter | 5 |
|  | For wind speed measurements. Measures outside wind speed, air velocity in hoods and gas movement in ducts. With a lightweight propeller rotates freely under air motion. Enclosed in a chemical and shock resistant hard cover and has handy flipopen bench stand for easy monitoring. Reading is displayed on a LCD panel. <br> Operation modes: current, average, maximum values of <br> wind speeds <br> Display update time: $\leq 1 \mathrm{~s}$ <br> Speed range: $0.3 \mathrm{~ms}-1$ to $40 \mathrm{~ms}-1$ <br> Other features: HOLD switch, display backlighting <br> BASIC EQUIPMENT |  |
| 117 | Adjustable spanner | 1 |
|  | Approximately 150 mm long with 19 mm opening span. |  |
| 118 | Balance |  |
|  | (a) Electronic balance <br> - Top pan, electronic, weighing range about 200 g , readability 0.01 g . <br> - For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase, a.c. supplies. <br> (b) Iriple beam balance | 1 5 |
|  | - Single pan (stainless steel, diameter 150 mm approx.), low form balance. <br> - Comprising 3 notched weighting beams with centre-indicating sliding masses. <br> - Beam graduated in <br> (i) $0-500 \mathrm{~g} \mathrm{x} 100 \mathrm{~g}$, <br> (ii) $0-100 \mathrm{~g} \mathrm{x} 10 \mathrm{~g}$, <br> (iii) $0-10 \mathrm{gx} 0.1 \mathrm{~g}$. <br> - Capacity about 2.5 kg . <br> - Sensitivity 0.1 g with supplementary masses <br> $2 \times 1,000 \mathrm{~g}, 1 \times 500 \mathrm{~g}$. |  |
| 119 | Barrier tape @ | 4 rolls |
|  | PVC type, strong adhesive, ideal for highlighting hazard/restricted areas, $50 \times 3 \mathrm{~mm}$ approx. |  |
| 120 | Beaker @ |  |
|  | Squat form, with spout, with two or more graduation marks showing approximate capacities. |  |
|  | (a) Pyrex or equivalent, 250 mL | 40 |
|  | (b) Pyrex or equivalent, 500 mL | 20 |
|  | (c) Polypropylene, 0-250 mL | 20 |
| \#121 | Bench protection mat | 10 |
|  | Heat-resistant mat, make of glass reinforced cement, about $300 \mathrm{~mm} \times 300 \mathrm{~mm}, 4.5 \mathrm{~mm}$ thick. (Asbestos free) |  |
| 122 | Bottle, narrow mouth |  |
|  | With dust proof stopper. |  |
|  | (a) Clear glass, 250 mL | 20 |
|  | (b) Clear glass, 500 mL | 10 |
| 123 | Brush, test tube |  |
|  | Nylon made. |  |
|  | (a) Diameter 15 mm | 12 |
|  | (b) Diameter 30 mm | 12 |
| 124 | Burette stand | 2 |
|  | Hardwood, single clamp, approximately 45 cm high. |  |
| 125 | Burner |  |
|  | (a) Bunsen Burner | 12 |
|  | For either town gas or liquefied petroleum gas or natural gas, depending on the type supplied. Nickel plated burner tube with rotatable air regulator and tapering, riffled connector, mounted on an enamelled pressed-steel base. Burner tube $100 \mathrm{~mm}(\mathrm{H}) \times 13 \mathrm{~mm}$ (diameter), base 80 mm diameter, connector 10 mm mean outer diameter. <br> (b) Teclu Burner | 1 |
|  | For either town gas or liquefied petroleum gas or natural gas depending on the type supplied. Nickel plated burner tube with a threaded disc valve for adjustment of the air/gas mixture. Burner tube $105 \mathrm{~mm}(\mathrm{H}) \times 13 \mathrm{~mm}$ (diameter), base 80 mm diameter, connector 10 mm mean outer diameter. Calipers, vernier | 1 |
| 126 | For measuring length, internal/external diameter and depth up to 150 mm . |  |
| 127 | Clip component holder | 20 |
|  | Comprising a pair of crocodile clips with integral 4 mm sockets mounted on plastic base at about 55 mm spacing. |  |
| 128 | Clips with lead @ | 50 |
|  | Crocodile-to-crocodile lead |  |
| 129 | Cold chisel | 1 |
|  | 150 mm approximately. |  |
| 130 | Contact key | 2 |
|  | 1 way, with spring brass contact arms. |  |
| 131 | Cotton thread @ | 1 reel |
| 132 | Craft tool | 1 |
|  | Consisting of slotting handle and blades. |  |
| 133 | Cylinder |  |
|  | Graduated with spout. <br> (a) Glass, 100 mL <br> (b) Glass, 250 mL | $\begin{aligned} & 10 \\ & 10 \end{aligned}$ |
| 134 | Eye wash unit | 1 |
|  | Equipped with an eye wash bottle for emergency treatment of the eye affected by liquids, dust or flying particles. By squeezing the bottle a fountain of wash is directed into the eye via the eye bath. Contaminated wash drains through the side tubes, so that a continual flow of clean wash reaches the eye. When not in use, eye bath is covered by a dust cap. The bottle is clipped into a moulded panel on which simple but complete instructions are <br> The panel has holes for wall hanging. <br> Filter Funnel | 2 |
| 135 | Plain, soda lime glass, 150 mm approx. top diameter. |  |
| 136 | Flask @ | 10 |
|  | Flat bottom, medium neck, Pyrex/equivalent, 500 mL . |  |
| 137 | Flat file | 1 |
|  | Second cut, length 200 mm approximately. |  |



| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 165 | Ruler |  |
|  | Graduated at one edge, in cm and mm divisions: |  |
|  | (a) Hardwood, $1 / 2$ metre | 20 |
|  | (b) Hardwood, 1 metre | 10 |
|  | (c) Steel, 300 mm | 1 |
| 166 | Safety screen | 1 |
|  | Transparent polycarbonate, comprising central panel $610 \mathrm{~mm}(\mathrm{H}) \times 300 \mathrm{~mm}$ (W) $\times 3 \mathrm{~mm}$ (thick) approx. connected to outer panels 610 $\mathrm{mm}(\mathrm{H}) \times 230 \mathrm{~mm}(\mathrm{~W}) \times 3 \mathrm{~mm}$ (thick) approx. on each side by full height hinges. <br> Safety spectacles | 45 |
| 167 | Constructed of polycarbonate, spectacle type with side shields giving all round protection. Top guard and lip prevents spillage into eyes. May be worn over prescription spectacles. <br> Sand paper @ | 1 set |
| 168 | Various grit sizes. |  |
| 169 | Saw | 1 |
|  | General purpose, 410 mm length approximately, suitable for cutting all woods, plastics as well as mild steel, copper, brass, lead and aluminum. <br> Scissors | 10 |
| 170 | 175 mm approximately. |  |
| 171 | Screwdriver, electricians |  |
|  | Plastic handle, length of blade approximately |  |
|  | (a) 65 mm | 1 |
|  | (b) 100 mm | 1 |
| 172 | Screwdriver, Philips type | 1 |
|  | Length of blade 100 mm approximately. |  |
| 173 | Screwdriver, watchman's | 1 |
|  | Width of blade approximately 2.5 mm . |  |
| 174 | Shield, face | 1 |
|  | With curved hard plastic visor which can be raised from the face when not required, with adjustable headband. |  |
| 175 | Silk thread @ | 1 reel |
| 176 | Slotted base | 2 |
|  | To hold flat objects up to 35 mm thick approx. in a vertical position. Cast metal, finished in paint, with jaw 40 mm high approx., end fitted with thumb screw. |  |
| 177 | Soldering iron, electrical ${ }^{7}$ | 1 |
| 178 | Spirit Level | 1 |
|  | 200 mm long approximately. |  |
| 179 | Steel claw hammer | 1 |
|  | Complete with handle, mass of head approximately 450 g . |  |
| 180 | Switch, plug | 20 |
|  | One-way, brass. |  |
| 181 | Switch, reversing | 2 |
|  | Rotary brush type switch with brass contacts on rotatable spring loaded ebonite beam. 4 mm socket terminals. Mounted on an insulating base. The brushes and contact strips are arranged on the pivoted bar and base separately so that when the bar is turned from one extreme to the other, the polarity of the connections is Maximum current 10 A . For use on circuits below 50 V . <br> Test-tube @ |  |
| 182 | Medium wall, with rim, Pyrex or equivalent. |  |
|  | (a) $150 \times 24 \mathrm{~mm}$ | 50 |
|  | (b) $100 \times 12 \mathrm{~mm}$ | 100 |
| 183 | Triangular file | 1 |
|  | Second cut, length 150 mm approximately. |  |
| 184 | Tripod stand | 10 |
|  | Triangular top, cast iron, with splayed steel legs, approximately 150 mm (L) $\times 210 \mathrm{~mm}$ (H). |  |
| 185 | Tubing, glass |  |
|  | Soda lime glass, standard wall, can be worked in a Bunsen flame, in length of 1.5 m approximately. External diameter: |  |
|  | $4 \mathrm{~mm}, 5 \mathrm{~mm}, 6 \mathrm{~mm}$ | 22 meach |
|  | $7 \mathrm{~mm}, 8 \mathrm{~mm}$ | 15 meach |
|  | $30 \mathrm{~mm}, 40 \mathrm{~mm}$ | 3 meach |
| 186 | Tubing, Bunsen burner | 30 m |
|  | Rubber, of an approved type with internal bore about 9 mm , for either town gas or liquefied petroleum gas or natural gas, depending on the type supplied. <br> Tubing, rubber @ |  |
| 187 | (a) Normal wall, 5 mm (bore) $\times 1.5 \mathrm{~mm}$ (wall thickness) | 20 m |
|  | (b) Normal wall, 8 mm (bore) $\times 1.5 \mathrm{~mm}$ (wall thickness) | 20 m |
| 188 | Tubing, rubber @ | 10 m |
|  | Red, heavy wall, for use under pressure and at relatively low pressure. |  |
| 189 | Vaseline @ | 1 tin |
| \# 190 | Wire gauze | 10 |
|  | With ceramic centre, $150 \mathrm{~mm} \times 150 \mathrm{~mm}$. For use on tripod stands. (Asbestos free) |  |
| 191 | (Asbestos free) | 5 |
|  | Adjustable for different wire or cable sizes, also serves as a wire |  |
| 192 | Y-piece | 20 |
|  | Polypropylene, length of stem and limb 35 mm , external diameter 7 mm approximately. |  |
|  |  |  |
| 193 | First-aid cabinet | 1 |
| 194 | Stool | 45 |
|  | approx. dimensions of $300 \times 300 \mathrm{~mm}, 530 \mathrm{~mm}(\mathrm{H})$ |  |
| 195 | Movable benches | 10 |
|  | $1,525 \mathrm{~mm}(\mathrm{~L}) \times 760 \mathrm{~mm}(\mathrm{~W}) \times 840 \mathrm{~mm}(\mathrm{H})$, with acid and heat resistant plastic laminate on top. FURNITURE FOR PHYSICS/CHEMISTRY PREPARATION ROOM |  |


| Item No | Description | Quantity |
| :---: | :--- | :---: |
| 196 | Blackout Curtains | 1 set |
|  | Total Cost | $\mathbf{6 0 4 , 8 0 0}$ |

\# - The asbestos-free requirement should be clearly specified when purchasing the item. As a safeguarding measure, schools may consider requesting suppliers to provide evidence (e.g. laboratory testing report) authenticating their products are free of asbestos.

- School may also consider using other alternatives e.g. stainless steel bench protection mat if suppliers fail to authenticate their products are free of asbestos.
\#\# - The asbestos-free requirement should be clearly specified when purchasing the item. As a safeguarding measure, schools may consider requesting suppliers to provide evidence (e.g. laboratory testing report) authenticating their products are free of asbestos. - School may also consider using other alternatives e.g. wire gauze without the ceramic center if suppliers fail to authenticate their products are free of asbestos.


## 1 Specification of item "14": Centralized low voltage power supply unit

(A) General description

This equipment is designed to provide a source of low voltage a.c. or d.c. power supplies simultaneously to distribution points with output controlled from the unit; for general use in school laboratories with provision for charging secondary batteries.

A single phase a.c. supply is taken from an outlet with fused plug and is connected to the double pole isolator which disconnects the supply completely from all components immediately when the front panel is opened. From the isolator, power is taken through the input circuit breaker to the variable ratio auto-transformer. The input circuit is protected against both surge or steady overload by the input circuit breaker. Input current and voltage are indicated by the input ammeter and input voltmeter at the top of the front panel. The output from the variable ratio auto-transformer is taken to the primary of a fixed ratio, step down, double wound, main transformer. The secondary of this main transformer is taken to the rotary selector switch. To provide a.c. sources, the secondary output is fed via the output ammeter, output voltmeter and output circuit breaker to the output terminals. The output circuit breaker designed to withstand heavy current safeguards the output circuit. To provide d.c. sources, the low voltage alternating current is fed into the selenium cell full wave bridge connected rectifier and then via the output terminals. The
d.c. output is unsmoothed and the polarity is indicated by terminal colour.

All the measuring instruments are of the moving iron type. The input and output circuit breakers are both of the magnetic terminal release type and are adjusted to trip at 5 and 50 amperes respectively.

For inspection purposes, the front panel is hinged at the bottom to allow it to be opened through 140 degrees. The internal wiring is colour coded, with green for a.c. and red/black for d.c. When opening, the supply is automatically disconnected making the wiring "dead" and perfectly safe to touch.
(B) For laboratory use

The output from the unit is taken via a ring main circuit to at most 13 distribution points in the laboratory. The output voltage and/or current may be kept constant or varied by adjustment of the auto-transformer. Maximum outputs are :
$0-14 \mathrm{~V}$ at 40 A a.c. or d.c.
$14-18 \mathrm{~V}$ at 32 A a.c. or d.c.
(C) For battery charging, the cells should be connected in series with the positive and negative terminals connected to the output terminals of like polarity. The maximum number of 2 volt cells that can be charged is 6 and the maximum charging current advised by the battery manufacturer should not be exceeded. The unit is rated at 580 VA.
(D) Overall dimensions approx. $310 \mathrm{~mm} \times 540 \mathrm{~mm} \times 740 \mathrm{~mm}$ high approximately. For use on $220-240 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase, a.c. supplies. Bonded to earth through 3 core supply cable and 3 rectangular pin appropriately fused
B.S.S. plug.

## 2 Specification of item ' 35 '": Geiger-Muller tube assembly

(A) GM tube

Centronic ZP1481(MX168), sensitive to beta, gamma and high energy alpha radiations, to be used with scaler/timer. Specification:
Threshold voltage (max.): 370 V Plateau length (min.): 100 V Plateau slope (max.): $0.5 \%$ per V
Operating temp. range: -50 to +60 oC Dead time (max.): $150 \mu \mathrm{~s}$ Anode/cathode capacity: 3.5 pF
Background, shielded with 50 mm lead +3 mm aluminum (max): 30
Sensitivity for $1 \mathrm{mR} / \mathrm{h}$ radium: 1200 counts $/ \mathrm{min}$ Window thickness: $2.5-3.0 \mathrm{mg} / \mathrm{cm} 2$
Electrical connections: B2A base
(B) GM tube holder and lead

Circular base, 50 mm diameter, with GM tube socket, stabilising resistor and detachable 1.5 m coaxial cable fitted with PET 100 series plug.

## 3 Specification of item " 51 ': Linear air track assembly

(A) Linear air track

Track overall length 2 m , made from a square plastic section, $60 \times 60 \mathrm{~mm}$ approx., supported along one corner of the section (i.e. diagonally) on five adjustable feet. Two rows of fine holes run along the top of the track. Hole diameter and spacing, $1.05 \mathrm{~mm} ; 25 \mathrm{~mm}$ approximately. The track is supplied complete with the following accessories:
(i) Two heavy and one light vehicle, their masses in the ratio $2: 1$.
(ii) Two metal location plates, sprayed black and drilled to take the inner feet of the track so that it can be firmly positioned on the bench using ' G ' clamps,
screws or self-adhesive pads. The plates are fitted with pegs to support the shutter accessory pillars.
(iii) Three moulded, black 'buffers' and three 'horns' (fitted with rubber bands for work on elastic collisions).
(iv) Ane set of pin and adsorber (plasticine) attachments for work on inelastic collisions.
(vi) A set of Magnadur magnets (2) and counter balances (2) for work on collisions at a distance.
(vii) Three black cards to fit the vehicles for use in timing.
(B) Air blower This is of general purpose laboratory type for secondary school to be used with the linear air track. The blower is supplied with the standard hose approximately 2 m long
and the integral 3-core mains cable, approx. 5 m long
$\begin{array}{ll}\text { and the integral } & \text { 3-core mains cable, approx. } 5 \mathrm{~m} \text { long. } \\ \text { Motor rating : } & 650 \mathrm{~W} \text { approximately Maximum pressure : } 14 \mathrm{kPa} \text { approximately. }\end{array}$
For use on $220-240 \mathrm{~V}$ a.c., 50 Hz , single phase supplies. Bonded to earth through 3-core supply cable and 3 rectangular pin appropriately fused B.S.S. plug.

## 4 Specification of item ' 66 ': Oscilloscope, dual trace

(A) Display:

Display area: Not less than $10 \times 8 \mathrm{~cm}$ with
graticule and illumination. Beam Control
Focus, brightness control and front panel.
Trace rotation: Astigmatism adjustment by screw driver.
(B) Vertical Amplifier:

Sensitivity: $5 \mathrm{mV} /$ div. to $20 \mathrm{~V} /$ div. $\pm 3 \%,(1 \mathrm{Div}=1 \mathrm{~cm})$ calibrated in 1-2-5 step sequence with magnification "x5" switch. Freq. response: DC to $10 \mathrm{MHz}(-3 \mathrm{~dB})$ Rise time: 35 ns max.
Input impedance: $1 \mathrm{M} \Omega$ shunted by $35 \mathrm{pF} \pm 35 \mathrm{pF}$. Max input voltage: not less than 400 V peak
Input terminal: BNC, complete with 4 mm BNC adaptor binding post Input coupling: DC/AC/GND
Calibration Inverting: calibrated signal provided either CH 1 or CH 2 be fitted with "inverting" switch.
(C) Time Base:

Sweep speed: $0.5 \mu \mathrm{~s} /$ div. to $1 \mathrm{~s} /$ div. $\pm 3 \%$, calibrated in 1-2-5 sequence. Magnification "x5" switch. Sweep mode: CH 1, CH 2, CHOP, ALT, CH $1+$ CH 2 Trigger mode: CH $1+$, CH $1-$, $\mathrm{CH} 2+$, CH $2-$, auto, external Trigger sensitivity: (INT) 2 Hz to 10 MHz at 1 div. (EXT) 2 Hz to 10 MHz at 200 mV p.p. (min.) Auto: (INT) $50 \mathrm{~Hz}-10 \mathrm{MHz}$ at 1 div . (EXT) $50 \mathrm{~Hz}-10 \mathrm{Mhz}$ at 200 mV p.p.
Max. external input not to exceed 200 V p.p.
(D) X-Y operation:

The oscilloscope can be switched to $\mathrm{X}-\mathrm{Y}$ operation with $\mathrm{CH} 1=\mathrm{Y}, \mathrm{CH} 2=\mathrm{X}$ or vice versa.
(E) Z Modulation :

Trace could be blanked by TTL level signal input.
(F) Power Supply:
$220 \mathrm{~V}-240 \mathrm{~V}$ a.c. 50 Hz , single phase.
(G) Weight :

Equipment should not weigh more than 10 kg for portability.
(H) Durability :

The equipment should be able to withstand rugged treatment in operation. All control knobs shall lock to the control spindles despite excessive turning and twisting effort.
(I) Safety :

The equipment shall satisfy safety standard to BS4743.
(J) Material and Component :

Semiconductor components are to be used, except for the cathode ray tube. Fibre glass PCB to be used. Resistors to be either carbon film type or metal oxide type. Casing should be constructed of metal, with vinyl cladding on the external surface. For oscilloscopes with a plastic moulded casing, there shall be adequate provisions of electromagnetic screening for the electronic circuits.

5 Specification of item " 80 ": Scaler/Timer
(A) General description:

Power Supply :
Single phase $220-240 \mathrm{~V}$ a.c. $50 \mathrm{~Hz} \pm 1 \mathrm{~Hz}$ via 3 core mains
lead with I.E.C. connector. Display :
6digits LED/LCD at least 12 mm high featuring most significant blanking (i.e. zeros to the left of the most significant digit are not displayed.)
(B) Timer:

Maximum recording capacity: $1 \times 105 \mathrm{~s}$.
Range :
0 to $99,999.9 \mathrm{~s}$ in units of 0.1 s
0 to $9,999.99 \mathrm{~s}$ in units of 0.01 s
0 to 999.999 s in units of 1 ms
0 to 99.9999 s in units of 0.1 ms Accuracy :
Better than $0.02 \% \pm$ count Controls :
By manual on/off
By make or break input socket
By triggering timing stop/start inputs (such as by momentary interruption of the light beam) Power Output :2 V a.c. 0.5 A for Lamp ( 4 mm socket)
(C) Scaler:

Maximum count capacity : 100 M Overall counting speed : $\geq 2,000 / \mathrm{s}$ Counting method:
Selection of continuous count or automatic rate measurement with sampling period selectable at 1 second, 10 second or 100 second. Input : PET coaxial connector EHT supply : 300 to 500 V adjustable using calibrated control Preamplifier power supply ( 4 mm socket): 6 V a.c. 0.5 A .

## 6 Specification of item "84(a)": Signal Generator, Low Impedance Output

(A) Frequency Range :

10 Hz to 100 kHz in 5 decades and reads on linearly calibrated scale, with $\pm 2 \%$ accuracy. The frequency control should have slow motion reduction gear drive. Output waveform :
Sinewave with less than $0.5 \%$ T.H.D. Square wave with $1: 1 \mathrm{mark} /$ space ratio. Triangular wave - if available.
(B) Output coupling : a.c.
(C) Output power :

Not less than 2 W r.m.s. into $3 \Omega$ with volume control, additional 600 W output adjustable from 0 V to 10 V will be an advantage.
(D) Power :
a.c. $220 \mathrm{~V}-240 \mathrm{~V},(50 \pm 1) \mathrm{Hz}$, single phase or a.c. / d.c. with built-in a.c. adaptor.

## 7 Specification of item " 177 ': Soldering iron, electrical

(A) General :

The soldering iron shall be of an electrically safe design and shall be suitable for heavy duty usage.
(B) Type :

Pistol grip / Straight handle, instant heat, general purpose, interchangeable tip, small power, light weight.
(C) Heating Power :

A heating power of below 100 W is required.
(D) Construction :
(i) The soldering iron body shall be of steel, securely attached to a high strength plastic, or wood handle which shall be easily removable for maintenance and repair.
(ii) The interior design shall ensure maximum heat transfer to the electrically insulated tip and minimum heat transfer to the wiring, switch and supply cable.
(iii) If fitted, the ON/OFF switch shall be biased to the OFF position so as to cause minimum operator fatigue during long periods of use.
(iv) The supply cable shall enter the handle through a rubber grommet and shall be secured inside with a screw-down type clamp, or equal.
(v) The heating element shall be designed and constructed so as to minimize the possibility of electric shock to the user in the event of a burn-out, or electrical circuit failure.
(vi) The Pistol grip type should preferably have a work piece light activated from main ON/OFF switch.
(E) Tip : The tip shall be manufactured from steel or copper, shall present a smooth soldering surface and shall be factory pre-coated for maximum performance and durability.
(F) Electrics:
(i) The soldering iron offered shall be designed and fitted so as to prevent an electric shock to the user, in the event of any internal electrical failure.
(ii) The iron shall be designed for operation on a $220-240 \mathrm{~V}$ a.c. 50 Hz supply.
(iii) Any irons NOT fitted with an integral, ON/biased OFF switch shall have the element rated for, at least, a full 1 hour duty without overheating, or burn-out.
(iv) The iron shall be fitted with high temperature insulated wires between the element and the flexible supply cable.
(v) The iron shall be fitted with a suitable flexible supply cable and plug, to a standard, type and capacity full equivalent to the expressed by the latest British standard specifications.

## Subject : SS Music

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | FURNITURE |  |
| 1 | Student Chair | 40 |
| 2 | Teacher Desk | 2 |
| 3 | Teacher Chair | 2 |
| 4 | Blackout Curtains* | 1 set |
|  | MUSICAL INSTRUMENTS / EQUIPMENT |  |
|  | Pianos |  |
| 5 | Upright School Model Piano ${ }^{1}$ | 1 |
| 6 | Upright Piano Cover | 1 |
| 7 | Grand Piano ${ }^{2}$ | 1 |
| 8 | Grand Piano Cover | 1 |
|  | Unpitched Percussion Instruments |  |
| 9 | Triangle | 2 |
|  | 15 cm , with beater and holder |  |
| 10 | Solo Triangle | 2 |
|  | 24 cm , with beater and holder |  |
| 11 | Pair of Wooden Castanets | 2 |
|  | Mounted on a wooden handle |  |
| 12 | Pair of Finger Castanets | 2 |
| 13 | Two-tone Tubular Woodblock | 2 |
|  | With beater and holder |  |
| 14 | Tambour | 2 |
|  | 25 cm vellum |  |
| 15 | Tambourine | 2 |
|  | 25 cm vellum, with jingles and wooden frame |  |
| 16 | Sleigh Bells | 2 |
|  | With 10 bells and handle |  |
| 17 | Pair of Cymbals | 1 |
|  | 26 cm |  |
| 18 | Cymbal | 1 |
|  | 40 cm , with stand and soft beater |  |
| 19 | Pair of Wooden Maracas | 1 |
|  | Mexican style or fish style |  |
| 20 | Cabasa | 1 |
|  | Standard size |  |
| 21 | Guiro | 1 |
| 22 | Pair of Claves | 1 |
|  | Rosewood, large size |  |
| 23 | Pair of Bongo Drums with Stand | 1 |
| 24 | Snare Drum | 1 |
|  | With stand and beaters |  |
| 25 | Bass Drum | 1 |
|  | With stand and beater |  |
|  | Pitched Percussion Instruments |  |
| 26 | Soprano Glockenspiel | 1 |
|  | - single row <br> - C major scale c"' - c\#""' with additional F\# and Bb <br> - 19 individual removable bars ( $20 \times 4 \mathrm{~mm}$ ) complete with case and one pair of double-headed beaters |  |
| 27 | Chromatic Glockenspiel | 1 |
|  | - tenor-alto range c" - c\#"' <br> - 26 individual removable bars ( 20 X 4 mm ) double row with chromatic scale together with case and one pair of double-ended rubber beaters |  |
| 28 | Soprano Xylophone (Rosewood) | 1 |
|  | - single row <br> - C major scale c" - f \#" with additional F\# and Bb <br> - 14 individual bars ( $40 \times 15 \mathrm{~mm}$ ) complete with one pair of single-headed beaters |  |
| 29 | Tenor-alto Xylophone (Rosewood) | 1 |
|  | - diatonic c' - c\#"' with additional F\# and Bb <br> - 19 individual bars ( $40 \times 15 \mathrm{~mm}$ ) complete with one pair of single-headed beaters |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 30 | Bass Xylophone（Rosewood） <br> －diatonic c＇－a＂with additional F\＃and Bb <br> － 16 individual bars（ $40 \times 18 \mathrm{~mm}$ ）complete with one pair of single－headed beaters | 1 |
| 31 | Set of Chime Bars <br> －single notes c＂－c\＃＂＂accurately <br> －tuned and mounted on a tuned wood or metal resonator <br> － 26 individual notes forming a chromatic scale as specified above －with a pair of medium－hard rubber single－headed beaters <br> Other Instruments | 1 |
| 32 | Descant Recorder／Soprano Recorder | 4 |
|  | Baroque fingering |  |
| 33 | Treble Recorder／Alto Recorder <br> Baroque fingering | 4 |
| 34 | Guitar | 1 |
| 35 | Melodica | 1 |
|  | 36 notes |  |
| 36 | Portable Electronic Keyboard <br> With transformer and stand <br> － 61 full－size keys <br> －32－note polyphonic sounds or more <br> －MIDI in／out <br> Music Stand | 1 |
| 37 | Music Stand | 20 |
|  | －desk adjustable（Pipe ： 30 mm diameter） －with wide，folding legs <br> Chinese Percussion Instruments |  |
| 38 | Pair of Dajingbo（大京鈸一對） | 1 |
| 39 | Pair of Xiaojingbo（小京鈸一對） | 1 |
| 40 | Pair of Dabo， 40 cm （大鈸一對， 40 厘米） | 1 |
| 41 | Wuyinmuyu with Stand and Beaters（五音木魚連架及棒子） | 1 |
| 42 | Zhonghuyinluo with Beater（中虎音鑼連棒子） | 1 |
| 43 | Jingluo with Beater（京鑼連棒子） | 1 |
| 44 | Xiaoluo with Luo Pian（小鑼連鑼片） | 1 |
| 45 | Stand for Luo and Bo（鑼查架一套） | 1 |
| 46 | Pair of Pengling（碰鈴一對） | 1 |
| 47 | Dabukyu with Beaters，Rosewood（花梨木大卜魚連棒子） | 1 |
| 48 | Shadi with Stand and Beaters（沙的連架及棒子） | 1 |
| 49 | Wuyingu with Stand and Beaters（五音鼓連架及棒子） | 1 |
| 50 | Zhangu with Stand and Beaters（戰鼓連架及棒子） | 1 |
| 51 | Shuangpigu with Stand and Beaters（雙皮鼓連架及棒子） Audio－visual Equipment | 1 |
| 52 | Projection system with screen | 1 |
| 53 | Media player（DVD／VCD／CD／Bluetooth／USB） | 1 |
| 54 | Microcomputer workstation <br> －DVD－RW Drive <br> －MIDI－compatible <br> －installation of music notation／sequencing software <br> －connection to the stereo speakers below | 1 set |
| 55 | Pair of Stereo Speakers <br> －with amplification（Amplifier Power Output：50W＋50W RMS） <br> －woofer $\geqq f 200 \mathrm{~mm}$ <br> －connection to the multimedia computer system and DVD player | 1 |
| 56 | Mixer <br> －8－12 Channels including Balance／Unbalance Microphoneand Line Inputs with： Aux Channels with Send and Return EQ（Equalisation） <br> Other Electrionic Equipment | 1 |
| 57 | Dehumidifier |  |
| 58 | Digital Video Camera <br> －full HD <br> －with external mic input <br> －portable tripod for digital video camera | 1 |
| 59 | Microphone <br> －with cable | 2 |
| 60 | Stand for microphone | 2 |
|  | A Collection of Self－chosen Teaching Materials <br> Audio－visual materials（such as CDs，DVDs） | 1 set |
| 62 | Music Software（such as notation and／or sequencing software） |  |
| 63 | Wall Charts |  |
| 64 65 | Music Scores／Music Books <br> Teachers＇Reference Books |  |


| Item No | Description | Quantity |
| :---: | :--- | :---: |
|  | Total cost (only Items 58 to 65) | 24,600 |

Notes:-
@ Items 1 to 56 are shared with Music and therefore, excluded in calculating the total cost
1 School may consider using an 88-key digital piano with acoustics and touch similar to an upright piano.
2 School may consider using an 88-key digital piano with acoustics and touch similar to an upright piano.

## Reference List of Furniture and Equipment

for Secondary School
Subject: SS Geography

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| (I) | FURNITURE |  |
| A | Geography Room |  |
| A1 | Student desk | 24 |
| A2 | Student chair | 40 |
| A3 | Teacher chair | 1 |
| A4 | Bookcase / storage cabinet | 1 |
| A5 | Blackout Curtains | 1 set |
| B | Geography Resource Room |  |
| B1 | Bookcase / storage cabinet | 1 |
| B2 | Teacher desk | 1 |
| B3 | Teacher chair | 1 |
| C | Geography IT Room |  |
| C1 | Tables for computer and printer <br> Table for computer \& printer, overall dimensions $1,000 \mathrm{~mm}$ wide x 690 mm high x 760 mm deep. <br> Materials <br> (a) Legs and rails <br> teakwood, seasoned and straight-grained and free from shakes; <br> (b) Top <br> 20 mm thick plywood top faced with acid and heat resistant plastic laminate lipped with 12 mm thick teakwood edge all round. All surfaces should be sanded, filed and polished in natural lacquer. All arris-edges should be chamferred. | 3 |
| C2 | Student chair | 8 |
| C3 | Bookcase / storage cabinet | 1 |
| (II) | EQUIPMENT |  |
| A | Chalkboard Equipment |  |
| A1 | Magnets | 15 |
|  | Colour magnets for the magnet board, with a minimum diameter of 3 cm . |  |
| A2 | Compasses | 2 |
|  | Wooden varnished/plastic made up, overall length about 45 cm , rubber non-slip tip on one leg and chalk holder on the other. <br> Set Squares |  |
| A3 | (a) $45^{\circ}$ Length of hypotenuse about 45 cm . | 1 |
|  | Provided with/without handle and with centimetre graduations on one edge. Corners are slightly rounded for safety, made of plastic/varnished wood. |  |
|  | (b) $60^{\circ}$ Similar to A3(a) <br> but having angles of $90 \mathrm{o}, 60 \mathrm{o}, 30 \mathrm{o}$. Length of hypotenuse about 50 cm . Longest non-hypotenuse side graduated from 0 to 44 cm . | 1 |
| A4 | Long Ruler | 1 |
|  | Plastic or wooden varnished, 1 metre graduated in 1 cm , with/without handle. <br> Protractor | 1 |
| A5 | Half circle, plastic or wooden varnished, graduated in degree ' 0 o to 180 o in both directions, figured every 100 . The base is provided with a handle. Length of base 50 cm . |  |
| A6 | Wooden Pointer | 1 |
|  | About 80 cm . |  |
| B | Globes |  |
| B1 | Globe -Political | 1 |
|  | Showing clear locations of political divisions of the in colour, with a minimum diameter of 30 cm , unted on wood $/ \mathrm{moplastic} / \mathrm{metal}$ base with tilted axis. | ('2) |
| B2 | Globe-Physical | 1 |
|  | Showing mountains, rivers and other features of the earth's surface in colour, minimum 30 cm diameter, mounted on wood/plastic/metal base with tilted axis. |  |
| B3 | Physiographic Relief Globe | 1 |
|  | All of the major geologic landforms of the earth are depicted in raised relief. <br> The two-piece globe construction provides students with a view of the cross-section of the earth, exposing the internal physical characteristics of the planet. The colourful cutaway shows the earth's crust, mantle and inner and outer cores, and provides useful data such as temperatures, air densities, distances and atmospheric layers. The globe is markable. |  |
| C | Meteorological Instruments |  |
| C1 | Digital Weather Station | 1 |
|  | (1) a field unit consisting of sensors for measuring temperature, ultra-violet radiation, humidity, wind speed/direction, pressure and rainfall, and a display console for showing the weather data in real-time <br> (2) a software programme for transmitting the data to a PC and for running a user-friendly graphic display of the weather data in real-time on the same PC <br> (3) a software programme for transmitting the weather back to a local meteorological organisation for further data analysis |  |
| C2 | Six's Thermometer | 1 |
|  | To indicate present temperature as well as the highest and lowest temperatures since last resetting of indices. Ranges: about -30 oC to 50 oC , measures about 30 cm in length. Thermometer mounted as a single unit, e.g. a glass U-tube on a separate printed scale, with magnet for resetting the maximum and minimum temperatures. To be mounted on metal/plastic/wooden case. |  |
| C3 | Hygrometer with Celsius Tables | 2 |
|  | Wet and dry bulb thermometers mounted on plastic base-plate with printed scales from -30 oC to 50 oC (approx.). <br> A plastic reservoir for the wet bulb is secured to the plate by a metal clip or strip, supplied with muslin thread. The comparison table in Celsius is either printed on the base plate or on a separate sheet. |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| C4 | Wind Vane | 1 |
|  | Pointer rotates on a vertical steel shaft to be fixed on a mast. Indication of directions North, East, South and West are fixed to the shaft. |  |
| C5 | Thermometer, Maximum and Minimum <br> 2 thermometers about 20 cm in length mounted on a single unit. Mercury filled, dual scales, each calibrated degrees Celsius and Fahrenheit. Weatherproof, all plastic casing and a push-button resetting system which does not require the use of a separate magnet. Range -35 o to 50 oC ( -31 o to 122 oF ). | 1 |
| D | Field Study Instruments |  |
| D1 | Measuring Tapes | 10 |
|  | Total length not less than 30 metres. |  |
| D2 | Prismatic Compasses (liquid- filled) | 1 |
|  | With prismatic reading, the pivoted dial and magnet assembly are liquid-filled and housed in a metal case about 60 mm diameter. |  |
| D3 | Pocket Compasses | 10 |
|  | About 40 mm diameter, with circle graduated in degrees and with compass points marked. |  |
| D4 | Orienteering Compasses | 20 |
|  | For rapid transfer of map bearings to field sightings and vice versa. The compass needle is enclosed in a clear liquid-filled housing, with a clockwise $0 \mathrm{o}-360$ o scale and North/South index lines which can rotate on a rectangular clear plastic base plate. Convenient measuring scale on bevelled end and on one of the base plates. |  |
| D5 | 5 in 1 Pocket Digital Weather Meter | 10 |
|  | Functions of the weather meter (about $15 \mathrm{~cm} \times 6 \mathrm{~cm} \times 2 \mathrm{~cm}$ ) include the measurement of wind speed, temperature, relative humidity, air pressure and altitude. |  |
| D6 | Rock Specimen Set | 1 |
|  | Packing in wooden/metal box. Including typical specimens of igneous, sedimentary and metamorphioc rocks. Each specimen, more than $40 \mathrm{~mm} \times 40 \mathrm{~mm}$ in size, comprising a total of at least 40 pieces per set. |  |
| D7 | Abney level | 5 |
|  | A precision-made clinometer for measuring angles of elevation and depression. Scale divided $900-0 \mathrm{o}-90 \mathrm{o}$ vernier scale reading to 10 min. of arc. Includes sighting tube with reflector and spirit level in case. |  |
| D8 | Ranging Rods | 5 |
|  | Ranging rod about 2 metres long (either in one piece or 2 pieces each of 1 metre long) |  |
| D9 | Soil Thermometer | 5 |
|  | Slotted aluminum/brass case with pointed end for easy insertion into soil. Encloses mercury/spirit in glass thermometer which may be read through a window in the tube; engraved stem to enable measurement at various depths, with range -100 C to $60 \mathrm{oC} \times 1 \mathrm{C}$. |  |
| D10 | Whirling Psychrometer | 2 |
|  | Wet and dry bulb thermometers with lens front stems, range -5 oC to $50 \mathrm{oC} \times 0.5 \mathrm{oC}$, mounted in wooden/plastic frames to be rotated. With simple plastics conversion slide/plastic coated table in Celsius to compute relative humidity from the thermometer readings. |  |
| D11 | Laser / Infrared distance meter (up to 100 m ) | 5 |
|  | The meter (about $14 \mathrm{~cm} \times 3 \mathrm{~cm} \times 2 \mathrm{~cm}$ ) can be used to measure distance up to 100 m as well as calculating area and volume. |  |
| D12 | Soil Testing Kit @ | 5 |
|  | The test kit provides reagents and test tubes for measuring the level of lime, pH , nitrogen, phosphorus and potassium salts. Contained in a carrying case, for use in the field. Each reagent is sufficient for at least 50 individual tests. Complete with colour charts, for each test, and full instructions. |  |
| D13 | Environmental Test Kit (for water and / or air pollution) @ | 5 |
|  | Designed to provide students with practical experience in environmental monitoring, this field kit supplies all of the required materials for investigations of the major types of air and/or water pollution. Water tests include dissolved oxygen (D.O.), hardness, chloride, phosphate, nitrate and pH . Air tests are for windblown particles, smoke density, nylon deterioration and carbon dioxide. Included in the kit are clear instructions, background information and sufficient reagents for at least 50 individual tests. |  |
| D14 | Simple Stereoscope | 5 pairs |
| D15 | Stop Watch | 5 |
|  | With a $0-60$ seconds main dial graduated to 0.2 The subsidiary dial reads up to 60 minutes and is graduated to 1 minute. Size: about 5.5 cm diameter $\times 1.5 \mathrm{~cm}$ deep. |  |
| D16 | pH meter | 5 |
|  | The meter (about $15 \mathrm{~cm} \times 3 \mathrm{~cm} \times 1 \mathrm{~cm}$ ) can be used for measuring the pH value of liquid from 0-14 ( $\pm 0.05$ ). |  |
| D17 | Level angle finder | 10 |
|  | Each $8 \mathrm{~cm} \times 8 \mathrm{~cm} \times 2 \mathrm{~cm}$ <br> It can be used to measure the angle of a flat surface / slope angles. |  |
| D18 | 10xField Lens | 10 |
|  | About 18 mm in diameter each. <br> The lens are used for the close inspection on rock composition. |  |
| D19 | Light meter | 2 |
|  | Digital meter for outdoor use and can measure up to 200,000 lux |  |
| D20 | Noise meter | 2 |
|  | Digital meter with sound measuring range from 30 to 130 dB |  |
| D21 | Air quality / PM2.5 monitor | 5 |
|  | Digital meter with sensors to measure fine particulate dust matter <2.5 microns in size (PM2.5) |  |
| D22 | Vernier caliper, metal / digital | 5 |
|  | Metal / digital caliper which can measure outside and inside dimension with a range of $0-150 \mathrm{~mm}$ |  |
| D23 | Soil sieves | 5 sets |
|  | A set of at least 2 sieves for different grain size: (1) 2.0 mm and (2) 0.063 mm |  |
| D24 | Mohs hardness testing kit | 5 |
|  | A box of 9-10 minerals, each with a distinct hardness, and a specimen key. It can be used in the field or the geography room to determine the hardness of different minerals, rocks or any unidentified sample |  |
| D25 | Stream flow meter | 2 |
|  | Digital handheld meter via an at least 1 m cable with LCD display which shows the velocity of meters per second (m/s) Digital data logger |  |
| D26 | Digital data logger |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| EE1 | (with large, high resolution touch screen, built-in graphing and analysis application(s), and wireless data sharing function for collecting sensor data and for collaborative learning in geography fieldwork) and the following external data collection sensors: <br> (a) A weather sensor with functions to measure temperature, humidity, wind speed, dew point and barometric pressure / individual sensors for measuring different weather elements (e.g. anemometer, temperature sensor, relative humidity sensor, wind speed sensor); <br> (b) Salinity sensor; <br> (c) Sound level sensor; <br> (d) Light sensor; <br> (e) Flow rate sensor: <br> (f) Soil moisture sensor; <br> (g) pH sensor: <br> (h) CO 2 sensor; <br> (i) Optical dissolved oxygen sensor <br> Atlas | 5 sets |
|  | Comprehensive Reference Atlas | 1 |
| F | Includes maps showing world and regional relief, climate, natural vegetation, political divisions and density of population, with some basic information, statistical tables and comprehensive index. <br> Hong Kong Maps and Photographs |  |
| F1 | Maps Index @ |  |
|  | (Published by Lands Department, H.K.) <br> (a) 1:1 000 Large Scale Plan Index (Index A) | 1 |
| F2 | Geological Maps @ |  |
|  | HGM 20 series (Sheets 2-16) | 1 set |
| F3 | End-maps for Hong Kong Annual Report @ | 100 |
|  | 20 copies of any 5 sheets to be selected by the school |  |
| F4 | Topographic Maps @ |  |
|  | (a) Series HM20C (1:20 000) (Sheets 2-16) | 2 sets |
|  | (b) 20 copies of any 3 sheets in Series | 60 copies |
|  | HM20C (1:20 000) to be selected by the school |  |
|  | (c) Series HM50CP (1:50 000) (2 sheets) | 2 sets |
|  | (d) Series HM100CL (1:100 000) | 5 copies |
|  | (e) Series HM200C (1:200 000) | 50 copies |
| F5 | Large Scale and Medium Scale Plans@ | 50 copies |
|  | To be selected by the school from the following scales: <br> (a) Series HP1C ( $1: 1000$ ) <br> (b) Series HP5C ( $1: 5000$ ) <br> (c) Series SM10D (1:10 000) <br> (d) Series SM15D (1:15 000) <br> (Kowloon \& Hong Kong- 2 sheets) | (10 copies per selected sheet) |
| F6 | Countryside Series Sheets @ |  |
|  | Hong Kong Island | 1 |
|  | Central N.T. | 1 |
|  | North-West N.T. | 1 |
|  | Lantau Island | 1 |
|  | Outlying Islands | 1 |
|  | Sai Kung and Clear Water Bay | 1 |
|  | North-East N.T. | 1 |
| F7 | Hong Kong Guide - Streets \& Places@ | 1 |
| F8 | Vertical Aerial Photos (Black \& White) @ | 10 |
|  | To be selected by the school. |  |
| F9 | Ground and Oblique Aerial Photos (Black \& White) @ | 15 copies |
|  | To be selected by the school. |  |
| F10 | Vertical Aerial Photos (Colour) @ | 5 pairs |
|  | To be selected by the school |  |
| F11 | Ground and Oblique Aerial Photos (Colour) @ | 15 copies |
|  | To be selected by the school |  |
| G | Aerial Photos and Maps of China. and other Countries |  |
| G1 | Aerial Photos @ |  |
|  | To be selected by the school |  |
| G2 | Ordinance Survey Maps @ |  |
|  | (a) Landranger Sheets (1:50 000) |  |
|  | (b) Student Map Packs |  |
|  | (c) Examination Map Extracts |  |
| G3 | Aerial Photos and Maps of China and Other Countries @ |  |
|  | e.g. To be selected by the school |  |
| H | AR Sandbox | 1 set |
|  | Hardware components: <br> (a) A computer with a high-end graphics card <br> (b) A 3D camera / depth sensor <br> (c) A digital video projector with a digital video interface, such as HDMI, DVI, or display DisplayPort |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| I | (d) A sandbox with a way to mount the 3D camera / depth sensor and the projector above the sandbox <br> (e) Sand (white in colour) <br> Software components: <br> (a) AR sandbox and related software packages <br> IT Equipment | No specified quantity but controlled by ceiling of the estimated cost |
| I1 | Computer Softwares, GIS Software and data files |  |
|  | Softwares to be selected by the school: <br> (a) Softwares programmes providing either updated facts and data for themes covered by the geography curriculum or simulation xercises. <br> For example, , World Atlas <br> Encyclopedia, Simcity, Simfarm. <br> (b) GIS software and data files <br> (c) Geography and fieldwork-related applications for mobile devices |  |
| 12 | Microcomputer workstation |  |
|  | Three sets of desktop computers equipped with essential software. Specifications should conform to the latest standard of desktop omputers acquired by school via the bulk contract of information technology (IT) equipment |  |
| 13 | Projection system with screen | 1 |
|  | Total Cost for Subject | 290,400 |

## Note:

@ Consumable items

Reference List of Furniture and Equipmen
for Secondary Schoo
Subject : SS Visual Arts

| Item No | Description | Quantity |
| :---: | :---: | :---: |
|  | FURNITURE |  |
| 1 | Working Table | 10 |
| 2 | Wooden Panel for Working Table Tops | 10 |
| 3 | Stool | 40 |
| 4 | Teacher Desk | 1 |
| 5 | Teacher chair | 1 |
| 6 | Cupboard with lock for media storage | 1 |
| 7 | Plan Chest | 2 |
|  | Steel, approx. 1,200 mm (W) $\times 915 \mathrm{~mm}$ (D) $\times 625 \mathrm{~mm}$ overall, fitted with 5 equal drawers |  |
| 8 | First-aid Cabinet | 1 |
| 9 | Blackout Curtains | 1 set |
|  | EQUIPMENT |  |
| 10 | Trolley | 1 |
|  | Stainless steel, with 3 tiers |  |
| 11 | Hair Dryer (blower with handle) | 2 |
|  | For drying prints including hot and cold air, approx. $1,000 \mathrm{~W} / 220 \mathrm{~V} / 50 \mathrm{~Hz} \mathrm{AC}$ (or use standard specifications "spec. 60/07/02 C(6)" issued by the and Mechanical Services Department) |  |
| 12 | Domestic Iron | 2 |
|  | Operating on approx. $1,000 \mathrm{~W} / 220 \mathrm{~V} / 50 \mathrm{~Hz}$ AC. <br> With adjustable thermostat control and indicating self-resetting (e.g. General Electric, National) |  |
| 13 | Paper Trimmer | 1 |
|  | Rotary trimming blade, cut length 610 mm . The maximum thickness of cut is about 3 mm |  |
| 14 | Drawing Board | 40 |
|  | Plywood, 8 mm thick, size A2 (420 mm x 594 mm ) |  |
| 15 | Palette | 40 |
| 16 | Light Box for Screen Printing | 1 |
| 17 | Squeegee for Screen Printing | 1 set |
|  | Assorted sizes: (20 nos.) |  |
| 18 | Etching Press | 2 |
|  | Steel bed plate size at least $330 \mathrm{~mm} \times 660 \mathrm{~mm} \times 6 \mathrm{~mm}$, approx. With upper and lower rollers. Four-arm spoked drive wheel. Fitted with one sheet of felt blanket and one oiler |  |
| 19 | Scissors | 40 |
|  | 150 mm , stainless steel |  |
| 20 | Staple Gun | 5 |
|  | (e.g. Rapid 13 or equivalent) |  |
| 21 | Stapler | 40 |
|  | (e.g. Max. HD-10 or equivalent) |  |
| 22 | Staple Remover | 5 |
|  | (e.g. Max. R2 or equivalent) |  |
| 23 | Knife | 40 |
|  | 130 mm blade |  |
| 24 | Woodblock Cutters | 40 boxes |
|  | Heavy duty, 6 shapes in box, with grind stone and baren |  |
| 25 | Lino Dabber | 40 |
| 26 | Bench Hook | 40 |
| 27 | Plastic Mug | 40 |
|  | 100 mm diameter |  |
| 28 | Palette Knife | 10 |
|  | 100 mm blade |  |
| 29 | Paper Cutter | 40 |
|  | With chippable, retractable blade and safety lock (e.g. N.T. Cutter, S200 or equivalent) |  |
| 30 | Mat Cutter with Guide Rail | 1 |
|  | For picture frames cutting. (e.g. Logan Model 440 or equivalent) |  |
| 31 | Oval and Circle Cutter | 1 |
|  | (e.g. Logan Model 2013 -step oval and circle cutter or equivalent) |  |
| 32 | Ruler | 40 |
|  | Plastic, 450 mm |  |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 33 | Ruler | 1 |
|  | Wooden or plastic, 1 meter long |  |
| 34 | T-square, A1 | 2 |
|  | Hardwood, length of blade 920 mm |  |
| 35 | T-square, A2 | 5 |
|  | Hardwood, length of blade 650 mm approx. |  |
| 36 | Set Square | 5 sets |
|  | Plastic, $45^{\circ}, 60^{\circ}, 30^{\circ}, 200 \mathrm{~mm}$ in set |  |
| 37 | Cutting Mat | 40 |
|  | Plastic, 3 layers structure (soft P.V.C. sandwiches hard P.V.C. board), double sided usage, $300 \mathrm{~mm} \times 450 \mathrm{~mm} 3 \mathrm{~mm}$ thickness |  |
| 38 | Lino Roller | 1 set |
|  | $\begin{aligned} & 100 \mathrm{~mm}-5 \text { nos. } \\ & 150 \mathrm{~mm}-5 \text { nos. } \\ & 270 \mathrm{~mm}-2 \text { nos. (rubber) } \end{aligned}$ |  |
| 39 | Claw Hammer | 2 |
|  | 450 g head |  |
| 40 | Screw Driver | 2 |
|  | 100 mm blade length, 6 mm tip |  |
| 41 | Screw Driver | 2 |
|  | 150 mm blade length, 8 mm tip |  |
| 42 | Hand Drill | 2 |
|  | 6 mm capacity, overall length about 330 mm |  |
| 43 | Hand Saw | 1 |
|  | Length $400 \mathrm{~mm}, 10$ points per 25 mm |  |
| 44 | Pliers | 10 |
|  | Round nose, overall length 150 mm |  |
| 45 | Pliers | 10 |
|  | Combination, overall length $150-250 \mathrm{~mm}$ |  |
| 46 | Pincers | 2 |
|  | Carpenter, overall length $150-250 \mathrm{~mm}$ |  |
| 47 | Tenon Saw | 1 |
|  | Length 250 mm , 11 to 20 points per 25 mm |  |
| 48 | Hacksaw | 2 |
|  | Adjustable, to take blades up to 310 mm |  |
| 49 | File | 1 set |
|  | Needle, second cut, 12 assorted shapes |  |
| 50 | File | 1 |
|  | Flat, rough with handles, overall length about 250 mm |  |
| 51 | File | 1 |
|  | Flat, smooth, with handles, overall length about 250 mm |  |
| 52 | Rasp | 1 |
|  | (Chinese style - small size) |  |
| 53 | Chisels | 1 set |
|  | Firmer, square edge, with handles, $6 \mathrm{~mm} / 10 \mathrm{~mm} / 12 \mathrm{~mm} / 20 \mathrm{~mm}$ (2 of each size) |  |
| 54 | Gouges | 1 set |
|  | Firmer outcannelled, with handles, $6 \mathrm{~mm} / 10 \mathrm{~mm} / 12 \mathrm{~mm}$ ( 4 of each size) |  |
| 5556 | Centre Punch | 2 |
|  | Nail Punch | 2 |
|  | Point diameter 2 mm and 3 mm (one of each) |  |
| 57 | "G" Clamp | 1 |
|  | 100 mm |  |
| 58 | "G" Clamp | 1 |
|  | 150 mm |  |
| 59 | Stainless Steel Ruler | 2 |
|  | 300 mm |  |
| 60 | Stainless Steel Ruler | 1 |
|  | 600 mm |  |
| 61 | Drying Rack | 1 |
|  | Steel, spray painted, 50 tiers with spring action for Size of wire mesh shelves : $700 \times 920 \mathrm{~mm}$, approx., mesh opening not larger than 200 x 200 mm . Overall dimension: $740 \times 940 \times 1,350 \mathrm{~mm}$, approx. with four rollers ( 80 mm diam. approx.) |  |
| 6263 | Teacher Reference Books | 1 set |
|  | Electric Ceramic Kiln\#** | 1 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 64 | (a) Framework : <br> The kiln shall be robustly constructed and the kiln door shall be mounted on strong hinges allowing easy but firm closing. <br> There shall be a spy-hole situated in the door for cone sighting. If the kiln is a side-loading type, it shall be provided with an integral metal stand. <br> (b) Firing Chamber : <br> Firing chamber capacity shall be about 80 litres and shall be lined with low conductivity materials and faced with special high temperature refractory insulation bricks. <br> (c) Heating element : <br> The heating elements shall be made of long lasting high temperature wire and shall not be more than 6 KW and at 200 V . The elements shall be securely carried. <br> (d) Control : <br> For the control and regulation of firing, the ceramic kiln shall be fitted with the following items : <br> (i) an energy regulator; <br> (ii) a temperature indicator/control device incorporated with thermocouple; <br> (iii) an automatic time controller for predetermined firing control. <br> (e) Firing temperature : <br> The maximum firing temperature shall be $1,260^{\circ} \mathrm{C}$ or above. The heat-up time required to reach $1000^{\circ} \mathrm{C}$ shall not be more than 8 hours. <br> (f) Safety : <br> The ceramic kiln shall be suitable and safe to use in schools. It shall be equipped with at least three electrical safety precautions : <br> (i) a warning light which glows whenever the elements are live; <br> (ii) a door-operated switch to disconnect the electrical supply automatically as the door is opened; <br> (iii) a key-operated switch/door lock, or has provision for fitting a padlock for the kiln door to prevent unauthorized opening of the kiln. <br> (g) Accessories : <br> (i) Bat, refractory, about 15 mm thickness, size to match the kiln; (12 pcs) <br> (ii) Prop, tubular, about 100 mm long. ( 20 pcs ) |  |
|  | Potters' Kick Wheel <br> All moving parts fitted with bearings (wheel-head 250 mm ) | 4 |
| 65 | Turntable | 10 |
|  | 250 mm diam. for pottery |  |
| 66 | Clay Storage Bin with Lid | 4 |
|  | Water proof, plastic, min., capacity, 35 litres |  |
| 67 | Turning Tools | 4 sets |
|  | Assorted shapes, 4 in a set |  |
| 68 | Modelling Tools | 10 sets |
|  | Wood, assorted shape, 10 in a set |  |
| 69 | Rolling Pin | 10 |
|  | Wooden, 510 mm long approximately, for rolling clay slabs |  |
| 70 | LED Spotlights | 1 |
|  | 3 pieces of LED spotlight (continuous, daylight) with tripod stand for photography |  |
| 71 | IT Equipment for Visual Arts |  |
|  | (A) Microcomputer workstation for graphic use, teacher Specifications: with software items for: word processing graphic picture and photo processing video editing presentation animation | 1 set |
|  | (B) Microcomputer workstation for graphic use, student | 5 |
|  | Specifications: with software items for: word processing graphic picture and photo processing video editing presentation animation- Windows system |  |
|  | (C) Pressure Sensitive Drawing Tablet | 1 |
|  | - Pressure levels: 1,024 <br> - Active area: $15 \times 20 \mathrm{~cm}$ |  |
|  | (D) Digital Camera with Accessories | 4 |
|  | Specifications: <br> - for High Definition photo and video shooting with AVI and HDMI <br> - tripod <br> - moisture proof plastic box for storage <br> (F) Printer or printer cum scanner (small) | 1 |
| 72 | Projection system with screen | 1 |

Note:-
@ All items are shared with Visual Arts. No additional items are needed to be purchased for the SS Visual Arts.

Reference List of Furniture and Equipmen
for Secondary Schoo

Subject : SS Design \& Applied Technology

| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 1 | (A) FURNITURE |  |
|  | Square woodwork bench | 2 |
|  | $1,070 \mathrm{~mm}$ (L) $\times 1,070 \mathrm{~mm}$ (W) $\times 760 \mathrm{~mm}$ (H) |  |
| 2 | Square woodwork bench | 3 |
|  | $1,070 \mathrm{~mm}$ (L) $\times 1,070 \mathrm{~mm}$ (W) $\times 800 \mathrm{~mm}$ (H) |  |
| 3 | Design table |  |
|  | $1,800 \mathrm{~mm}(\mathrm{~L}) \times 1,000 \mathrm{~mm}(\mathrm{~W}) \times 760 \mathrm{~mm}(\mathrm{H})$, heavy-duty tabletop covered with light-covered plastic laminated sheet, sturdy metal underframe. | 3 |
| 4 | Demo Bench | 1 |
|  | $1,800 \mathrm{~mm}(\mathrm{~L}) \times 800 \mathrm{~mm}(\mathrm{~W}) \times 700 \mathrm{~mm}(\mathrm{H})$, heavy-duty tabletop covered with light-covered plastic laminated sheet, sturdy metal underframe. |  |
| 5 | Stool | 20 |
|  | Stackable, 460 mm height, made from plastics or hardwood. |  |
| 6 | Trolley | 2 |
|  | Stainless steel, 4 shelves, rubber casters |  |
| 7 | Bin for inflammable fluids | 2 |
|  | $\begin{aligned} & 760 \mathrm{~mm}(\mathrm{~L}) \times 450 \mathrm{~mm}(\mathrm{~W}) \times 380 \mathrm{~mm}(\mathrm{H}) \\ & (20 \text { SWG G.I. }) \end{aligned}$ |  |
| 8 | Cabinet, first aid | 1 |
|  | (B) COMPUTER-AIDED DESIGN |  |
|  | WORKSTATION \& TECHNOLOGY KITS |  |
| 9 | Computer workstation | 21 |
|  | General purpose desktop PC with 20" LCD monitor |  |
| 10 | Integrated software package | 21 |
|  | MS Chinese/English Office (standard suite) (Education Version) |  |
| 11 | 3-D CAD software | 21 |
|  | Inventor/SolidWorks /ProENGINEER or equivalent (Education Version) |  |
| 12 | Animation software | 21 |
|  | 3D Studio VIZ or equivalent (Education Version) |  |
| 13 | Computer graphics software | 21 |
|  | - CorelDRAW or equivalent (Education Version) |  |
| 14 | CAL on Electronics | 1 |
|  | Interactive, simulate electronic circuits (Education Version) |  |
| 15 | Printer or printer cum scanner (small) | 1 |
| 16 | Digital video camera | 4 |
|  | for photo / HD video shooting |  |
| 17 | Mechanisms kit | 2 |
|  | for introduction of mechanical components, structures and forces, completed with building instruction sheets and storage unit. Class pack is preferable. |  |
| 18 | Pneumatics kit | 1 |
|  | for constructing simple pneumatic systems, completed with teacher's manual and instruction sheets. An air pump unit (without cylinder) should be included. |  |
| 19 | Robotics kit | 3 |
|  | Robotics kit, completed with interface, capable of simulating a variety of manufacturing processes such as pick and place, sorting, assembling. (Site license preferable) |  |
| 20 | Learning kit for electronics | 1 |
|  | DC operated electronics system with decisions module containing AND, OR, NOT gates and other accessories such as micro-switch, sensors, battery, connecting leads. Completed with teacher's manual \& worksheets. Class pack is preferable. |  |
| 21 | Learning kit for computer / microcontroller control | 3 |
|  | completed with the following essential elements:- <br> - flowchart-based control software <br> - text-based control software <br> - interface with i/o ports/adapters <br> - set of digital i/o devices and sensor devices <br> - motorised model e.g. 'Buggy' or manufacturing unit <br> - building guide and publication resource <br> Site license of software is preferable, if applicable. |  |
| 22 | Laser Cutter and Engraver | 1 |
|  | Completed with odour reduction and exhaust system |  |


| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 23 | CNC Lathe (for DAT) <br> PC controlled, bench type, with driven motor 700 W (approx.), operated at $220 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase, a.c. Basic requirements include:- <br> - Full 2-axis simultaneous movement <br> - Swing over bed: 150 mm approx. <br> - Programmable speed range: 0-3,000 r.p.m. approx. <br> - Position repeatability 0.01 mm (or better) <br> - Programmable tool turret <br> - X-axis travel 100 mm (min.), Z-axis travel 200 mm (min.) <br> - Safety features including safety guard, emergency stop, overload protection, low-volt release unit, travel limit switches etc. <br> - All electrical wiring of the equipmentshall comply with the latest edition of BS7671 <br> Completed with: <br> - full set of tool holders <br> - CNC control software <br> - CAD/CAM software <br> - Teaching and learning resources <br> Training should be provided for teachers or school's assigned personnel. <br> (To comply with latest Factories and Industrial Undertakings Ordinance and Regulation.) | 1 |
| 24 | Video editing software (for DAT) <br> - VideoStudio or equivalent (education version) | 5 |
| 25 | Web Authoring software (for DAT) <br> - Adobe Web Tools or equivalent (education version) <br> (C) PLASTICS \& ELECTRICAL EQUIPMENT | 5 |
| 26 | Strip heater <br> for heating acrylic sheets, 500 mm length, 220 V 50 Hz single phase A.C., 1 kW approx., electrical components and cabling conform to the latest B.S.S. earthing through 3-core supply cable. | 1 |
| 27 | Oven <br> (curing), 220 V , approx. $1,000 \mathrm{~W}$, single phase, up to 300 C , electrical components and cabling conformed to the latest B.S.S. earthing through 3-core supply cable, exterior temperature 50 oC at max. optimum temperature, safety door interlock, firing chamber approx. 250 x $300 \times 450 \mathrm{~mm}$. | 1 |
| 28 | Vacuum former <br> (manual), capable of blank size $300 \mathrm{~mm} \times 300 \mathrm{~mm}$ end up to 2 mm thick sheet. Heating element is 1.5 kW . <br> Vacuum pump is self-contained unit, 200W. <br> Electrical components and cabling conform to the latest B.S.S. Operated on $220 \mathrm{~V}, 50 \mathrm{~Hz}$ single phase A.C. and earthing through 3 core supply cable. | 1 |
| 29 | Multimeter <br> battery operated. | 4 |
| 30 | Glue gun <br> for 11 mm dia. glue-sticks, double insulated, 220 V 50 Hz A.C. | 10 |
| 31 | Electric soldering iron with stand 220 V 50 Hz , single phase A.C., 25 W . | 4 |
| 32 | Electric soldering iron with stand 220 V 50 Hz , single phase A.C., 125 W . | 1 |
| 33 | Electric soldering iron with stand <br> 220 V 50 Hz , single phase A.C., 240 W . | 1 |
| 34 | Hand engraver <br> 220 V 50 Hz single phase A.C., variable <br> stroke control, electrical components and cabling conformed to the latest B.S.S., earthing through 3 core supply cable. | 1 |
| 35 | Power hand drill with accessories <br> single phase, 220 V 50 Hz 2 speed - 1,150 r.p.m. and 2,300 r.p.m., double insulation, heavy duty motor with ball bearings, capacity 10 mm , earthing through 3 core supply cable. | 1 |
| 36 | Solid state D.C. power supply <br> mains input 220 V A.C. 50 Hz , Output 0-20V D.C., 0-2A approx. on-off switch with indicator lamp, earthing through 3 core supply cable. <br> (D) MACHINERY | 2 |
| 37 | Drilling machine <br> bench model, 13 mm drilling capacity, 100 mm spindle travel, chuck and adequate chuck guard, push button starter with overload rotection and no-volt release unit with operating coil designed for $220 \mathrm{~V}, 370 \mathrm{~W}, 3$ phase, 380 V 50 cycles AC motor, safety belt guard. (To comply with E. \& M. standard specification and F. \& I. U. Ord. \& Regulations) | 2 |
| 38 | Circular saw <br> bench, 250 mm , tilt-arbor depth of cut at $450,50 \mathrm{~mm}$, depth of cut at $90 \mathrm{o}, 70 \mathrm{~mm}$ max., quick release safety guard fitted to riving knife, precision machined rip-fence locks back and front of table with single lever, fine adjustment through rack and pinion, extra heavy close grained cast iron table unit size $700 \times 700 \mathrm{~mm}$. $1.5 \mathrm{Kw}, 3$ phase, $380 \mathrm{~V}, 50$ cycle motor A.C. supply. Push button starter with no-volt release unit with coil designed to operate at 220 V with over-load protection; accessible door for saw dust removal. | 1 |
| 39 | Chip extractor for woodworking machine <br> mobile extractor, $220 \mathrm{~V}, 50 \mathrm{~Hz}$ single phase A.C., motor driven at 560 W with airflow rate $0.2 \mathrm{~m} 3 / \mathrm{s}$ approximately. Supplied with 2.5 m ong flexible hose of 100 mm dia. <br> Electrical components and cabling conform to the latest B.S.S., earthing through 3-core supply cable. | 1 |
| 40 | Power disc sander <br> bench type, $260 \pm 50 \mathrm{~mm}$ dia. Disc, with 550 W motor, single phase, 220 V , 50 cycles A.C. supply, mounted on solid cast iron bases. Fitted with fixed disc guard covering the major part of disc, leaving only the portion of the disc in use, and supplied with dust extraction port. Push button overload and no-volt release starter for 220 V supply. (To comply with latest F. \& I.U. Ord. \& Regulations.) | 1 |
| 41 | Jigsaw <br> bench model, stroke of blade $25 \mathrm{~mm}, 400 \mathrm{~mm}$ throat, size of table approx. $200 \times 225 \mathrm{~mm}, 720$ strokes per min. 200 W motor, single phase, $220 \mathrm{~V}, 50$ cycles A.C. supply, earthing through 3 core supply cable. Safety guard must be included. | 2 |
| 42 | Metalworking lathe <br> metric model, 250 mm , on cabinet base to admit 560 mm between centres, with 560 W 3 -phase motor and lever controlled gear change mounted inside the cabinet base, push button starter with overload protection and no-volt release unit with operating coil designed for 220 V . Electrical equipment to be fully tropicallised and suitable for $380 \mathrm{~V}, 50 \mathrm{~Hz}, 3$ phase A.C., emergency stop button at convenient position, chuck guard with safety interlocking device, suds pump and fitting, single phase low voltage lighting unit preferably 24 V but not exceeding 50 V and saddle limit switch (electrical/mechanical). | 1 |



| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 69 | Calipers | 1 |
|  | outside firm joint, 200 mm |  |
| 70 | Calipers | 1 |
|  | inside 150 mm , firm joint |  |
| 71 | Calipers | 3 |
|  | outside 150 mm , firm joint |  |
| 72 | Centre punch | 10 |
|  | 5 mm point dia x 100 mm long, round head |  |
| 73 | Chisel | 10 |
|  | bevel edge 25 mm , plastic handle |  |
| 74 | Chisel | 10 |
|  | bevel edge, 19 mm blade, plastic handle |  |
| 75 | Chisel | 10 |
|  | bevel edge 16 mm , plastic handle |  |
| 76 | Chisel | 10 |
|  | bevel edge 13 mm , plastic handle |  |
| 77 | Chisel | 10 |
|  | bevel edge 10 mm , plastic handle |  |
| 78 | Chisel | 10 |
|  | bevel edge 6 mm , plastic handle |  |
| 79 | Chisel | 20 |
|  | square edge, firmer, 19 mm ash handle |  |
| 80 | Chisel | 20 |
|  | square edge, firmer, 13 mm ash handle |  |
| 81 | Chisel | 20 |
|  | square edge, firmer, 6 mm ash handle |  |
| 82 | Chisel | 5 |
|  | sash mortice, 13 mm blade, beech handle |  |
| 83 | Chisel | 10 |
|  | sash mortice, 8 mm blade, beech handle |  |
| 84 | Chisel | 20 |
|  | sash mortice, 6 mm blade, beech handle |  |
| 85 | Cold chisel | 2 |
|  | flat, octagon steel, 12 mm blade width $\times 150 \mathrm{~mm}$ long |  |
| 86 | Cold chisel | 1 |
|  | cross cut, octagon steel, 6 mm blade width $\times 150 \mathrm{~mm}$ long |  |
| 87 | Compasses | 2 |
|  | wing 200 mm |  |
| 88 | Cork | 4 |
|  | rubbing block |  |
| 89 | Cramp | 12 |
|  | 'G' ribbed, 150 mm |  |
| 90 | Cramp | 12 |
|  | 'G' ribbed, 100 mm |  |
| 91 | Cramp | 12 |
|  | 'G' ribbed, 50 mm |  |
| 92 | Cramp | 4 |
|  | 'G' ribbed, 200 mm |  |
| 93 | Cramp | 4 |
|  | sash, 900 mm length out of steel bar |  |
| 94 | Cramp | 4 |
|  | sash, 600 mm length out of steel bar |  |
| 95 | Die stocks for circular die | 2 |
|  | 21 mm O.D. |  |
| 96 | Die stocks for circular die | 2 |
|  | 25 mm , O.D. |  |
| 97 | Dividers | 2 |
|  | 150 mm quick solid nut, spring type |  |
| 98 | Set of drill morse | 2 |


| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 99 | twist, straight shank, H.S.S |  |
|  | Drill | 2 |
|  | hand, 8 mm capacity, machine cut gears and pinion, double pinion with all bright parts plated |  |
| 100 | Enamel trough | 1 |
|  | $152 \times 250 \times 50 \mathrm{~mm}$ |  |
| 101 | Engineer steel square | 10 |
|  | 150 mm |  |
| 102 | Engineers' combination pliers | 2 |
|  | 150 mm |  |
| 103 | Engineers' H.S.S. hand taps | 2 |
|  | metric M3 0.5 (set of 3) |  |
| 104 | Engineers' H.S.S. hand taps | 2 |
|  | metric M5 x 0.8 (set of 3) |  |
| 105 | Engineers' H.S.S. hand taps | 2 |
|  | metric M6 x 1 (set of 3) |  |
| 106 | Engineers' H.S.S. hand taps | 2 |
|  | metric M8 x 1.25 (set of 3) |  |
| 107 | Engineers' H.S.S. hand taps | 2 |
|  | metric M10 x 1.5 (set of 3) |  |
| 108 | Face shield | 2 |
|  | for general eye and face protection, with 200 mm adjustable clear vizor and adjustable crown strap |  |
| 109 | File card | 6 |
|  | 50 mm wide, 100 mm long. |  |
| 110 | File | 6 |
|  | taper, saw, slim, 150 mm |  |
| 111 | File | 6 |
|  | taper, saw, extra slim 100 mm |  |
| 112 | File | 5 |
|  | half round, $2^{\text {nd }} \mathrm{cut}, 200 \mathrm{~mm}$ |  |
| 113 | File | 5 |
|  | round, $2^{\text {nd }} \mathrm{cut}, 200 \mathrm{~mm}$ |  |
| 114 | File | 5 |
|  | square, $2^{\text {nd }} \mathrm{cut}, 200 \mathrm{~mm}$ |  |
| 115 | File | 2 |
|  | surform, 250 mm blade, plastic handle |  |
| 116 | File | 20 |
|  | hand, safe edge, bastard, 250 mm |  |
| 117 | File | 10 |
|  | hand, safe edge, $2^{\text {nd }}$ cut, 200 mm |  |
| 118 | Gauge | 1 |
|  | cutting, beechwood head and half round stock, brass facing strips and plastic thumbscrew |  |
| 119 | Gauge | 20 |
|  | marking, beechwood head plastic thumbscrew and stock |  |
| 120 | Gauge | 2 |
|  | mortice, rosewood head and stock, brass facing strips on stock, thumbscrew operated slide, knurled screw for fixing stock |  |
| 121 | Gloves | 1 |
|  | leather |  |
| 122 | Hacksaw | 20 |
|  | adjustable, 230 mm telescopic pattern, depth of bow 90 mm , hard wood handle |  |
| 123 | Hammer engineers' ball pein | 1 |
|  | ash handle, 900 g |  |
| 124 | Hammer | 1 |
|  | claw, 450 g Adze eye |  |
| 125 | Hammer | 5 |
|  | Warrington, 226 g , ash handle |  |
| 126 | Hand lever operated shear | 1 |
|  | length of blade 180 mm for cutting plate and round steel. |  |
| 127 | Hand riveter | 2 |
|  | capable of riveting $2.4,3.2,4$ and 4.8 mm diameter rivets by means of inter-changeable nose-pieces |  |


| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 128 | Hand vice <br> 50 mm width x 125 mm drop forged <br> steel, bright jaws, spring type | 2 |
| 129 | Knife <br> marking, plastic handle, steel blade 150 mm overall length | 10 |
| 130 | Letter stamps <br> 5 mm (27 in case) | 1 |
| 131 | Level <br> spirit, multi-view, plastic body, 230 mm long | 2 |
| 132 | Machine vice <br> 100 mm jaw width, 32 mm depth of jaw, jaw opening 75 mm . Suitable for holding round and square sections, with knurled handle. | 2 |
| 133 | Mechanic vice <br> 100 mm jaws, with plastic vice grips | 20 |
| 134 | Machinist scriber <br> 115 mm long | 10 |
| 135 | Machinists screwdriver <br> 267 mm overall, chrome vanadium blade, 8 mm square $\times 150 \mathrm{~mm}$ long securely pinned in handle | 1 |
| 136 | Mallet <br> carpenter, beechwood head and handle 125 mm | 20 |
| 137 | Mitre block <br> beechwood, $300 \mathrm{~mm} \times 100 \mathrm{~mm} \times 50 \mathrm{~mm}$ | 1 |
| 138 | Mitre square <br> 250 mm fixed blade, rosewood handle | 2 |
| 139 | Needle file <br> round handle 140 mm warding, 3 square | 3 |
| 140 | Needle file <br> round handle 140 mm warding | 6 |
| 141 | Nippers, end cutting, 125 mm | 2 |
| 142 | Nippers, side cutting, 125 mm | 5 |
| 143 | Number stamps, 5 mm (9 or 10 in case) | 1 |
| 144 | Odd leg calipers <br> firm joint, 125 mm | 2 |
| 145 | Oil can <br> valve spout, 85 c.c. conical tin spring valve | 1 |
| 146 | Philips driver set | 2 |
| 147 | Piercing saw frames <br> adjustable, blade length up to 150 mm , depth of bow 70 mm | 2 |
| 148 | Pincers <br> carpenter, 150 mm | 4 |
| 149 | Plane <br> smoothing, adjustable iron | 20 |
| 150 | Pliers <br> combination, 150 mm insulated | 1 |
| 151 | Pliers <br> end cutter, 150 mm | 1 |
| 152 | Pliers <br> flat nose, smooth jaw, 125 mm | 5 |
| 153 | Pliers <br> round nose, 125 mm | 5 |
| 154 | Punch <br> centre, 10 mm dia. knurled | 2 |
| 155 | Rasp wood, 200 mm , half round, hardwood handle, smooth | 6 |
| 156 | Rasp <br> wood, 200 mm , flat, hardwood handle, smooth | 6 |
| 157 | Rasp <br> wood, 200 mm , half round, hardwood handle, bastard | 6 |
| 158 | Rasp <br> wood, 200 mm , flat, hardwood handle, bastard. | 6 |


| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 159 | Respirator <br> soft PVC face mask, micro foam filter, adjustable plastic headband | 4 |
| 160 | Round split dies, H.S.S. <br> metric M3 x 0.5 , 21 mm O.D. | 2 |
| 161 | Round split dies, H.S.S. <br> metric M5 x 0.8, 21 mm O.D. | 2 |
| 162 | Round split dies, H.S.S. <br> metric M6x 1, 21 mm O.D. | 2 |
| 163 | Round split dies, H.S.S. <br> metric M8 x 1.25, 25 mm O.D. | 2 |
| 164 | Round split dies, H.S.S. metric M10 x 1.5, 25 mm O.D. | 2 |
| 165 | Rule <br> stainless steel, 300 mm , graduated in inches and mm | 20 |
| 166 | Rule <br> stainless steel, 600 mm , graduated in inches and mm | 4 |
| 167 | Safety goggle/spectacle comply with B.S.S. or equivalent | 20 |
| 168 | Saw set | 1 |
| 169 | Saw <br> coping, 163 mm coping saw blade, pinned ends, depth of bow 120 mm . | 20 |
| 170 | Saw <br> cross cut, 600 mm skewback, 8 T.P.I. beech handle | 1 |
| 171 | Saw <br> keyhole, hardwood handle | 1 |
| 172 | Saw <br> keyhole, blades, 250 mm , fine | 2 |
| 173 | Saw <br> panel, 500 mm 10 T.P.I. beech handle | 1 |
| 174 | Saw <br> rip, $650 \mathrm{~mm}, 6$ T.P.I. beech handle | 1 |
| 175 | Saw <br> tenon, brass back 250 mm , beech handle. | 20 |
| 176 | Saw <br> piercing | 10 |
| 177 | Screwdriver <br> cabinet pattern, 150 mm blade. | 6 |
| 178 | Screwdriver <br> cabinet pattern, 200 mm blade | 2 |
| 179 | Screwdriver <br> engineer fluted, plastic handle 100 mm | 6 |
| 180 | Screwdriver <br> engineer fluted, plastic handle 75 mm | 6 |
| 181 | Sheetmetal bender <br> bench type hand-operated, capable of bending steel sheets 0.6 mm thick and aluminum sheets 1.5 thick | 1 |
| 182 | Spanner set <br> double end type, $6 \mathrm{~mm}-24 \mathrm{~mm}$ | 2 |
| 183 | Spokeshave <br> metal, flat bottom, adjustable iron, 250 mm long 50 mm cutter | 5 |
| 184 | Spokeshave <br> metal, round bottom, adjustable iron, 250 mm long 50 mm cutter | 5 |
| 185 | Square <br> mitre combination, 300 mm | 2 |
| 186 | Tape measuring <br> 3 m long, high impact electroplated chrome finish case, automatic rewind with locking switch | 5 |
| 187 | $\begin{aligned} & \text { Tinmen's boxwood mallets } \\ & 75 \mathrm{~mm}, \text { ash handle } \end{aligned}$ | 4 |
| 188 | Tinmen's groove punches <br> 3 mm | 1 |


| Item No. | Description | Quantity |
| :---: | :---: | :---: |
| 189 | Tinmen's groove punches <br> 5 mm | 1 |
| 190 | Tinmen's groove punches 6 mm | 1 |
| 191 | Tinmen's rivet sets | 1 |
|  | 3 mm |  |
| 192 | Tinmen's rivet sets | 1 |
|  | 5 mm |  |
| 193 | Tinmen's rivet sets | 1 |
|  | 6 mm |  |
| 194 | Tinmen's snips straight blade 250 mm | 4 |
| 195 | Tinmen's snips curved blade 250 mm | 4 |
| 196 | Trysquare <br> 300 mm rosewood stock faced with brass, blade secured with brass diamonds | 1 |
| 197 | Trysquare <br> 150 mm rosewood stock faced with brass, blade secured with brass diamonds. | 20 |
| 198 | Tweezers | 8 |
| 199 | Universal surface gauge <br> one pillar, height 300 mm base length 75 mm , base width 75 mm | 1 |
| 200 | Vee-blocks and clamp <br> cast iron, $50 \mathrm{~mm} \times 40 \mathrm{~mm}$ sq., 40 mm dia. Capacity, two $90^{\circ}$ vees having different capacities, vees truly centre | 1 |
| 201 | 3D Printer <br> Using FDM / SLA printing technology or equivalent <br> Minimum print volume 150x150x150mm | 5 |
| 202 | 3D scanner <br> Depth Precision $\pm 0.05 \mathrm{~mm}$ <br> Minimum scan volume 100x100x100mm | 1 |
| 203 | Vinyl cutter <br> Minimum cutting width 290 mm | 1 |
|  | Total cost for Items* | 94,700 |

* F\&E Items Nos. 1-22, 26-43 and 45-203 are shared with Design and Technology.


## Reference List of Furniture and Equipmen

for Secondary Schoo
Subject: SS Information and Communication Technology

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 1 | COMPUTER EQUIPMENT ITEMS |  |
|  | Microcomputer workstation | 26 |
| 2 | Projection system with screen | 1 |
| 3 | Printer or printer cum scanner (small) | 2 |
| 4 | LAN kit including hub/switch, router, printer server, wireless access point, cabling tools | 1 |
| 5 | Web camera | 10 |
| 6 | Digital video camera | 10 |
| 7 | Diagnostic toolkit | 1 |
| 8 | Web page development tool | 1 |
|  | (for at least 21 concurrent users) |  |
| 9 | Graphics package | 1 |
|  | (for at least 21 concurrent users) |  |
| 10 | PDF Editor | 1 |
|  | FURNITURE \& EQUIPMENT ITEMS |  |
| 11 | Dehumidifier | 2 |
| 12 | Student chair |  |
| 13 | Teacher chair | 21 |

Note: Furniture and equipment items listed above are already provided in the Computer Subject Rm in Part IIa.

Subject : Technology and Living - Food Science and Technology Strand

| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 1 | FURNITURE |  |  |
|  | Cabinet | 1 | ** |
|  | First-aid, single door type |  |  |
| 2 | Chair | 1 | ** |
|  | Student, large to extra large |  |  |
| 3 | Stool | 24 | ** |
|  | 480 mm high |  |  |
| 4 | Table | 8 | ** |
|  | Housecraft, Pupils' |  |  |
| 5 | Table | 3 | ** |
|  | Work, with cupboards <br> Home Living Area Furniture |  |  |
| 6 | Trolley | 2 | ** |
|  | Tea |  |  |
|  | EQUIPMENT |  |  |
|  | Appliances - Gas |  |  |
| 7 | Cooker | 7 | ** |
|  | Domestic, Asian style, free standing, consists of 4 burners (2 middle burners and 2 big burners with inner and outer rings), automatic ignition, height 200 mm approx., with flame failure devices. |  |  |
| 8 | Cooker | 5 | ** |
|  | Domestic, full size, completed with automatic ignition, consists of a separate grill compartment, 4 - burner hotplate of 2 sizes, with flame failure devices for the burners and the oven. <br> Appliances - Electrical |  |  |
| 9 | Cooker* | 1 | ** |
|  | Domestic, consists of 4 radiant rings with 2 economy mini/maxi rings, with control panel for different functions, i.e. grill and oven, oven temperature in degree Celsius ranged from $150^{\circ} \mathrm{C}-250^{\circ} \mathrm{C}$, the should be suitable for use on $200-220$ Volts, $50 \mathrm{~Hz}, 60$ Ampere power supply. |  |  |
| 10 | Dish Washer* | 1 | ** |
|  | with a capacity of washing 12 culinary sets, 2 washing temperatures and $4-6$ washing programmes, stainless steel tub, adjustable basket. |  |  |
| 11 | Dryer, Tumble* | 1 | ** |
|  | capable of drying 3-5 kg dry weight of wash with 2 temperature settings, loading of heaters shall be of 2,000W approx. |  |  |
| 12 | Hot Water Pot* ${ }^{*}$ | 1 | ** |
|  | Electric, with a capacity of 3 litres, water level indicator, boil and reboil function, detachable lid with power of 600-700W. |  |  |
| 13 | Induction Cooker* | 1 | ** |
|  | On/Off switch with different power level control, ceramic top plate, overheat sensor, protection fuse with power of $1,300-1,600 \mathrm{~W}$. |  |  |
| 14 | Iron* | 2 | ** |
|  | electric, steam with thermostat, loading of 1,200W or above. |  |  |
| 15 | Mixer |  |  |
|  | electric : |  |  |
|  | (a) Egg beater * | 6 | ** |
|  | $3-5$ speed control with 2 beaters and 2 dough hooks, with/without stand and bowl with power of $15-180 \mathrm{~W}$. |  |  |
|  | (b) Liquidizer* <br> 2-4 speed control switch, glass container with 1-1.5 litre capacity, detachable blades with power of 400-750W. | 6 | ** |
| 16 | Multi-purpose Food Preparation Machine* | 1 | ** |
|  | stainless steel bowl (approximately 4.3-litre capacity), with special attachments : e.g. Dough hook, Whisk, Kbeater, Pasta Extruder, Multi-Mill and Mincer with power of 600-700W. |  |  |
| 17 | Oven, Microwave* | 2 | ** |
|  | electric, oven capacity of approximately 23 litre, loading of 900 W , fully automatic with timer, safety door lock and at least 3 microwave settings. |  |  |
| 18 | Processor, Food* | 2 | ** |
|  | stainless steel blade with different functions, e.g. slicing, shredding, grating, chopping with safety lock device, bowl volume of at least 1-litre capacity, with blender and juice extractor attachments with power of 500-700W |  |  |
| 19 | Refrigerator* | 2 | ** |
|  | Net capacity of 300-450 litres, frost-free type |  |  |
| 20 | Rice Cooker* ${ }^{*}$ | 3 | ** |
|  | electric, medium (capacity for 6-8 persons), automatic release button, hinge spring for auto lid opening, with power of 600-650W. |  |  |
| 21 | Rice Cooker* ${ }^{*}$ | 3 | ** |
|  | electric, small, (capacity for 2-4 persons) automatic release button, hinge spring for auto lid opening, with power of 300-450W. |  |  |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 22 | Washing Machine* | 1 | ** |
|  | fully automatic with selectable programmes for washing and spin drying, capable of washing 5 kg dry weight of wash, front provided with a cold and hot water washing facility <br> MISCELLANEOUS |  |  |
| 23 | Blanket | 1 | ** |
|  | Fire Fighting |  |  |
| 24 | Board |  |  |
|  | Ironing, metal : |  |  |
|  | (a) Sleeve | 2 | ** |
|  | (b) Standard | 2 | ** |
| 25 | Drying Equipment | 2 | ** |
|  | portable, indoor, durable steel frame with rust proof and rounded drying line fittings, adjustable multiposition, additional rubber fittings on the feet for improved stability. |  |  |
| 26 | Water Purifier | 7 | ** |
|  | free standing or built in type with replaceable filter, contain filter cartridge life checker and safety valve to prevent damage to purifier. <br> SMALL EQUIPMENT |  |  |
|  | Bamboo-Wooden-Cane Utensils |  |  |
| 27 | Board | 13 | ** |
|  | Chopping, 30 cm to 33 cm dia. x 4 cm approx. |  |  |
| 28 | Board | 13 | ** |
|  | Chopping, Oblong, $35 \mathrm{~cm} \times 22 \mathrm{~cm} \times 2.5 \mathrm{~cm}$ approx. |  |  |
| 29 | Cake Mould | 6 | ** |
|  | small |  |  |
| 30 | Cake Mould | 6 | ** |
|  | medium |  |  |
| 31 | Chopsticks | 23 | ** |
|  | Bamboo |  |  |
| 32 | Chopsticks | 23 | ** |
|  | Bamboo, extra long |  |  |
| 33 | Panstand | 24 | ** |
| 34 | Pin | 13 | ** |
|  | Rolling, Wooden, Chinese |  |  |
| 35 | Pin | 13 | ** |
|  | Rolling, Wooden, Western |  |  |
| 36 | Spoon | 24 | ** |
|  | Wooden, small |  |  |
| 37 | Steamer | 13 | ** |
|  | Bamboo with cover, 14 cm dia. |  |  |
| 38 | Steamer | 6 | ** |
|  | Bamboo with cover, $28-30 \mathrm{~cm}$ dia. |  |  |
| 39 | Tray | 3 | ** |
|  | Service |  |  |
|  | Metal (aluminum, stainless steel etc.)/Plastic Utensils |  |  |
| 40 | Board | 13 | ** |
|  | Chopping, Plastic, $18 \mathrm{~cm} \times 25 \mathrm{~cm}$ approx. |  |  |
| 41 | Board | 13 | ** |
|  | Chopping, Plastic, $35 \mathrm{~cm} \times 20 \mathrm{~cm}$ approx. |  |  |
| 42 | Bowl | 24 | ** |
|  | Washing-up, Plastic, 35 cm dia. approx. |  |  |
| 43 | Bucket | 7 | ** |
|  | Plastic with lid, 10-13 litres |  |  |
| 44 | Colander | 13 | ** |
|  | Plastic, Chinese |  |  |
| 45 | Colander | 13 | ** |
|  | Stainless Steel |  |  |
| 46 | Container | 2 | ** |
|  | Storage, Plastic, (set of 3) |  |  |
| 47 | Container | 3 | ** |
|  | Stainless Steel for oil, 1-1.5 litres |  |  |
| 48 | Container | 13 | ** |
|  | Cutlery, Plastic |  |  |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 49 | Cutters | 12 | ** |
|  | Pastry (set) - assorted sizes/shapes |  |  |
| 50 | Cutters | 12 | ** |
|  | Pastry(set) - fluted/plain |  |  |
| 51 | Dish | 7 | ** |
|  | Soap, Plastic |  |  |
| 52 | Dredger | 13 | ** |
|  | Flour |  |  |
| 53 | Dust pan | 1 | ** |
|  | with handle |  |  |
| 54 | Grater | 13 | ** |
|  | combining 3 sizes of teeth |  |  |
| 55 | Jug | 2 | ** |
|  | Water, Plastic, with cover |  |  |
| 56 | Kettle | 7 | ** |
|  | Stainless steel, 2 litres to 4.5 litres |  |  |
| 57 | Ladle | 13 | ** |
|  | Draining, Stainless Steel, 12.5 cm dia. approx. |  |  |
| 58 | Ladle | 2 | ** |
|  | Soup, Stainless Steel, horizontal handle |  |  |
| 59 | Ladle | 6 | ** |
|  | Soup, Stainless Steel, vertical handle |  |  |
| 60 | Ladle | 6 | ** |
|  | Rice, Stainless Steel |  |  |
| 61 | Mould | 46 | ** |
|  | Telly, Plastic, small |  |  |
| 62 | Mould | 6 | ** |
|  | Jelly, 0.5 litre |  |  |
| 63 | Pan | 13 | ** |
|  | Stainless Steel, 1 litre, 12.5 cm dia. approx. |  |  |
| 64 | Pan | 12 | ** |
|  | Stainless Steel, 1.7 litre, 15 cm dia. approx. |  |  |
| 65 | Pan | 12 | ** |
|  | Stainless Steel, 2.5 litre, 18 cm dia. approx |  |  |
| 66 | Pan | 12 | ** |
|  | Stainless Steel, 3 litre, 20 cm dia |  |  |
| 67 | Pan | 7 | ** |
|  | Milk, Non- stick/Stainless Steel, 12.5 cm dia. approx. |  |  |
| 68 | Pan | 1 | ** |
|  | Stainless Steel, Heavy Quality Machine Base, 1 litre, 12.5 cm dia. approx. |  |  |
| 69 | Pan | 1 | ** |
|  | Stainless Steel, Heavy Quality Machine Base, 2 litres, 15 cm dia. approx. |  |  |
| 70 | Pan | 1 | ** |
|  | Stainless Steel, Heavy Quality Machine Base, 3 litres, 18 cm dia. approx. |  |  |
| 71 | Pan | 2 | ** |
|  | Stainless Steel, Heavy Quality Machine Base, with basket for deep frying, 5.7 litres, 22 cm dia. approx. |  |  |
| 72 | Pan | 13 | ** |
|  | Frying, Flat, good quality, $17 \mathrm{~cm} / 20 \mathrm{~cm}$ dia. approx |  |  |
| 73 | Plate | 34 | ** |
|  | Stainless Steel, 17 cm dia. approx. |  |  |
| 74 | Plate | 34 | ** |
|  | Stainless Steel, 22 cm dia. approx. |  |  |
| 75 | Scale | 5 | ** |
|  | Weighing, Electronic, for kitchen use, with maximum capacity of 2 kg ,readability of 1 g , Battery or D.C. supply. |  |  |
| 76 | Scale | 3 | ** |
|  | Weighing, Kitchen, 2 kg approx. |  |  |
| 77 | Scraper | 13 | ** |
|  | Plastic |  |  |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 78 | Sieve | 13 | ** |
|  | with handle, 18 cm dia. approx. |  |  |
| 79 | Sink Tidy | 7 | ** |
|  | Plastic |  |  |
| 80 | Slicer | 6 | ** |
|  | Egg |  |  |
| 81 | Slice | 13 | ** |
|  | Fish, Small |  |  |
| 82 | Spoon | 13 | ** |
|  | Measuring (set of 3-4) |  |  |
| 83 | Sprinkler | 2 | ** |
|  | for laundry |  |  |
| 84 | Steamer | 6 | ** |
|  | Stainless Steel (set of 3 \& cover), 30 cm dia. approx. |  |  |
| 85 | Strainer | 2 | ** |
|  | Tea, with stand |  |  |
| 86 | Tin | 6 | ** |
|  | Baking, Loaf |  |  |
| 87 | Tin | 12 | ** |
|  | Baking, Oblong |  |  |
| 88 | Tin | 12 | ** |
|  | Baking, Oblong, shallow, 28 cm x 18 cm approx. |  |  |
| 89 | Tin | 24 | ** |
|  | Baking, Round, 17 cm approx. |  |  |
| 90 | Tin | 6 | ** |
|  | Baking, Round, deep, 15 cm dia. approx. |  |  |
| 91 | Tin | 6 | ** |
|  | Baking, Round, deep, 20 cm dia. approx. |  |  |
| 92 | Tin | 12 | ** |
|  | Baking, Sheet |  |  |
| 93 | Tin | 24 | ** |
|  | Baking, 6/9 holes, medium |  |  |
| 94 | Tin | 12 | ** |
|  | Baking, 12 holes, small |  |  |
| 95 | Tin | 24 | ** |
|  | Baking, 12 holes, medium |  |  |
| 96 | Tin | 6 | ** |
|  | Baking, Square, shallow, $20 \mathrm{~cm} \times 20 \mathrm{~cm}$ approx |  |  |
| 97 | Tray | 12 | ** |
|  | aluminum, oblong, 28 cm x 21 cm approx. |  |  |
| 98 | Tray | 18 | ** |
|  | aluminum, small, 35 cm x 25 cm approx. |  |  |
| 99 | Tray | 13 | ** |
|  | aluminum, medium, $45 \mathrm{~cm} \times 33 \mathrm{~cm}$ approx. |  |  |
| 100 | Tray | 13 | ** |
|  | aluminum, large, 48 cm x 38 cm approx. |  |  |
| 101 | Tray | 25 | ** |
|  | Cooling, Wire |  |  |
| 102 | Tripod | 13 | ** |
|  | for steaming |  |  |
| 103 | Turntable | 2 | ** |
|  | cake |  |  |
| 104 | Whisk | 13 | ** |
|  | Egg, Spiral |  |  |
| 105 | Whisk | 4 | ** |
|  | Egg, Rotary |  |  |
| 106 | Wok | 13 | ** |
|  | Stainless Steel, $33 \mathrm{~cm} / 35 \mathrm{~cm}$ dia. |  |  |
| 107 | Wok Chan | 13 | ** |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 108 | Stainless Steel, with wooden handle <br> Wok Cover <br> aluminum/ Stainless Steel, $30 \mathrm{~cm} / 32.5 \mathrm{~cm}$ dia. approx. (N.B. All pans, kettles etc. should have non-conductive handles) <br> Brushes | 13 | ** |
| 109 | Broom | 1 | ** |
| 110 | Sweeping Brush | 2 | ** |
| 111 | Clothes <br> Brush | 13 | ** |
| 112 | Nail, Plastic, single- sided Brush | 26 | ** |
| 113 | Pastry <br> Brush | 13 | ** |
| 114 | Scrubbing, 15 cm length Brush | 25 | ** |
|  | Vegetable |  |  |
| 115 | Mop | 1 | ** |
|  | Floor, complete with handle |  |  |
|  | China and Glassware I <br> Basin | 13 | ** |
| 117 | Pudding, 0.5 litre <br> Bottle | 12 | ** |
| 118 | Soya Sauce, small Bottle | 6 | ** |
|  | Soya Sauce, large <br> Bowl | 13 | ** |
| 119 | Mixing, 23 cm dia. approx. |  |  |
| 120 | Bowl | 13 | ** |
| 121 | Mixing, 26 cm dia. approx. <br> Bowl | 38 | ** |
| 122 | Utility, 11 cm dia. approx. <br> Bowl | 38 | ** |
|  | Utility, 15 cm dia. approx. |  |  |
| 123 | Casserole | 13 | ** |
| 124 | with Lid, Heatproof Glass, round, 0.5 litre Casserole with Lid, Heatproof Glass, round, 1 litre | 13 | ** |
| 125 | Chinese Pattern, Chinaware (Plain/Rice): |  |  |
|  | (a) Bowl, Tea | 24 | ** |
|  | (b) Bowl, small, 9 cm dia. approx. | 24 | ** |
|  | (c) Bowl, large, 11 cm dia. approx. | 24 | ** |
|  | (d) Dish, 7 cm dia. approx. | 24 | ** |
|  | (e) Dish, Bone, 9 cm dia. approx. | 24 | ** |
|  | (f) Dish, 9 cm dia. approx. (for soya sauce) | 6 | ** |
|  | (g) Dish, 13 cm dia. approx. | 24 | ** |
|  | (h) Plate, 18 cm dia. approx. | 12 | ** |
|  | (i) Plate, 23 cm dia. approx. | 12 | ** |
|  | (j) Plate, Oval, 20 cm long approx. | 6 | ** |
|  | (k) Serving Bowl, deep, 15 cm dia. approx. | 6 | ** |
|  | (1) Serving Bowl, shallow, 16 cm dia. approx. | 12 | ** |
|  | (m) Spoon, Serving | 6 | ** |
|  | (n) Spoon, Soup, small | 24 | ** |
| 126 | Coloured Glazed Earthenware/Chinaware |  |  |
|  | (a) Basin, Sugar | 3 | ** |
|  | (b) Jug, Milk | 3 | ** |
|  | (c) Pot, Coffee, 0.8 litre approx. | 2 | ** |
|  | (d) Pot, Tea, 0.4 litre approx. <br> (e) Pot, Tea, 0.7 litre approx. <br> (f) Pot, Hot water | 1 | ** <br> ** <br> ** |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 127 | (g) Cup, Tea, with Saucer | 24 | ** |
|  | (h) Plate, 18 cm dia. approx. | 24 | ** |
|  | (i) Plate, 23 cm dia. approx. | 12 | ** |
|  | (j) Plate, 25 cm dia. approx. | 12 | ** |
|  | Container | 6 | ** |
|  | Oil with lid |  |  |
| 128 | Dinner Set | 1 | ** |
|  | for 6 persons, Chinese style |  |  |
| 129 | Dish | 6 | ** |
|  | Pie, Heatproof Glass, 0.25 litre |  |  |
| 130 | Dish | 6 | ** |
|  | Pie, Heatproof Glass, 0.5 litre |  |  |
| 131 | Dish | 12 | ** |
|  | Pie, Oblong/Oval, 0.5 litre |  |  |
| 132 | Dish | 24 | ** |
|  | Souffle, 0.25 litre |  |  |
| 133 | Glass Cookware |  |  |
|  | heatproof |  |  |
|  | (a) saucepan, small 1.5 litres | 1 | ** |
|  | (b) saucepan, medium, 2.5 litres | 1 | ** |
|  | (c) saucepan, large, 3.5 litres | 1 | ** |
| 134 | Jug | 26 | ** |
|  | Measuring, heatproof glass, 300 ml |  |  |
| 135 | Jug | 8 | ** |
|  | Measuring, heatproof glass, 600 ml |  |  |
| 136 | Jug | 4 | ** |
|  | Measuring, heatproof glass, 1 litre |  |  |
| 137 | Iar | 8 | ** |
|  | Storage, Glass, with black plastic lid, 2-3 kg |  |  |
| 138 | Iar | 18 | ** |
|  | Storage, Glass, small with black plastic lid |  |  |
| 139 | Mould | 28 | ** |
|  | heatproof glass |  |  |
| 140 | Shaker | 6 | ** |
|  | Pepper, Glass, |  |  |
| 141 | Spoon | 24 | ** |
|  | Chinese, White Porcelain, small |  |  |
| 142 | Squeezer | 4 | ** |
|  | Lemon, Glass |  |  |
| 143 | Tea Set | 1 | ** |
|  | for 6 persons, Western |  |  |
| 144 | Tumbler | 24 | ** |
|  | Glass |  |  |
|  | Cutlery and Bladed Tools |  |  |
| 145 | Chopper | 23 | ** |
|  | Meat, 22 cm blade, 7 cm narrow end approx. |  |  |
| 146 | Chopsticks | 23 | ** |
|  | Plastic (table use) |  |  |
| 147 | Fork | 26 | ** |
| 148 | Knife | 4 | ** |
|  | Bread |  |  |
| 149 | Knife | 23 | ** |
|  | Kitchen, Cook's, 18 cm blade approx. |  |  |
| 150 | Knife | 23 | ** |
|  | Kitchen, Paring, with or without serrated edge, $7.5 \mathrm{~cm} / 10 \mathrm{~cm}$ blade approx. |  |  |
| 151 | Knife | 13 | ** |
|  | Kitchen, Utility, $13 \mathrm{~cm} / 18 \mathrm{~cm}$ blade |  |  |
| 152 | Knife | 13 | ** |
|  | Palette, small |  |  |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 153 | Knife | 13 | ** |
|  | Palette, large |  |  |
| 154 | Knife | 26 | ** |
|  | Round Ended, steel handle |  |  |
| 155 | Knife | 1 | ** |
|  | Sharpener |  |  |
| 156 | One Set of Cutlery |  |  |
|  | for serving 6 persons as follows : |  |  |
|  | (a) Fork, Table (this includes 2 extra for serving) | 8 | ** |
|  | (b) Fork, Dessert | 6 | ** |
|  | (c) Knife, Table | 6 | ** |
|  | (d) Knife, Dessert | 6 | ** |
|  | (e) Spoon, Table (For serving) | 4 | ** |
|  | (f) Spoon, Dessert | 6 | ** |
|  | (g) Spoon, Soup | 6 | ** |
|  | (h) Spoon, Tea | 6 | ** |
| 157 | Opener | 6 | ** |
|  | Tin |  |  |
| 158 | Scissors | 13 | ** |
|  | Kitchen |  |  |
| 159 | Spoon | 25 | ** |
|  | Dessert |  |  |
| 160 | Spoon | 25 | ** |
|  | Table |  |  |
| 161 | Spoon | 25 | ** |
|  | Tea |  |  |
| 162 | Vegetable Peeler | 13 | ** |
|  | Miscellaneous - Cloths, etc. |  |  |
| 163 | Cloth | 38 | ** |
|  | Dish-net |  |  |
| 164 | Cloth | 8 | ** |
|  | Glass, Linen, 50 cm x 75 cm approx. |  |  |
| 165 | Cloth/Gloves | 13 | ** |
|  | Oven |  |  |
| 166 | Cloth | 32 | ** |
|  | Kitchen |  |  |
| 167 | Cloth | 6 | ** |
|  | Table, Plastic |  |  |
| 168 | Duster | 6 | ** |
|  | Yellow |  |  |
| 169 | Furnishing Fabric | 1 | ** |
|  | for curtain, laundry equipment, sewing machines |  |  |
| 170 | Towel | 14 | ** |
|  | Hand, 55 cm x 38 cm approx. |  |  |
| 171 | Bread Maker* | 1 |  |
|  | Electric, domestic use, 220-230V, 3-pin plug, a selection of programme for different types of bread (including plain bread and bread with fillings) |  |  |
| 172 | Deep Fryer* | 1 |  |
|  | Electric, domestic use, 220-230V, 3-pin plug, capacity of 1.5 2.5 litres |  |  |
| 173 | Ice Cream Maker* | 5 |  |
|  | Electric, domestic use, 220-230V, 3-pin plug, capacity of 1-2 litres |  |  |
|  | Sub-total Cost |  | 8,300 |

Notes:
** These items share the F\&E of Home Ecom Rm 1.

* Electrical appliances should be suitable for use on 200-220 volts, 50 HZ ., single phase A.C. power supply.

1 Items 117, 118, 127, 138 and 140 above are intended for use with Item 98 (Tray), making 6 sets. The tray contains two small soya sauce bottles, one large soya sauce bottle,
2 For further details of the electrical appliances and small equipment, please refer to the Section on References and Resources of the webpage of the Technology Education
Section of the Curriculum Development Institute at http://www.edb.gov.hk/index.aspx?nodeID=3104\&langno=1

| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 174 | Balance, dial-o-gram |  |  |
|  | (a) Balance, electronic, capacity up to 200 g . | 5 | @ |
|  | (b) Balance, electronic, capacity up to 110 g . | 1 | @ |
| 175 | Beaker |  |  |
|  | Squat form with spout, with two or more graduation marks showing approximate capacities, |  |  |
|  | (a) Pyrex or equivalent, 100 mL . | 20 | @ |
|  | (b) Pyrex or equivalent, 250 mL . | 30 | @ |
|  | (c) Pyrex or equivalent, 500 mL . | 2 | @ |
|  | (d) Pyrex or equivalent, $1,000 \mathrm{~mL}$. | 2 | @ |
| 176 | Bench mat | 15 | @ |
|  | Make of glass reinforced cement, asbestos free, about $300 \times 300 \mathrm{~mm}, 4.5 \mathrm{~mm}$ thick. |  |  |
| 177 | Bone cutter forceps | 1 | @ |
|  | Nickel-plated carbon steel/stainless steel with spring handles and closing clip, blade length $20-40 \mathrm{~mm}$. |  |  |
| 178 | Bottle, dropping | 40 | @ |
|  | A three-piece pipette section comprising a stout glass dropper, high-density polythene stopper with dustproof head and vinyl teat, fitted to a reagent bottle. Capacity 60 mL . |  |  |
| 179 | Bottle, narrow mouth |  |  |
|  | Clear glass, with dust-proof stopper |  |  |
|  | (a) 100 mL . | 20 | @ |
|  | (b) 250 mL . | 40 | @ |
|  | (c) 500 mL | 20 | @ |
| 180 | Bottle, wide mouth | 20 | @ |
|  | Clear glass, with dust-proof stopper. |  |  |
|  | Capacity 250 mL . |  |  |
| 181 | Bottle stand | 12 | @ |
|  | Wooden with six holes for 60 mL dropping bottles. |  |  |
| 182 | Burner, Bunsen | 14 | @ |
|  | For *town gas/liquefied petroleum gas/natural gas supply. <br> Nickel-plated burner tube with rotatable air regulator and riffled connector, mounted on an enamelled pressed-steel base. Burner tube $100 \times 13 \mathrm{~mm}$ (height x diameter), base 80 mm diameter, connector 10 mm mean outer diameter. <br> *Schools should specify the type of gas supply used in their laboratories and delete whichever is inapplicable. |  |  |
| 183 | Clip, Hoffman | 30 | @ |
|  | Plated metal, with clamp screw and hinged bottom plate, width between bars 20 mm . |  |  |
| 184 | Clip, Hose | 30 | @ |
|  | For use on Bunsen burner tubing. |  |  |
| 185 | Clip, Mohr | 12 | @ |
|  | Plated metal, maximum diameter of tubing accepted 15 mm . |  |  |
| 186 | Cork | 1 pack | @ |
|  | Tapered, assorted sizes, pack of 144. |  |  |
| 187 | Cork borer | 5 sets | @ |
|  | Set of 6 from 4 to 10 mm . Plated metal. Cutting tube mounted with safety underflange in shaped handle ensuring that operator cannot be injured by a dislodged tube. With rod for clearing borers. |  |  |
| 188 | Cork borer sharpener | 1 | @ |
|  | Plated metal cone with hinged cutter blade set in slot and metal handle. <br> Circular shape of borer maintained by cone. <br> Edge cut to correct angle by depressing blade using thumb pressure button and rotating borer. |  |  |
| 189 | Cover glass | 2 boxes | @ |
|  | Square glass cover slip for microscope slides. Size 18 mm square. Thickness $0.13-0.16 \mathrm{~mm}$. In box of 100. |  |  |
| 190 | Cylinder, graduated |  |  |
|  | Glass, with spout, |  |  |
|  | (a) 10 mL . | 20 | @ |
|  | (b) 25 mL . | 20 | @ |
|  | (c) 100 mL . | 20 | @ |
|  | (d) 250 mL . | 2 | @ |
| 191 | Drier, hot air | 10 | @ |
|  | A low noise hair drier suitable for rapid drying of laboratory glassware, chromatograms, etc. A detachable nozzle is provided and there is an adjustable heat/speed setting. |  |  |
| 192 | Filter paper | 6 | @ |
|  | Whatman No. 1,125 mm diameter. In box of 200. | boxes |  |
| 193 | Flask, conical | 40 | @ |
|  | Narrow mouth, Pyrex or equivalent, 250 mL . |  |  |
| 194 | Flask, flat bottom | 20 | @ |
|  | Medium neck, Pyrex or equivalent, 250 mL . |  |  |
| 195 | Flask, round bottom | 20 | @ |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 196 | Pyrex or equivalent, 250 mL . |  |  |
|  | Flask, volumetric |  |  |
|  | (a) 250 mL . | 10 | @ |
|  | (b) 500 mL . | 10 | @ |
| 197 | (c) $1,000 \mathrm{~mL}$. | 5 | @ |
|  | Forceps, blunt | 20 | @ |
|  | Stainless steel, straight, length about 130 mm . |  |  |
| 198 | Forceps, fine | 20 | @ |
|  | Stainless steel, straight, length about 130 mm . |  |  |
| 199 | Funnel, dropping | 2 | @ |
|  | Cylindrical, open top, with interchangeable glass/teflon stopcock, borosilicate glass, 100 mL . |  |  |
| 200 | Funnel, filter |  |  |
|  | Plain, soda-lime glass, |  |  |
|  | (a) 75 mm top diameter. | 20 | @ |
|  | (b) 150 mm top diameter. | 4 | @ |
| 201 | Funnel, thistle | 4 | @ |
|  | With straight stem, soda-lime glass, overall length 300 mm . |  |  |
| 202 | Glass plate | 2 | @ |
|  | Square for bell jar, ground one side, 400-500 mm. |  |  |
| 203 | Glass rod | 10 | @ |
|  | Soda-lime glass, 6 mm diameter, in length of about 1.5 m . |  |  |
| 204 | Ice bucket | 1 | @ |
|  | For the transport and short-term storage of ice. Complete with lid. Capacity about 10 to 15 litres. |  |  |
| 205 | Jar, specimen |  |  |
|  | Clear glass, cylindrical, with foot and grip stopper, |  |  |
|  | (a) $150 \times 50 \mathrm{~mm}$ (height x diameter). | 6 | @ |
|  | (b) $250 \times 100 \mathrm{~mm}$ (height x diameter). | 6 | @ |
| 206 | Microscope, monocular | 20 | @ |
|  | Vertical monocular body. Inclinable. <br> Two eye-pieces: Huyghens $\times 4$ (or $\times 5$ ) and $\times 10$ (or x15). <br> Three objectives : x5, x10 and x40 (or $\times 45$ ) on triple (or quadruple) nosepiece. Coarse and fine adjustments, with limit stop. Abbe condenser NA 1.25 and iris diaphragm with filter tray. Built-in mechanical stage. Equipped with a halogen/tungsten or LED illuminator with intensity control fitted to base. Supplied with cabinet with lock and key |  |  |
| 207 | Microscope, stereoscopic | 10 | @ |
|  | Robust stand with reversible white and black plate. Paired x10 wide field eyepiece, with interpupillary adjustment. Two objectives: x 1 and x 2 interchangeable by rolling motion. Supplied with cabinet with lock and key OR supplied with dust cover. |  |  |
| 208 | Microscope cavity slide | 1 pack | @ |
|  | Single cavity, non-corrosive, hard-glass, $76 \times 26 \mathrm{~mm}$ (length x width), thickness not exceeding 1.5 mm . In pack of 50 . |  |  |
| 209 | Microscope slide | 1 pack | @ |
|  | Standard, non-corrosive, hard-glass, $76 \times 26 \mathrm{~mm}$ (length x width), thickness not exceeding 1.2 mm . In pack of 100 . |  |  |
| 210 | Microscope slide box | 5 | @ |
|  | Rack form, accommodate $76 \times 26 \mathrm{~mm}$ microscope slides. <br> Wooden/ High-impact polypropylene with hinged lid. Slides are held in numbered slots and there is an index inside the lid. <br> Capacity 100 slides in 2 rows. |  |  |
| 211 | Microscope slide folder | 10 | @ |
|  | Made of strong cardboard. Holds 9 to 10 microscope slides ( $76 \times 26 \mathrm{~mm}$ ) in one row. |  |  |
| 212 | Mortar and pestle | 12 | @ |
|  | Unglazed inside, glazed outside with spout. Porcelain. External diameter 110 mm . |  |  |
| 213 | Notebook computer | 1 | @ |
|  | For interface to the data logger device. Equipped with appropriate communication port(s) compatible with those available from the data logger interface. Please refer to the Specification of computer hardware and projection system provided by EDB under IT in Education Initiative. <br> Oven/Incubator | 1 | @ |
| 214 | Temperature range $5^{\circ} \mathrm{C}$ above ambient to $120^{\circ} \mathrm{C}$. Temperature fluctuation not more than $1^{\circ} \mathrm{C}$. Minimum capacity about 30 L . Provided with at least two shelves with at least three shelf positions. Thermometer required. |  |  |
| 215 | Petri dish | 24 | @ |
|  | Pyrex or equivalent, $90 \times 15 \mathrm{~mm}$ (diameter x depth). Supplied with cover. |  |  |
| 216 | Pipette, bulb form |  |  |
|  | Bulb form, single graduation on upper stem, capacity |  |  |
|  | (a) 2 mL . | 2 | @ |
|  | (b) 5 mL . | 2 | @ |
|  | (c) 10 mL . | 2 | @ |
| 217 | Pipette, dropping | 24 | @ |
|  | Narrow mouth, overall length about 110 mm . Supplied with rubber teats. |  |  |
| 218 | Pipette, graduated |  |  |




## Notes:

Furniture and equipment items listed above are to be used in respective special room / laboratories for conducting Technology and Living lessons. Except for computer equipment, all ther items should NOT be placed and used in one special room for safety reason
@ F\&E shared with SS Biology. Purchase of these items is not required if a school also offers SS Biology at the same time.
\#\# F\&E shared with SS Chemistry. Purchase of these items is not required if a school also offers SS Chemistry at the same time.
!! F\&E shared with PE.
$\wedge \wedge$ F\&E shared with Computer Assisted Learning Room

Reference List of Furniture and Equipment
for Secondary School
Subject : SS Technology and Living - Fashion, Clothing and Textiles Strand

| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
|  | FURNITURE |  |  |
| 1 | First-aid Cabinet | 1 |  |
| 2 | a. Student Chair | 37 |  |
| 3 | b. Teacher Chair | 1 |  |
| 4 | Stool | 8 |  |
| 5 | Teacher Desk | 2 |  |
| 6 | Needlework Table | 6 |  |
|  | EQUIPMENT |  |  |
|  | Appliances - Electrical |  |  |
|  | Computer Equipment Items |  |  |
| 7 | Microcomputer workstation | 1 |  |
| 8 | Printer or printer cum scanner (small) | 1 |  |
| 9 | Iron | 4 |  |
|  | steam with thermostat, loading of 1,200W or above. |  |  |
| 10 | Machine, Sewing | 1 |  |
|  | Interlock, Domestic, portable, sews with 3-4 threads, power driven with a safety switch |  |  |
| 11 | Machine, Sewing | 10 |  |
|  | power driven, portable with hard carrying case, finger guide/ needle guard |  |  |
| 12 | Machine, Sewing | 1 |  |
|  | computerized, power driven, portable with hard carrying case, finger guide/needle guard, built-in light and LCD display screen <br> MISCELLANEOUS |  |  |
| 13 | Board |  |  |
|  | Ironing, metal : |  |  |
|  | (a) Sleeve | 6 |  |
|  | (b) Standard | 6 |  |
| 14 | Dress Form | 1 |  |
|  | ladies' version, small dress size, (small petite to size 8), full/round shoulders, foam back fabric/nylon cover, stainless steel support stand with adjustable height. |  |  |
| 15 | Dress Form | 1 |  |
|  | ladies' version, medium dress size, (size 10 to size 14), full/round shoulders, foam back fabric/nylon cover, stainless steel 'support stand with adjustable height. |  |  |
| 16 | Dress Form | 1 |  |
|  | men's version, small or medium dress size, full/round shoulders, foam back fabric/nylon cover, stainless steel support stand with adjustable height. |  |  |
| 17 | Microscope, binocular | 2 |  |
|  | Eyepieces : pairs of $10 \mathrm{x}, 15 \mathrm{x}$ <br> Objectives : $4 \mathrm{x}, 10 \mathrm{x}, 40 \mathrm{x}, 100 \mathrm{x}$ on quadruple revolving nosepiece with click stop. <br> Focus control : Coarse and fine adjustments, with safety stop. <br> Stage : Rectangular stage surface with built-in graduated mechanical stage. <br> Condenser : Abbe condenser and Iris diaphragm with filter tray. <br> Illumination* : Built-in low voltage illuminator with adjustable brightness Supplied with dust cover, eyepiece dust cap, cabinet with lock and key. <br> SMALL EQUIPMENT |  |  |
| 18 | Awl | 7 |  |
| 19 | Broom | 1 |  |
|  | sweeping |  |  |
| 20 | Counting Glass | 12 |  |
| 21 | Dressmaking Ruler |  |  |
|  | (a) French Curves | 24 |  |
|  | (b) Metre Sticks | 24 |  |
|  | (c) Set Squares | 12 |  |
| 22 | Equipment |  |  |
|  | for Experiments : |  |  |
|  | (a) Beaker, heatproof, 50 ml | 13 |  |
|  | (b) Beaker, heatproof, 100 ml | 13 |  |
|  | (c) Beaker, heatproof, 250 ml | 13 |  |
|  | (d) Bench mat | 2 |  |
|  | (e) Boiling tube, heatproof, $10-12 \mathrm{~cm}$ long, 150 ml | 26 |  |
|  | (f) Bunsen burner with tubing | 2 |  |
|  | (g) Cylinder, measuring, 10 ml | 13 |  |
|  | (h) Cylinder, measuring, 25 ml | 13 |  |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
|  | (i) Cylinder, measuring, 50 ml | 26 |  |
|  | (j) Flask, heatproof, 50 ml | 7 |  |
|  | (k) Flask, heatproof, 100 ml | 7 |  |
|  | (1) Forceps | 13 |  |
|  | (m) Glass rod | 50 |  |
|  | (n) Glass watch | 50 |  |
|  | (o) Stand and Clamp | 2 sets |  |
|  | (p) Stop watch | 2 |  |
|  | (q) Test tube, $10-12 \mathrm{~cm}$ long | 50 |  |
|  | (r) Test tube brush | 13 |  |
|  | (s) Test tube holder | 13 |  |
|  | (t) Test tube rack (stainless steel) | 13 |  |
|  | (u) Thermometer ( $-10^{\circ} \mathrm{C}$ to $10^{\circ} \mathrm{C}$ ) | 13 |  |
|  | (v) Tongs | 13 |  |
|  | (w) Tray, stackable, polypropylene, chemical resistant | 6 |  |
|  | (x) Tripod stand | 2 |  |
|  | (y) Wire gauze | 2 |  |
| 23 | Notcher | 2 |  |
| 24 | Pan | 1 |  |
|  | Dust, with handle |  |  |
| 25 | Scissors | 13 |  |
|  | overall length, 16 cm approx. |  |  |
| 26 | Scissors | 25 |  |
|  | overall length, 22 cm approx. |  |  |
| 27 | Sewing Box/Basket | 7 |  |
|  | Plastic |  |  |
| 28 | Shears | 6 |  |
|  | Pinking |  |  |
| 29 | Sprinkler | 6 |  |
|  | Laundry |  |  |
| 30 | Tape Measure | 25 |  |
|  | Linen/Plastic, Tailor, 1.5 m long |  |  |
| 31 | Tracing Wheel | 25 |  |
| 32 | Dress Form | 1 |  |
|  | Child's version, small or medium dress size, full/round shoulders, foam back fabric/nylon cover, stainless steel support with adjustable height |  |  |
|  | Sub-total Cost: |  | 1,700 |

Note: \&\&
These items are included in the F\&E list for Home Economics Room II .

| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 33 | Balance, dial-o-gram |  |  |
|  | (a) Balance, electronic, capacity up to 200 g . | 5 | @ |
|  | (b) Balance, electronic, capacity up 110 g . | 1 | @ |
| 34 | Beaker |  |  |
|  | Squat form with spout, with two or more graduation marks showing approximate capacities, |  |  |
|  | (a) Pyrex or equivalent, 100 mL . | 20 | @ |
|  | (b) Pyrex or equivalent, 250 mL . | 30 | @ |
|  | (c) Pyrex or equivalent, 500 mL . | 2 | @ |
|  | (d) Pyrex or equivalent, $1,000 \mathrm{~mL}$. | 2 | @ |
| 35 | Bench mat | 15 | @ |
|  | Make of glass reinforced cement, asbestos free,_about $300 \times 300 \mathrm{~mm}, 4.5 \mathrm{~mm}$ thick. |  |  |
| 36 | Bone cutter forceps | 1 | @ |
|  | Nickel-plated carbon steel/stainless steel with spring handles and closing clip, blade length 20-40 mm. <br> Bottle, dropping | 40 | @ |
| 37 | A three-piece pipette section comprising a stout glass dropper, high-density polythene stopper with dustproof head and vinyl teat, fitted to a reagent bottle. Capacity 60 mL . <br> Bottle, narrow mouth |  |  |
| 38 | Clear glass, with dust-proof stopper <br> (a) 100 mL . | 20 | @ |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 39 | (b) 250 mL . | 40 | @ |
|  | (c) 500 mL | 20 | @ |
|  | Bottle, wide mouth | 20 | @ |
|  | Clear glass, with dust-proof stopper. Capacity 250 mL . |  |  |
| 40 | Bottle stand | 12 | @ |
|  | Wooden with six holes for 60 mL dropping bottles. |  |  |
| 41 | Burner, Bunsen | 14 | @ |
|  | For *town gas/liquefied petroleum gas/natural gas <br> Nickel-plated burner tube with rotatable air regulator and tapering, riffled connector, mounted on an enamelled pressed-steel base. Burner tube $100 \times 13 \mathrm{~mm}$ (height x diameter), base 80 mm diameter, connector 10 mm mean outer diameter. *Schools should specify the type of gas supply used in their laboratories and delete whichever is inapplicable. <br> Clip, Hoffman | 30 | @ |
| 42 | Plated metal, with clamp screw and hinged bottom plate, width between bars 20 mm . |  |  |
| 43 | Clip, Hose | 30 | @ |
|  | For use on Bunsen burner tubing. |  |  |
| 44 | Clip, Mohr | 12 | @ |
|  | Plated metal, maximum diameter of tubing accepted 15 mm . |  |  |
| 45 | Cork | 1 | @ |
|  | Tapered, assorted sizes, pack of 144. | pack |  |
| 46 | Cork borer | 5 | @ |
|  | Set of 6 from 4 to 10 mm . Plated metal. <br> Cutting tube mounted with safety underflange in shaped handle ensuring that operator cannot be injured by a dislodged tube. With rod for clearing borers. | sets |  |
| 47 | Cork borer sharpener | 1 | @ |
|  | Plated metal cone with hinged cutter blade set in slot and metal handle. Circular shape of borer maintained by cone. Edge cut to correct angle by depressing blade using thumb pressure button and rotating borer. Cover glass | 2 | @ |
| 48 | Square glass cover slip for microscope slides. Size 18 mm square. Thickness $0.13-0.16 \mathrm{~mm}$. In box of 100 . | boxes |  |
| 49 | Cylinder, graduated |  |  |
|  | Glass, with spout, |  |  |
|  | (a) 10 mL . | 20 | @ |
|  | (b) 25 mL . | 20 | @ |
|  | (c) 100 mL . | 20 | @ |
|  | (d) 250 mL . | 2 | @ |
| 50 | Drier, hot air | 10 | @ |
|  | A low noise hair drier suitable for rapid drying of laboratory glassware, chromatograms, etc. A detachable nozzle is provided and there is an adjustable heat/speed setting. |  |  |
| 51 | Filter paper | 6 | @ |
|  | Whatman No. 1, 125 mm diameter. In box of 200. | boxes |  |
| 52 | Flask, conical | 40 | @ |
|  | Narrow mouth, Pyrex or equivalent, 250 mL . |  |  |
| 53 | Flask, flat bottom | 20 | @ |
|  | Medium neck, Pyrex or equivalent, 250 mL . |  |  |
| 54 | Flask, round bottom | 20 | @ |
|  | Pyrex or equivalent, 250 mL . |  |  |
| 55 | Flask, volumetric |  |  |
|  | (a) 250 mL . | 10 | @ |
|  | (b) 500 mL . | 10 | @ |
|  | (c) $1,000 \mathrm{~mL}$. | 5 | @ |
| 56 | Forceps, blunt | 20 | @ |
|  | Stainless steel, straight, length about 130 mm . |  |  |
| 57 | Forceps, fine | 20 | @ |
|  | Stainless steel, straight, length about 130 mm . |  |  |
| 58 | Funnel, dropping | 2 | @ |
| 59 | Cylindrical, open top, with interchangeable glass teflon/stopcock, borosilicate glass, 100 mL . Funnel, filter |  |  |
|  | Plain, soda-lime glass, <br> (a) 75 mm top diameter. | 20 | @ |
|  | (b) 150 mm top diameter. | 4 | @ |
| 60 | Funnel, thistle | 4 | @ |
|  | With straight stem, soda-lime glass, overall length 300 mm . |  |  |
| 61 | Glass plate | 2 | @ |
|  | Square for bell jar, ground one side, 400-500 mm. |  |  |


| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 62 | Glass rod | 10 | @ |
|  | Soda-lime glass, 6 mm diameter, in length of about 1.5 m . |  |  |
| 63 | Ice bucket | 1 | @ |
|  | For the transport and short-term storage of ice. Complete with lid. Capacity about 10 to 15 litres. Jar, specimen |  |  |
| 64 | Clear glass, cylindrical, with foot and grip stopper, |  |  |
|  | (a) $150 \times 50 \mathrm{~mm}$ (height x diameter). | 6 | @ |
|  | (b) $250 \times 100 \mathrm{~mm}$ (height x diameter). | 6 | @ |
| 65 | Microscope, monocular | 20 | @ |
|  | Vertical monocular body. Inclinable. <br> Two eye-pieces : Huyghens x 4 (or x5) and x 10 (or x15). Three objectives: $\mathrm{x} 5, \mathrm{x} 10$ and x 40 (or x45) on triple (or quadruple) nosepiece. <br> Coarse and fine adjustments, with limit stop. <br> Abbe condenser NA 1.25 and iris diaphragm with filter tray. <br> Built-in mechanical stage. Equipped with a halogen/tungsten or LED illuminator with intensity control fitted to base. <br> Supplied with cabinet with lock and key |  |  |
| 66 | Microscope, stereoscopic | 10 | @ |
|  | Robust stand with reversible white and black plate. <br> Paired x10 wide field eyepiece, with interpupillary <br> Two objectives : x1 and x2 interchangeable by rolling motion. Supplied with cabinet with lock and key OR supplied with dust cover. |  |  |
| 67 | Microscope cavity slide | 1 | @ |
|  | Single cavity, non-corrosive, hard-glass, $76 \times 26 \mathrm{~mm}$ (length x width), thickness not exceeding 1.5 mm . In pack of 50 . | pack |  |
| 68 | Microscope slide | 1 | @ |
|  | Standard, non-corrosive, hard-glass, $76 \times 26 \mathrm{~mm}$ (length x width), thickness not exceeding 1.2 mm . In pack of 100 . | pack |  |
| 69 | Microscope slide box | 5 | @ |
|  | Rack form, accommodate $76 \times 26 \mathrm{~mm}$ microscope slides. <br> Wooden/ High-impact polypropylene with hinged lid. Slides are held in numbered slots and there is an index inside the lid. <br> Capacity 100 slides in 2 rows. |  |  |
| 70 | Microscope slide folder | 10 | @ |
|  | Made of strong cardboard. Holds 9 to 10 microscope slides ( $76 \times 26 \mathrm{~mm}$ ) in one row. |  |  |
| 71 | Mortar and pestle | 12 | @ |
|  | Unglazed inside, glazed outside with spout. Porcelain. External diameter 110 mm . |  |  |
| 72 | Notebook computer | 1 | @ |
|  | For interface to the data logger device. <br> Equipped with appropriate communication port(s) compatible with those available from the data logger interface. <br> Please refer to the Specification of computer hardware and projection system provided by EDB under IT in Education Initiative. |  |  |
| 73 | Petri dish | 24 | @ |
|  | Pyrex or equivalent, $90 \times 15 \mathrm{~mm}$ (diameter x depth). Supplied with cover. |  |  |
| 74 | Pipette, bulb form |  |  |
|  | Bulb form, single graduation on upper stem, capacity |  |  |
|  | (a) 2 mL . | 2 | @ |
|  | (b) 5 mL . | 2 | @ |
|  | (c) 10 mL . | 2 | @ |
| 75 | Pipette, dropping | 24 | @ |
|  | Narrow mouth, overall length about 110 mm . Supplied with rubber teats. <br> Pipette, graduated |  |  |
| 76 | Fast-flow, amber stain graduations and inscriptions, <br> (a) 1 mL , subdivision 0.01 mL . | 20 | @ |
|  | (b) 2 mL , subdivision 0.02 mL . | 20 | @ |
|  | (c) 5 mL , subdivision 0.05 mL . | 20 | @ |
|  | (d) 10 mL , subdivision 0.1 mL . | 20 | @ |
| 77 | Pipette filler | 20 | @ |
|  | For use with bulb or graduated pipettes of capacity up to 10 mL . With finely adjustable thumb wheel that can avoid the back of liquid into the filler. With flexible pipette holding socket to minimize possible damage to pipette and a rapid release valve. |  |  |
| 78 | Printer or printer cum scanner (small) | 1 | @ |
| 79 | Pump, filter | 4 | @ |
|  | Plated metal or moulded polypropylene body, with integral non-return valve, water inlet for flexible pressure tubing, and vacuum nozzle for about 10 mm bore tubing. |  |  |
| 80 | Retort stand | 20 | @ |
|  | Supplied with boss and clamp. Retort stand base : iron with corrosion resistant finish, minimum size 160 x 100 mm . <br> Stand rod : cadmium plated mild steel/bright aluminum alloy, $500 \times 12 \mathrm{~mm}$ (length x diameter). Clamp enables articles from 2 to 90 mm diameter to be clamped securely; design of the jaw ensures a firm grip at all angles of opening; cork liners for the jaws well secured with 8 mm diameter rod suitable for use in bossheads. <br> Bosshead with offset jaws for great strength; gives a firm grip in either jaw on rods up to 16 mm diameter. |  |  |



| Item No | Description | Quantity | Remarks |
| :---: | :---: | :---: | :---: |
| 99 | Tubing connector, T-shaped | 20 | @ |
|  | Polypropylene, autoclavable, of suitable O.D. to fit rubber tubing of bore diameter about 8 mm . |  |  |
| 100 | Wash bottle | 12 | @ |
|  | White translucent, flexible, with screw cap and bent tube, polyethene, 250 mL capacity. <br> Watch glass |  |  |
| 101 | Ground edge, diameter |  |  |
|  | (a) 50 mm | 12 | @ |
|  | (b) 100 mm | 12 | @ |
| 102 | Water bath | 1 | @ |
|  | Capacity about 14 litres. Temperature ranges $5^{\circ} \mathrm{C}$ above ambient to about $80^{\circ} \mathrm{C}$. Sensitivity $0.5^{\circ} \mathrm{C}$. With thermostat and heater at the bottom of a polypropylene tank, under a perforated stainless steel tray. A clip is provided to hold a thermometer. Polypropylene tank in protected metal outer case. |  |  |
|  | Protection against low water level or thermostat failure is provided by either a thermal fuse or a fixedtemperature cutout. Heating rate is about $0.5^{\circ} \mathrm{C}$ per minute. <br> Wire gauze |  |  |
| 103 | Ceramic centred, asbestos free, $150 \times 150 \mathrm{~mm}$ | 14 | @ |
|  | Sub-total Cost |  | 83,600 |
| 104 | Microcomputer workstation | 41 set | $\wedge \wedge$ |
| 105 | Printer or printer cum scanner (small) | 4 | $\wedge \wedge$ |
| 106 | Headphones | 41 | $\wedge \wedge$ |
| 107 | Media player (DVD/VCD/CD/Bluetooth/USB) | 1 | $\wedge \wedge$ |
| 108 | Digital video camera | 1 | $\wedge \wedge$ |
| 109 | Projection system with screen | 1 | $\wedge \wedge$ |
|  | Grand-total Cost (if a school does not offer SS Biology at the same time) |  | 85,300 |

## Notes:

Furniture and equipment items listed above are to be used in respective special rooms / laboratory for conducting Technology and Living lessons @ F\&E shared with SS Biology. Purchase of these items is not required if a school also offers SS Biology at the same time. $\wedge^{\wedge}$ F\&E shared with Computer Assisted Learning Room.

Reference List of Furniture and Equipment
for Secondary School
Subject: SS Physical Education

| Item No | Description | Quantity |
| :---: | :---: | :---: |
| I | GENERAL EQUIPMENT Athletics |  |
| 1 | Discus (rubber) | 2 |
|  | Weight : 1 kg <br> Diameter : 180-182 mm <br> Thickness at centre : $37-39 \mathrm{~mm}$ <br> Thickness of rim : 12 mm |  |
| 2 | Discus (rubber) | 2 |
|  | Weight : 1.5 kg <br> Diameter : 200-205 mm <br> Thickness at centre : $37-42 \mathrm{~mm}$ <br> Thickness of rim : 12 mm |  |
| 3 | High jump cross bar (C) | 1 |
|  | Fibreglass, circular, with square ends. (AAA specifications) |  |
| 4 | High jump stands | 1 pair |
|  | Two cross pieces at bottom of the stand to make a firm base with stays fixed diagonally to post. Sliding metal buckles for adjustment of height should be provided. <br> Height : $1,830 \mathrm{~mm}$ |  |
| 5 | Hurdle | 12 |
|  | Adjustable plastic or foam training hurdle. Height can be adjusted to $762 \mathrm{~mm}, 840 \mathrm{~mm}, 914 \mathrm{~mm}, 990 \mathrm{~mm}$ and $1,067 \mathrm{~mm}$. |  |
| 6 | Relay baton (C) | 20 |
|  | Made of light aluminum. |  |
| 7 | Javelin | 1 |
|  | For practice use, aluminum with cord grip and blunt plastic tips Weight: 600 gm |  |
| 8 | Javelin | 1 |
|  | For practice use, aluminum with cord grip and blunt plastic tips Weight: 700 gm |  |
| 9 | Shot (indoor) | 3 |
|  | Plastic case with vacuum moulded cap, lead shot filled. Weight : 3 kg |  |
| 10 | Shot (indoor) | 3 |
|  | Plastic case with vacuum moulded cap, lead shot filled. Weight : 4 kg |  |
| 11 | Shot (indoor) | 1 |
|  | Plastic case with vacuum moulded cap, lead shot filled. <br> Weight : 5 kg <br> Dance |  |
| 12 | Tambour or hand drum |  |
|  | With beater Dia : 250-300 mm | 1 |
| 13 | Drum | 1 |
|  | With sticks <br> Dia. : 250-800 mm |  |
| 14 | Tambourine | 1 |
|  | With head \& jingles <br> Dia. : 250-300 mm |  |
| 15 | Media player (DVD/VCD/VC/Bluetooth/USB) | 1 |
| 16 | Amplifier with portable microphone <br> Gymnastics |  |
| 17 | Gymnastic mat <br> With Velcro corners, $1500 \mathrm{~mm} \times 1000 \mathrm{~mm} \times 60 \mathrm{~mm}$ |  |
| 18 | Balance beam <br> Wooden beam with steel base. Layer is elastic and covered with non-slippery material. Local-made beam not recommended. <br> Height : 700-1,200 mm, adjustable in 50 mm intervals <br> Length : 5,000 $\pm 10 \mathrm{~mm}$ <br> Width of beam : 100 mm | 1 |
| 19 | Low balance beam <br> Wooden beam with steel base. Layer is elastic and covered with non-slippery material. <br> Height : 600-900 mm, adjustable in 100 mm interval <br> Length : 3,500 mm <br> Width of beam : 100 mm | 1 |
| 20 | Gymnastic mat <br> a) Airex (Swiss), sponge rubber <br> Size : $1,523 \mathrm{~mm} \times 1,219 \mathrm{~mm} \times 32 \mathrm{~mm}$ OR | 12 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 21 | b) Sarneige (French) |  |
|  | Size : $1,523 \mathrm{~mm} \times 1,219 \mathrm{~mm} \times 40 \mathrm{~mm}$ |  |
|  | [School should choose either (a) or (b)] |  |
|  | Horizontal bar | 1 |
|  | Made of polished steel with cable \& hooks, may be fixed on floor for stability. Local-made bar not recommended. <br> Bar : 2,400 $\pm 2 \mathrm{~mm}$ (length), <br> $28 \mathrm{~mm} \pm 0.1 \mathrm{~mm}$ (dia.) <br> Height of the bar : 1,200-2,500 mm, adjustable in 200 mm interval |  |
| 22 | Parallel bars (with or without trolley) | 1 |
|  | With foot board. Remaining part made of steel or cast iron. Local-made bars not recommended. <br> Bars: $3,500 \pm 10 \mathrm{~mm}$ (long) <br> Dist. between bars : 420-480 mm <br> Dist. of pivot points : $2,300 \pm 3 \mathrm{~mm}$ <br> Height of bars : $1,550-1,800 \mathrm{~mm}$ |  |
| 23 | Spring board | 2 |
|  | Surface must be covered with non-slippery layer of strong elastic material. The elasticity must be most effective at the highest point. <br> Local-made board not recommended <br> Length : $1,200 \pm 5 \mathrm{~mm}$ <br> Width : $600 \pm 3 \mathrm{~mm}$ <br> Thickness : 120-140 mm (front brim) |  |
| 24 | Uneven parallel bars (with or without trolley) | 1 |
|  | With foot board. The bars should be made of wood with braces to prevent total breaking. Local-made bars not recommended. <br> Bar : 3,500 mm (length); <br> Cross section of bar : 41-48 mm <br> Distance between 2 bars (vertical plane) : 420-480 mm (easily adjustable) <br> Height of upper bar : $2,300 \pm 10 \mathrm{~mm}$ <br> Height of lower bar : $1,500 \pm 10 \mathrm{~mm}$ |  |
| 25 | Vaulting box | 2 |
|  | In 5 sections, with casters, made of pinewood. Top cover made of best quality cow hide leather. Stuffing at top panel should be outstanding, firm and evenly distributed. <br> Bottom : $1,300 \mathrm{~mm} x 900 \mathrm{~mm}$ <br> Top : $1,300 \mathrm{~mm} \times 350 \mathrm{~mm}$ <br> Height : $1,000 \mathrm{~mm}$ |  |
|  | Racket Games |  |
|  | (Badminton) |  |
| 26 | Badminton racket (C) | 40 |
| 27 | Shuttlecock (practice) (C) | 6 doz. |
| 28 | Shuttlecock (competition) (C) | 6 doz. |
|  | The feather should be 16 pieces with the length of $64-78 \mathrm{~mm}$ |  |
| 29 | Badminton net (C) | 2 |
| 30 | Badminton stand | 2 pairs |
|  | Portable with solid base. |  |
|  | Height : $1,550 \mathrm{~mm}$ |  |
|  | (Table tennis) |  |
| 31 | Table tennis ball (C) | 72 |
| 32 | Table tennis bat (C) | 40 |
|  | Wooden bladed, could be covered with plain pimpled rubber or sponge and pimpled rubber. The two faces should be in 2 different contrast dark colour. |  |
| 33 | Table tennis net \& clamp (C) | 4 sets |
| 34 | Table tennis table | 4 |
|  | Hardwood or plywood or particle board in dark green or dark blue, could be folded and moved on rollers. <br> Dimension : $2,740 \mathrm{~mm} \times 1,525 \mathrm{~mm}$ <br> Thickness : $16-30 \mathrm{~mm}$ <br> Height : 762 mm (regular) <br> Swimming |  |
| 35 | Kick board (C) | 40 |
| 36 | Swimming cap or rubber wrist band (C) | 45 |
|  | Team Games |  |
| 37 | Match timer | 1 |
|  | With start, stop \& reset buttons. <br> Two sweep hands recording minutes and seconds. |  |
| 38 | Number bib | 4 |
|  | No. 1-15/set, of light weight and made of nylon or cloth. |  |
| 39 | Score board | 1 |
|  | Heavy duty plastic, 6-digit scorer with display on both sides for competitions, foldable. <br> Pump or compressor unit with metre | 1 |
| 40 | $200-220 \mathrm{~V}, 50 \mathrm{~Hz}$, single phase A.C., earthed B.S.S. fused plug, <br> 200 W approx. $500 \mathrm{~g} / \mathrm{sq} . \mathrm{cm}$ max. working pressure, without air receiver. <br> Electric component \& cabling conform to the latest B.S.S., earthing through 3 core supply cable. <br> (Basketball) |  |
| 41 | Basketball (size 6) (C) | 20 |
| 42 | For girls. Synthetic. <br> Basketball (size 7) (C) | 20 |


| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 43 | For boys. Synthetic. |  |
|  | Basketball (size 6) (C) | 5 |
|  | For girls. Leather. |  |
| 44 | Basketball (size 7) (C) | 5 |
|  | For boys. Leather. |  |
| 45 | a. Basketball stand with protective pad, fibreglass backboard and ring | 2 pairs |
|  | For open playground, specification must conform to the latest International Basketball Rules. Basketball stands should be adequately secured or anchored to the ground (Price includes installation.) |  |
| 46 | Basketball ring net (C) | 2 pairs |
|  | (Football) |  |
| 47 | Football (size 4) (C) | 20 |
|  | Leather |  |
| 48 | Football (size 5) (C) | 20 |
|  | Leather |  |
|  | (Handball) |  |
| 49 | Handball (size 2) (C) | 20 |
|  | Synthetic. |  |
| 50 | Handball (size 3) (C) | 20 |
|  | Synthetic. |  |
| 51 | Handball (size 2) (C) | 5 |
|  | Leather. |  |
| 52 | Handball (size 3) (C) | 5 |
|  | Leather. |  |
| 53 | Handball goal with net (with or without trolley, and with or without anchors) | 1 pair |
|  | Post made of wood, metal or light metal painted in 2 contrasting colours. (Specifications must conform to the latest rules of the International Handball Federation) ( School should choose either type; i.e. with or without trolley/with or without anchors) |  |
| 54 | Handball net (C) | 1 pair |
|  | Made of hemp or nylon. |  |
|  | (Volleyball) |  |
| 55 | Volleyball (practice) (C) | 24 |
|  | Leather. Regular size. |  |
| 56 | Volleyball (competition) (C) | 10 |
|  | Leather, better quality. Regular size. |  |
| 57 | Volleyball (soft) (C) | 20 |
|  | Made of foam material with PU coverRegular size. |  |
| 58 | Volleyball net (C) | 1 |
|  | With 6.35 mm (dia.) flexible wire cable through the top edge canvas cover. <br> Net : $9,500 \mathrm{~mm} \times 1,000 \mathrm{~mm}$ <br> Mesh : 100 mm <br> Vertical tape : $1,000 \mathrm{~mm} \times 50 \mathrm{~mm}$ <br> Length of wire cable : $16,000 \mathrm{~mm}$ |  |
| 59 | Volleyball post (with or without sockets) | 1 pair |
|  | Made of iron. Adjustable height. <br> Dia. of post : 76 mm (Price includes installation.) <br> [School should specify either "with sockets" or 'without socket".] |  |
| 60 | Volleyball umpire stand | 1 |
| 61 | Rugby (Size 5) (C) | 10 |
|  | PU Cover or Leather. |  |
| 62 | Rugby Tag | 2 sets |
|  | Team set: 10 pcs |  |
|  | Fitness |  |
| 63 | Bar bell | 1 set |
|  | 1 stand and 1 bar. <br> Weights : 7.5 kg (2pcs) <br> 5 kg (2pcs) <br> 2.5 kg (2pcs) <br> 2 kg (2pcs) <br> 1.25 kg (6pcs) <br> 1 kg (2pcs) <br> 0.5 kg (2pcs) <br> 0.25 kg (2pcs) |  |
| 64 | Dumb bell | 4 pairs |
|  | Weight : $1.5-1.8 \mathrm{~kg}$ |  |
| 65 | Dumb bell | 4 pairs |
|  | Weight : 2.5 - 2.7 kg |  |
| 66 | Dumb bell | 4 pairs |
|  | Weight : $3.5-3.7 \mathrm{~kg}$ |  |



| Item No | Description | Quantity |
| :---: | :---: | :---: |
| 89 | Stop watch | 8 |
|  | 1/100 second. Measures accumulated split times. |  |
| 90 | Quoit (C) | 40 |
|  | Rubber, in various colours. <br> Dia. : 165 mm <br> Weight : 280 g <br> Dia. of rubber ring : 25 mm |  |
| 91 | Weighing scale (digital) | 2 |
|  | With weight and body fat indicator |  |
| 92 | Triangular body height measuring tape | 2 |
|  | Pull down when measuring height <br> Part II - FURNITURE FOR STORAGE OF EQUIPMENT |  |
| 93 | Plastic storage box | 4 |
|  | Size : $680-740 \mathrm{~mm} \times 470-500 \mathrm{~mm} \times 455-470 \mathrm{~mm}$ (H) |  |
| 94 | Storage cabinet | 1 |
|  | Made of wood or metal <br> Size : $760 \mathrm{~mm} \times 1,370 \mathrm{~mm} \times 1,980 \mathrm{~mm}(\mathrm{H})$ |  |
| 95 | Rack | 1 |
|  | Made of wood or metal with shelves. <br> size : $1,830 \mathrm{~mm} \times 610 \mathrm{~mm} \times 1,675 \mathrm{~mm}(\mathrm{H})$ |  |
| 96 | Basket drawer | 4 |
|  | Made of mesh / fibre with handle. Size: $840 \mathrm{~mm}(\mathrm{~L}) \times 610 \mathrm{~mm}(\mathrm{~W}) \times 430 \mathrm{~m}(\mathrm{H})$ |  |
| 97 | Ball cage with casters (with or without lid) | 4 |
| 98 | Storage Trolley (with side door or sliding door) | 1 |
|  | made of wire-mesh, with adjustable shelves and non-marking multi-direction swivel casters. $1,500 \times 1,500 \times 650 \mathrm{~mm}$ <br> Dia. of caster : 100 mm <br> (School should choose either type; i.e. with side door or sliding door) |  |
| 99 | Mat trolley (horizontal, with or without handle) | 1 |
|  | for gymnastic mats, made of painted G.I. tube, with swivel non-marking rubber multi-direction swivel casters. <br> Length : $1,800 \mathrm{~mm}$ <br> Width : $1,200 \mathrm{~mm}$ <br> Diameter of tube : 25 mm <br> Diameter of caster : 220 mm <br> (Schools should choose either type; i.e. with or without handle) |  |
| 100 | Polypad Trolley (vertical) | 2 |
|  | Made of painted G.I. tube with non-marking rubber multi-direction swivel casters. <br> Length : $2,450 \mathrm{~mm}$ <br> Width : 850 mm <br> Height : 2,200 mm <br> Dia. of tube : 25 mm <br> Dia. of caster : 220 mm <br> Part III - FOR SCHOOLS OFFERING THE PHYSICAL EDUCATION ELECTIVE AT SENIOR SECONDARY |  |
| 101 | Exercise Test Bike | 1 |
|  | Weight : $40-60 \mathrm{~kg}$ <br> Length : $100-130 \mathrm{~cm}$ <br> Width : $40-60 \mathrm{~cm}$ <br> Height: $80-120 \mathrm{~cm}$ <br> Adjustable saddle post <br> Showing pedal-turns per minute (rpm) <br> Heart rate in beats per minute (HR) <br> Cycling time in minutes and seconds (TIME) <br> Intended cycling speed in $\mathrm{km} /$ miles per hour (SPEED) <br> Distance covered in $\mathrm{km} /$ miles (DISTANCE) |  |
| 102 | Strapless Heart Rate Monitor | 5 |
|  | Current, average, and maximum heart rate <br> Heart rate (displayed as \% of maximum heart rate) <br> Log memory <br> Stopwatch with first 30 laps stored <br> User-replaceable battery <br> Water resistant to 30 m ( 100 ft ) <br> Computer connectivity with software |  |
| 103 | Hand-held Bioimpedance Body Fat Analyser | 1 |
|  | Hand-held and Battery operated <br> Provides percentage and total weight of body fat |  |
| 104 | Electronic Goniometer <br> Measures range of motion as well as angular motion, velocity and acceleration Support data storage and analysis through built-in functions or connecting to a data logger | 1 |
| 105 | Movement Analysis Software/Apps <br> Watch and review video with a frame rate of 25 images per second Measures key events using time, angle, distance and speed | 1 |
| 106 | Human Anatomy Software/Apps | 1 |
|  | Introduces different parts of the human body Introduces the human body by graphics, text, animations |  |
| 107 | Biofeedback Equipment | 1 |
|  | Measures skin temperature, sweat gland activity, muscle tension, etc.; and conveys the information to the user in real-time Equipped with computer software and interface for relaxation training <br> FIRST AID TRAINING EQUIPMENT |  |
| 108 | Resuscitation Training Torso <br> Weight: $15-20 \mathrm{~kg}$ <br> Height: $70-80 \mathrm{~cm}$ | 1 |


| Item No | Description | Quantity |
| :--- | :--- | :---: |
|  | Width : 25-30 cm <br> Diameter: 35-50 <br> Natural obstruction of the airway for applying head tilt/chin lift <br> Realistic resistance for chest compression <br> Anatomically correct landmarks and sternal notch <br> Disposable non-rebreathing airways |  |
|  | Total cost for subject | $\mathbf{5 4 , 4 0 0}$ |

Note: *Items under Parts I and II are already included in the F\&E list for PE.

