

Bare minimum requirements for D.A.E Course (Polytechnic)Building:

S.No	Unit	Number	Size in Feet
1.	Principal Office	01 No	12 x 14
2.	Admin/Account Office	01 No	12 x 14
3.	Staff Room	01 No	12 x 14
4.	Students Common Room	01 No	12 x 14
5.	Library (Having 300 books including text books and reference books of all concerned disciplines)	01 No	12 x 14
6.	Examination Hall (Multi Purpose Hall)	01 No	20 x 40
7.	Physics Lab	01 No	14 x 16
8.	Chemistry Lab	01 No	14 x 16
9.	Computer Lab	01 No	18 x 20
10.	General Workshops: Welding/Metalwork/Wood Work/Wiring	01 No	20 x 25
11.	Theory Class Rooms	03 No Per Technology	16 x 20
12.	Technology wise/ Year wise / Subject wise workshops	01 No	14 x 16
13.	Separate wash rooms/toilets for Staff and Students in accordance with strength.	----	----

Staff:

S.No	Staff	Qualification	Quantity
1.	Principal	B.Sc. Engineering	One
2.	Lecturer in English	M.A English	One
3.	Lecturer in Islamiat/Pak. Study	MA. Islamiat	One
4.	Lecturer in Mathematics	M.Sc. Mathematics	One
5.	Lecturer in Computer Science	M.Sc. Computer Science	One
6.	Lecturer in Physics	M.Sc. Physics	One
7.	Lecturer in Chemistry	M.Sc. Chemistry	One
8.	H.O.D for Each Technology	B.Sc. Engineering	One
9.	Instructor	B.Sc. Engineering	Two up to 3 rd year
10.	Junior Instructor	D.A.E	Two up to 3 rd year
11.	Shop Assistant	TTC/Voc Certificate Holder	One for each shop
12.	Shop Attendant	S.S.C	Three per Technology

Civil Technology (DAE)
(for 25 students)
List of Equipment & Tools

Electrical Wiring

Sr #	Equipment/ Instrument	Quantity required
1.	Side cutter 6"	12 Nos.
2.	Combination Pliers 8"	12 Nos.
3.	Screw driver sets	12 Nos.
4.	Small hammers "	12 Nos.
5.	Hand Drill machine electric two speeds 3/4" chuck heavy duty	5 Nos.
6.	Cold chisels 10" long	5 Nos.
7.	Long nose pliers 6"	5 Nos.
8.	Rip saw 12"	12 Nos.
9.	Hack saws 15"	12 Nos.
10.	Phase Testers	25 Nos.
11.	AVO meter	5 Nos.
12.	Spirit levels 15"	12 Nos.
13.	Plumb bobs !	12 Nos.
14.	Screw drivers 12"	6 Nos.
15.	Wood chisel 1"	5 Nos.
16.	Rough cut file 12"	6 Nos.
17.	Smooth files 12"	6 Nos.
18.	Wiring Boards 3' x 5' wall mounted	6 Nos.
19.	Work benches 4' x 6' x 2.5'	12 Nos.
20.	Clamp on meter	ONE
21.	2 -phase energy meter	2 Nos.
22.	3 -phase energy ni'eter	5 Nos.
23.	Kerosene burners	5 Nos.
24.	2 phase and 3 phase electric motors	01 each

Wood Working

Sr #	Equipment/ Instrument	Quantity required
1.	Jack plane (Stanley) 14"	25 Nos.
2.	Smoother plane 9"	10 Nos.
3.	Jointer plane	01 Nos.
4.	Rebate plane	01 Nos.
5.	Block plane ..	01 Nos.
6.	Tri square 30 cm. Steel	25 Nos.
7.	Surface plate 24 x 18	01 Nos.
8.	Oil stone	10 Nos.
9.	Nail Puller 18"	01 Nos.
10.	WW Vices	12 Nos.
11.	WW benches	06 Nos.
12.	Combination Square 12"	02 Nos.
13.	C clamps 10"	01 Nos.
14.	Marking guage	12 Nos.
15.	Auger bits 1/2"	02 Nos.
16.	Screw Drivers flat 10"	10 Nos.
17.	Electric drill chuck size 1/2" 220 V	01 Nos.
18.	Pliers 8"	06 Nos.
19.	Measuring tapes 3 m	12 Nos.
20.	Flat chisel 1/2"	12 Nos.
21.	Back saw 15" with handle	12 Nos.
22.	Key hole saw 12"	12 Nos.
23.	Tennon saw 15" ..	12 Nos.
24.	Rip saw 18"	12 Nos.

25.	Cross cut saw 18"	12 Nos.
26.	T bevel 12"	02 Nos.
27.	Ratcher brace	01 Nos.
28.	Triangle file 5"	05 Nos.
29.	Triangle file 6"	05 Nos.
30.	Inside calipers 8"	01 Nos.
31.	Outside calipers 8"	01 Nos.
32.	Adjustable wrench 8"	01 Nos.
33.	Adz (Tessa) 1 kg	02 Nos.
34.	Mallets wooden	12 Nos.

Surveying Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Metric Chains 20m	05 Nos.
2.	Metric Chains 30m	05 Nos.
3.	Engineers chain 100 ft	05 Nos.
4.	Ranging rods steel or bamboo, with steel shoes	20 Nos.
5.	Arrows	20 Nos.
6.	Measuring Tape 20m metallic	05 Nos.
7.	Measuring tape 20m steel	05 Nos.
8.	Measuring tape fiberglass 20m	05 Nos.
9.	Wooden mallet	05 Nos.
10.	Cross staff wooden	05 Nos.
11.	French Cross staff	02 Nos.
12.	Prismatic compass with tripod	05 Nos.
13.	Plane table standard size with tripod	05 Nos.
14.	Ali Dade	05 Nos.
15.	Trough compass	05 Nos.
16.	Plumb fork	05 Nos.
17.	Metric staff collapsible	05 Nos.
18.	Sop with staff	05 Nos.
19.	Target staff	02 Nos.
20.	Spirit levels for staff	05 Nos.
21.	Auto set level	02 Nos.
22.	Tilting level	02 Nos.
23.	Sounding rods	10 Nos.
24.	Velocity rods ..	10 Nos.
25.	Current meter	02 Nos.
26.	Steel band	01 Nos.
27.	Vernier theodolite	02 Nos.
28.	Microptic theodolite	02 Nos.
29.	Electronic Digital theodolite	02 Nos.
30.	Electronic Distan meter	01 Nos.
31.	Total station with all accessories	01 Nos.

Small instruments for theory explanation

32.	Abney level	01 Nos.
33.	Clinometers	01 Nos.
34.	Pantographs	01 Nos.
35.	Line ranger	01 Nos.
36.	Optical square (wedge type)	01 Nos.
37.	Optical square (box type)	01 Nos.
38.	Invar tape	01 Nos.
39.	Gunter's chain	01 Nos.

Building Construction

Sr #	Equipment/ Instrument	Quantity required
1.	Kassi	05 Nos.
2.	Spades	05 Nos.
3.	Pick axes	05 Nos.
4.	Iron rammers	02 Nos.
5.	Wheel barrows rubber tired	02 Nos.
6.	Mixing plate forms steel 7'x10'x8"	02 Nos.
7.	Mason trowels	05 Nos.
8.	Brick hammers	05 Nos.
9.	Plumb bobs	05 Nos.
10.	Tri squares ..	05 Nos.
11.	Spirit levels 24"	05 Nos.
12.	Mortar pans. 18" dia	05 Nos.
13.	Measuring tapes 6 m	05 Nos.
14.	Wire brushes	05 Nos.
15.	Brooms	05 Nos.
16.	Wooden floats. 24"	05 Nos.
17.	Wooden floats. 9"	05 Nos.
18.	Corner floats	05 Nos.
19.	Steel floats	05 Nos.
20.	Measuring box standard size	02 Nos.
21.	Rose cane	02 Nos.
22.	Steel cribs	02 Nos.
23.	Concrete mixer small	01 Nos.
24.	Poker vibrator electric or gas driven	01 Nos.
25.	Tampling rods	05 Nos.
26.	Pointing trowels	05 Nos.
27.	Hawks 12" x 12" ..	05 Nos.
28.	Wooden battens 7' x 2" x 2"	02 Nos.
29.	Bar bending table with accessories	01 Nos.
30.	Pliers	05 Nos.
31.	Chisels for dressing stone	05 Nos.
32.	Hammers cross penne 1 kg	05 Nos.
33.	Wire cutter	05 Nos.
Additional equipment for demonstration (Optional)		
34.	Floor grinding machine	01 Nos.
35.	Brick and tile cutter	01 Nos.
36.	Vibratory compactor	01 Nos.
37.	Block moulds for making blocks from prepared concrete	05 Nos.
38.	Straight edges 10ft x 2" x 2"	05 Nos.
39.	Tamping Rammers'10 kg with handle	05 Nos.
40.	Wood saws 24"	05 Nos.
41.	Hammers with nail pullers 2 lbs	05 Nos.
42.	Wooden floats	05 Nos.
43.	Steel floats	05 Nos.
44.	Hydraulic jack heavy duty	02 Nos.
45.	Differential pulley clock with tripod	01 Nos.
46.	Moulds of battens, Blocks	02 Nos.
47.	Wheel barrows	02 Nos.
48.	Shovels	05 Nos.
49.	Mixing plate forms 7' x 5' 12 guage	02 Nos.
50.	Mixing pans 18" dia	05 Nos.
51.	Spirit levels 18"	05 Nos.

Drafting Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Drafting tables	25 Nos.

2.	Stools	25 Nos.
3.	Large Drawing box for Chalk Board use	2 Nos.
4.	Lettering stencils of sizes	5 Nos.
5.	French curves of sorts	5 Nos.

Computer Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Computer P-4 complete set	12 Nos.
2.	Printer dot matrix	02 Nos.

Optional

Sr #	Equipment/ Instrument	Quantity required
3.	Printer laser	01 Nos.
4.	Scanner	01 Nos.
5.	Digital camera	01 Nos.
6.	Colour Printer	01 Nos.
7.	Multimedia complete set	01 Nos.

Public Health Engineering Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Pipe wrench 18"	6 Nos.
2.	Adjustable wrench 8"	4 Nos.
3.	chain wrench	1 Nos.
4.	Pipe cutter 1/2" -3/4"	2 Nos.
5.	Hack saw 18"	6 Nos.
6.	Die set 1/2" -2"	4 Nos.
7.	Pipe vice	4 Nos.
8.	Work benches	4 Nos.
9.	Kerosene stoves	4 Nos.
10.	Ladle	4 Nos.
11.	Caulking tool	4 Nos.
12.	Cold chisel 8" ..	5 Nos.
13.	Hammer ball penne 1/2 kg	5 Nos.
14.	Measuring tape 3 m	5 Nos.
15.	Pipe bender of sizes	3 Nos.
16.	Threading tapes with handle 1/2" & 3/4"	2 each
17.	Electric Hand drill machine 1/2" chuck	2 Nos.
18.	Center Punch	5 Nos.
19.	Small chisels of sizes	5 Nos.
20.	Bench vice 6"	2 Nos.
21.	Mixing Pane 18" dia	2 Nos.
22.	Mixing trowel	2 Nos.
23.	single acting reciprocating pump	1 Nos.
24.	Boring system with tripod, pully block, cutter etc	1 Nos.
25.	Kassi	2 Nos.
26.	Pick Axe	2 Nos.
27.	Crow bar 3 ft	2 Nos.
28.	Wheel Barrows	2 Nos.
29.	Spirit level of 18"	5 Nos.
30.	Plumb bobs	5 Nos.
31.	Hamd bits of sizes	5 Nos.
32.	Graduated cylinders 500 ml	12 Nos.
33.	Glass beakers	10 Nos.
34.	Sanitary Fixtures	1 each
35.	Sewer Cleaning rods with accories	2 sets

Material Testing Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Mixing plate 24"x18"x14" steel	5 Nos.
2.	Mixing trowels 8"	10 Nos.
3.	Scoops	5 Nos.
4.	Triple beam balance	5 Nos.
5.	Electronic balance 1000kg capacity .1 gr	2 Nos.
6.	Graduated cylinders 500 ml	5 Nos.
7.	Vicat apparatus ..	3 Nos.
8.	Le- Chatlier's moulds with accessories	5 Nos.
9.	Boiling chambers for above water tubes	1 Nos.
10.	Cubes moulds 2x2x2 set of 3	3 Nos.
11.	Compression testing machine portable type with accessories	1 Nos.
12.	Briquette moulds set of 3	5 Nos.
13.	Briquette testing machine	1 Nos.
14.	Mixing pans 18" dia	5 Nos.
15.	Sieve set 3", 1-1/2,3/4,3/16,7,14,25,52,100,200 no. sieves	3 Nos.
16.	Mechanical sieve shaker	1 No.
17.	Sieve cleaning guage	5 Nos.
18.	Flackiness indeep guage	5 Nos.
19.	Elongation indeep guage	5 Nos.
20.	Slump cone with accessories	5 Nos.
21.	Compacting factor testing appat. With accessories	1 Nos.
22.	Cube moulds 6x6x6 in.	5 Nos.
23.	Cylinder moulds 6"x12" steel	5 Nos.
24.	Table viberator	1 Nos.
25.	Tamping rods 3/4" dia	5 Nos.
26.	Laboratory Concrete Mixer	1 Nos.
27.	Graduated Cylinders 1000ml	5 Nos.
28.	Water Containers for lab	1 Nos.
29.	Material Containers for lab	2 Nos.
30.	Curing chamber	1 Nos.
31.	Beam mould for flexure test	3 Nos.
32.	Steel plates as base plate	1 Nos.
33.	Universal Testing machine with floual testing attachments included Roller Support	2 Nos.
34.	Rockwell Hardness testing machine	1 Nos.
35.	Brinnels Hardness testing machine	1 Nos.
36.	Deflection of Beam apparatus	1 Nos.

Soil Mechanics & Highway Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Speedy moisture tester complete with all accessories	2 set
2.	Electronic Oven 300 C	ONE
3.	Electronic Balance 0.01gm -500g	ONE
4.	Container with lid	30 Nos.
5.	Spatula (stainless steel)	5 Nos.
6.	Pan 18" (stainless steel)	3 Nos.
7.	Density bottle (glass pyrex) 25 ml with capacity	3 Nos.
8.	Electronic balance 1gm to 1000gm	One
9.	Core cutter apparatus	3 Nos.
10.	Rammer for core cutter	3 Nos.
11.	Pick -axe	5 Nos.
12.	Wooden Block	5 Nos.
13.	Standard Prector Mould complete	3 Nos.

14.	Standard Hammer 12" fall	3 Nos.
15.	Modified Hamamer 18" fall	3 Nos.
16.	Electronic Balance 50 kg capacity	One
17.	Graduated glass cylinder 500 ml capacity	5 Nos.
18.	Trowel 8" for mixing	5 Nos.
19.	G.I mixing troy 36" x 36" x 4, 18 guage	5 Nos.
20.	Scoop	5 Nos.
21.	Triple beam Balance 2.50 kg capacity	3 Nos.
22.	Seive set ASTM standard sieve nos. 4,7,14,25,50,100,200 with pan and lid	3 set
23.	Shear Box Test Apparatus complete with all accessories	1 set
24.	Standard Penetration Testing with standard weight, Equipment completer with all accessories.	1 set
25.	Sand -cone Test Apparatus	3 Nos.
26.	Chisel (of sizes)	3 Nos.
27.	Hammer 1 kg	3 Nos.
28.	Dessicator	One
29.	Glass measuring cylinder 100ml capacity	3 Nos.

Hydraulic Lab

Sr #	Equipment/ Instrument	Quantity required
1.	Bourdon's Gauges	2 Nos.
2.	Impact of jet apparatus	2 Nos.
3.	Hydrostatic pressure appt.	2 Nos.
4.	Pontoon apparatus	2 Nos.
5.	Venturimeter apparatus	2 Nos.
6.	Velocity rods local made	5 Nos.
7.	Current meter complete	1 No.
8.	Notches & Weir apparatus	1 No.
9.	Hydraulic Bench	2 Nos.
10.	Stop watch	1 No.
11.	Oer Head Projector	1 No.
12.	Pitot Tube	2 Nos.

Electrical Technology (DAE)
(For 25 students)
List of Equipment & Tools

1ST YEAR

Sr #	Equipment/ Instrument	Quantity required
1.	Insulated Pliers 4"	25 Nos.
2.	Insulated Pliers 6"	12 Nos.
3.	Insulated Screw Driver 10"	12 Nos.
4.	Insulated Screw Driver 8"	12 Nos.
5.	Insulated Screw Driver 6"	25 Nos.
6.	Insulated Screw Driver 4"	25 Nos.
7.	Soldering Iron	12 Nos.
8.	Standard Wire Guage	02 Nos.
9.	American Wire Guage	02 Nos.
10.	Bradawl	25 Nos.
11.	Hacksaw 12" for Wood	12 Nos.
12.	Wooden Chisel 1/2" tip for Wood	06 Nos.
13.	Wooden Chisel 1/4" tip for Wood	06 Nos.
14.	Hammer 1/4kg wt	25 Nos.
15.	Hammer 1/2kg wt	12 Nos.
16.	Cobler Hammer 1/4kg	06 Nos.
17.	Hand Drill Machine	12 Nos.
18.	Bearing Puller	02 Nos.
19.	Phase Tester	25 Nos.
20.	File 12" for Wood	06 Nos.
21.	Open End Spanner Set	02 Nos.
22.	Brace Set	1 No.
23.	Cable Insulation Scrapper	12 Nos.
24.	Electric Wire Knife	25 Nos.
25.	Porcelain Fuse 5A, 10A, 20A	Each of 24
26.	Metallic Hacksaw Frame 14"	06 Nos.
27.	Metallic Hacksaw Blade 12"	06 Nos.
28.	Insulated Nose Pliar 4"	12 Nos.
29.	Mallet	06 Nos.
30.	Pipe Wrench 6"	06 Nos.
31.	Pipe Wrench 8"	06 Nos.
32.	Pipe Thread Machine with adjustable chucks	01 No.
33.	Miniature Circuit Breaker 2A, 5A, 10A, 20A	Each of 6
34.	Main Metallic Fuse Switch 250V, 10A	06 Nos.
35.	Main 3-phase Metallic Fuse Switch 500V, 15A	03 Nos.
36.	Star Delta Manual Starter	02 Nos.
37.	Single Phase AC Magnetic Contactor	06 Nos.
38.	3-phase AC Magnetic Contactor 0-400 V	06 Nos.
39.	AC Time Delay Relay	06 Nos.
40.	AC Direct on Line Magnetic Mator Starter	02 Nos.
41.	Push Button Set (On-Off)	03 Nos.
42.	DC Motor Manual Starter (3-point and 4-point)	02 Nos.
43.	DC Magnetic Mator Starter	02 Nos.
44.	DC Magnetic Contactor	06 Nos.
45.	DC Time Delay Relay	03 Nos.
46.	Portable Electric Drill 1/4 H.P	01 No.

47.	Heavy Duty Electric Drill	01 No.
48.	Electric Pedestal Drill Press	01 No.
49.	Pedestal Grinder	01 No.
50.	AC Automatic 3-phase Forward as Reverse Motor Starter	01 No.
51.	Drill Bit Set (Masonry)	01 No.
52.	Drill Bit Set (Steel)	01 No.
53.	Fire Extinguisher	04 Nos.
54.	All wiring accessories such as switches, Holders, Ceiling Rose, Wiring Boards, Different types of Wiring System Materials, Wires & Cables, Lamps, Fluorescent tube etc is to be provided for all wiring practicals	

1ST YEAR

Sr #	Equipment/ Instrument	Quantity required
1.	(a). Ammeter 0-1A (DC)	15 Nos.
	(b) 0-5A (DC)	15 Nos.
	(c) 0-10A (DC)	05 Nos.
	(d) Milli Ammeter 0-25 mA	05 Nos.
2.	(a). Ammeter 0-1A (AC)	15 Nos.
	{b} 0-10A (AC)	15 Nos.
3.	(a). Voltmeter 0-12V (DC)	15 Nos.
	(b) Voltmeter 0-110V(AC,DC)	15 Nos.
	(c) Voltmeter 0-250V (AC, DC)	15 Nos.
4.	(a). Multimeter (Analog)	25 Nos.
	(b) Multimeter (Digital)	25 Nos.
5.	(a). Rheostate (Sliding) 1A	10 Nos.
	(b) Sliding Rheostate 3A	10 Nos.
6.	(a). Wattmeter AC 1-phase 1000 W, 230V	06 Nos.
	(b) Wattmeter AC 1-phase 2000 W	06 Nos.
	(c) Wattmeter AC 3-Phase 2000 W	06 Nos.
	(d) Wattmeter DC, 0-1000 W	06 Nos.
7.	Clamp on meter (Analog) 0-50A (Five ranges) 0-500V (Five ranges)	05 Nos.
8.	Clamp on meter (Digital) 0-50A (Five ranges) 0-500V (Five ranges)	05 Nos.
9.	Frequency meter Digital/Read type 50HZ - 60HZ	05 Nos.

10.	Power Factor Meter 1-phase (Analog/Digital type)	05 Nos.
11.	LCR meter (Inductance – Capacitance- Resistance meter)	06 Nos.
12.	Energy meter (1-phase)	06 Nos.
13.	Energy meter (3-phase)	03 Nos.
14.	Galvanometer	05 Nos.
15.	(a). Bar Magnet	25 Nos.
	(b) Magnetic Compass	25 Nos.
16.	(a). Variable Power Supply DC variable 0-250V (b) Variable Power Supply Variable 0-400V, AC	02 Nos.
17.	Transformer 1-phase with different input and out put tappings	06 Nos.
18.	Transformer 3-phase with different input and out put tappings	02 Nos.
19.	Megger Analog/Digital	05 Nos.
20.	Earth Leakage Tester	01 No.
21.	Micrometer	10 Nos.
22.	Cathode Ray Oscilloscope 20MH (Dual Beam)	02 Nos.
23.	Phase Sequence Meter	10 Nos.
24.	C.Ts	06 Nos.
25.	P.Ts	06 Nos.
26.	Polyphase Generator	01 No.
27.	(a). Inductive Load	05 Nos.
	(b) Capacitive Load	05 Nos.
	(c) Resistive Load	05 Nos.
28.	Electric Kettle	02 Nos.
29.	Set of colour coded resistor of different values	50 Nos.
30.	Thermal Relay	05 Nos.
31.	Choke Coil	05 Nos.
32.	Frequency Oscillator	05 Nos.

2ND YEAR

Sr #	Equipment/ Instrument	Quantity required
1.	Tangent Galvanometer	02 Nos.
2.	Voltmeter (0-250V) Precision Type	02 Nos.
3.	Wheat Stone Bridge	02 Nos.
4.	Lux Meter	02 Nos.
5.	Synchroscope	01 No.
6.	Current Recorder with periodic circuit current recording facilities	01 No.
7.	Air Conditioner	01 No.
8.	Refrigerator	01 No.
9.	Spot Welding Unit	01 No.
10.	Set of Vacuum Tubes	02 Nos.
11.	Semiconductor Diode	25 Nos.
12.	Full Wave Bridge	10 Nos.
13.	Zener Diodes (Shut Type)	25 Nos.
14.	Photo Conductive Cells	25 Nos.
15.	B.J.Ts NPN Type and PNP Type	25 Nos.
16.	MOSFET	15 Nos.
17.	DIAC	15 Nos.

18.	TRIAC	15 Nos.
19.	UJT	15 Nos.
20.	Pulse Generator	01 Nos.
21.	Different Simple Integrated Circuits (IC,s)	05 Nos.
22.	Following machines should have facility for flexible coupling for the purpose of making set for practical use. (a) D.C Shunt Machines (b) D.C Series Machines (c) D.C Compound Machines	05 Nos. 05 Nos. 05 Nos.
23.	Coil Winding Machines	05 Nos.
24.	Shunt Field Regulator	05 Nos.
25.	Series Motor Starter	05 Nos.
26.	Rheostat	06 Nos.
27.	Automatic D.C Motor Starter	05 Nos.
28.	Artificial load to match the out put of D.C Generator	05 Nos.
29.	Brake for Testing of Motors	02 Nos.
30.	Lead Acid Battery	02 Nos.
31.	Nickle Alkaline Battery	02 Nos.
32.	Battery Charger	01 No.
33.	Hydrometer	05 Nos.
34.	Techometer (Mechanical)	05 Nos.
35.	Techometer (Digital)	05 Nos.

3RD YEAR

Sr #	Equipment/ Instrument	Quantity required
25.	Transformer of different Tappings (1-phase and 3-phase) with different VA out put 1-phase 3-phase	15 Nos. 05 Nos.
26.	(a) Auto Transformer 1-phase (b) Auto Transformer 3-phase	05 Nos. 02 Nos.
27.	(a) Ammeter D.C (0-1A) (b) Ammeter (D.C) 0-10A (c) Ammeter (A.C) 0-1A (d) Ammeter (A. C) 0-5A (e) Ammeter (A.C) 0-10A	06 Nos. 12 Nos. 48 Nos. 48 Nos. 48 Nos.
28.	(a) Voltmeter (D.C) 0-25V (b) Voltmeter (D. C) 0-250V (c) Voltmeter (A. C) 0-250V (d) Voltmeter (A. C) 0-500V	06 Nos. 10 Nos. 24 Nos. 24 Nos.
29.	Inductive Load	06 Nos.
30.	Capacitive Load	06 Nos.
31.	Resistive Load	06 Nos.
32.	Watt meter (I-phase) 0-500W	06 Nos.
33.	Watt meter (I-phase) 0-1000W	06 Nos.
34.	Watt meter (3-phase) 0-1000W	06 Nos.

35.	Power Factor Meter (1-phase)	02 Nos.
36.	Power Factor Meter (3-phase)	02 Nos.
37.	Phase Sequence Meter	05 Nos.
38.	Frequency meter Digital/Analog	02 Nos.
39.	AC/DC Power Supply (Variable) 0-250V (DC) 0-380V (AC)	02 Nos.
40.	VAR meter	05 Nos.
41.	Following Machines should have detachable coupling for making different machine sets (a) Single Phase Squirrel Cage Induction Motor (b) Three phase Squirrel Cage Induction Motor (c) Three phase Wound Rotor Induction Motor (d) Shaded Pole Motor (1-phase) (e) Split Phase Motor	05 Nos. 05 Nos. 05 Nos. 05 Nos. 05 Nos.
42.	D.O.L Starter	05 Nos.
43.	Auto Transformer Starter	05 Nos.
44.	Manual star-Delta Starter	05 Nos.
45.	Automatic Star-Delta Starter	05 Nos.
46.	Alternator (3-phase)	05 Nos.
47.	Synchronous Motor (3-phase)	05 Nos.
48.	Servo Motor	05 Nos.
49.	Universal Motor	05 Nos.
50.	Brushes Motor	05 Nos.
51.	Brushes AC generator	05 Nos.
52.	Different types of Insulator	05 Each
53.	Dampers	05 Nos.
54.	Buchholz's Relay	02 Nos.
55.	T/F Oil Tester	02 Nos.
56.	Silica Gel	2kg
57.	Electric Iron	05 Nos.
58.	Pedestal Fan	05 Nos.
59.	Ceiling Fan	05 Nos.
60.	Kitchen Grinder	05 Nos.
61.	Juice Extractor	05 Nos.
62.	Water Heater	05 Nos.
63.	Kitchen Oven	02 Nos.
64.	Refrigerator	01 No.
65.	Air Conditioner	02 Nos.
66.	Digital Trainer	10 Nos.
67.	Different Gate Chip (Dual Type)	25 Nos.
68.	Half Adder Chip	10 Nos.
69.	Full Adder Chip	10 Nos.
70.	Half Subtractor Chip	10 Nos.
71.	Full Subtractor Chip	10 Nos.
72.	Flip Flop (a) R.S (b) D-Type (c) Jk	10 each
73.	Schmitt Trigger	10 Nos.
74.	Timer (555)	10 Nos.
75.	Multivibrator (a) Astable Chip (b) Monostable Chip (c) Bistable Chip	10 Nos. 10 Nos. 10 Nos.
76.	Shift Register Chip (a) SISO (b) SIPO (c) PISO (d) PIPO	10 Each
77.	Counter Chip (a) Ripple (b) Synchronous	10 Each

78.	Memory Device Chip (a) RAM (b) ROM (c) PROM (d) E-PROM	05 Nos. 05 Nos. 05 Nos. 05 Nos.
79.	Converter Chip Set D/A and NO	05 Each
80.	Microprocessor (8085)	05 Nos.
81.	Power Diodes	25 Nos.
82.	SCR	25 Nos.
83.	Inverter (a) 1-Phase (b) 3-phase	05 Nos. 05 Nos.
84.	Converter (a) 1-Phase (b) 3-phase (c) Cyclo Converter	05 Nos. 05 Nos. 05 Nos.
85.	PLC Trainer with Computer Sets	02 Nos.
86.	Morse Code Set key	05 Nos.
87.	Telecom Transmitter	05 Nos.
88.	Telecom Receiver	05 Nos.
89.	Digital Exchange	01 Nos.
90.	Tele Printer	01 Nos.
91.	Optical Fiber Cable	10 meter
92.	Oscilloscope 20MHZ (Dual Beam)	02 Nos.
93.	LED	25 Nos.

* Quantity already mentioned

Equipments & Tools

**Mechanical Technology (DAE)
(For 25 students)
List of Equipment & Tools**

(A) METAL WORKS MT-116 WORKSHOP PRACTICE-I

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	Preparation of Name Plate	Bench vice	25 Nos.
		Steel rule	25 Nos.
		Vernier Caliper 0 -150 mm	25 Nos.
		File Flat bastard	25 Nos.
		File Flat smooth	25 Nos.
		Try square 0 -150 mm	25 Nos.
		Master try square	2 Nos.
		Scriber	25 Nos.
		Ball peen hammer	25 Nos.
		Centre punch	25 Nos.
		Drill press (Floor Model)	5 Nos.
		Drill press vice	5 Nos.
		Twist drill set	5 Nos.
		Counter sink	5 Nos.
		Surface Plate	5 Nos.
		Angle Plate with fixture	5 Nos.
Height Gauge	5 Nos.		
Surfae Gauge	5 Nos.		
2.	Sawing Exercise	* Bench vice	
		Hand Hack saw	25 Nos.
		* Steel rule	
		* Try square	
		* Scriber	
		Bastard / Rough File	25 Nos.
3.	Preparation of Inside Caliper	* Bench vice	
		* Steel rule	
		Out side micrometer 0 -25 mm	10 Nos.
		* Vernier Caliper 0 -150 mm	
		* File Flat bastard	
		File Flat second cut	25 Nos.
		* File Flat smooth	
		File half round	10 Nos.
		Round second cut	10 Nos.
		* Try square 0 -150 mm	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		Divider	10 Nos.
		* Height Gauge I Surface Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press	
* Drill press vice			
* Twist drills set			
* Hand Hack saw			
* Hermapherodite (odd leg caliper)	5 Nos.		
4.	Preparation of Bottle Opener	* Bench vice	
		* Steel rule	
		* Vernier Caliper 0 -150 mm	

		* File Flat bastard	
		File Flat second cut	25 Nos.
		File Flat smooth	25 Nos.
		* File half round I round second cut	
		* Try square 0 -150 mm	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		Divider	10 Nos.
		* Height Gauge	
		* Surface Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press	
		* Drill press vice	
		* Twist drills set	
		* Hand Hack saw	
5.	Preparation of dove tail joint	* Bench vice	
		* Steel rule	
		* Vernier Caliper 0 -150 mm	
		* File Flat bastard	
		* File Flat second cut	
		* File Flat smooth	
		* File half round I round second cut	
		* Needle files set	
		* Try square 0 -150 mm	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		* Divider	
		* Height Gauge	
		* Surface Gauge	
		* Angle Plate with fixtures	
		* Drill press	
		* Twist drills set	
		* Hand Hack saw	
6.	Preparation of small size Try square	* Bench vice	
		* Steel rule	
		* Vernier Caliper 0 -150 mm	
		* File Flat bastard	
		* File Flat second cut	
		* File Flat smooth	
		* File half round / round second cut	
		* Try square	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		* Divider	
		* Height Gauge / Surface Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press	
		* Drill press vices	
		* Twist drills set	
		* Hand Hack saw	
		* Needle file set	
		* Counter sink	
		Anvil 25 kg	2 Nos.

7.	Preparation of coat hook	* Bench vice	
		* Steel rule	
		* Vernier Caliper 0 -150 mm	
		* File Flat bastard	
		* File Flat second cut	
		* File Flat smooth	
		* Try square	
		* File half round / round second cut	
		* Needle files set	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		* Divider	
		* Height Gauge	
		* Surface Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press (Floor Model)	
		* Drill press vices	
* Twist drills set			
* Hand Hack saw			
8.	Preparation of Funnel	* Steel rule	
		* Scriber	
		* Divider	
		Shearing Machine (Foot Operated)	1 Nos.
		Hand Sheer (Lever type)	1 Nos.
		Tinner's snips (Flat)	20 Nos.
		Tinner's stacks (different types)	10 Nos.
		Sheet metal seamer	05 Nos.
		Mallet	10 Nos.
		Soldering iron (medium)	15 Nos.
		Gloves (Leather)	25 Pairs
		Sheet metal and welding clamp	20 (C-Type)
		9.	Preparation of Pin Tray
* Scriber			
* Divider			
* Shearing Machine (Foot Operated)			
* Hand Sheer (Lever type)			
* Tinner's snips (Flat)			
* Tinner's stacks (different types)			
* Sheet metal seamer			
* Mallet			
* Soldering iron (medium)			
* Gloves (Leather)			
* Sheet metal and welding clamp			
10.	Preparation of Drawer Handle		
		* Steel rule	
		* Vernier Caliper 0 -150 mm	
		* Needle file set	
		* Try square	
		* File Flat bastard	
		* File Flat second cut	
		* File Flat smooth	
		* Ball peen hammer	
		* Centre punch	

		* Scriber	
		* Divider	
		* Height Gauge	
		* Surface Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press (Floor Model)	
		* Drill press vice	
		* Twist drills set	
		* Hand Hack saw	
		* Counter sink	
11.	Preparation of Bevel Square	* Bench vice	
		* Steel rule	
		* Vernier Caliper 0 -150 mm	
		* File Flat bastard	
		* File Flat smooth	
		* Files Flat double cut	
		* Files Flat dead smooth	
		* Files half round double cut	
		* Try square	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		* Divider	
		* Height Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press	
		* Drill press vice	
		* Twist drills set	
		* Hand Hack saw	
		* Needle file set	
		* Counter sink drill	
		* Anvil	
12.	Preparation of Spanner	* Bench vice	
		* Steel rule	
		* Vernier Caliper 0 -150 mm	
		* File Flat bastard	
		* File Flat smooth	
		* Files Flat double cut	
		* Files Flat dead smooth	
		* Prick punch	
		* Try square	
		* Ball peen hammer	
		* Centre punch	
		* Scriber	
		* Divider	
		* Height Gauge	
		* Surface plate	
		* Angle Plate with fixtures	
		* Drill press	
		* Drill press vice	
		* Twist drills set	
		* Hand Hack saw	
		* Needle file set	
		* Counter sink	
		* Anvil 25kg	

(B) WELDING / FORGING MT-116 WORKSHOP PRACTICE-I

Sr #	List of Practicals	Name of Equipment	Quantity required
94.	Gas Welding	Acetylene gas cylinder with regulator	06 Nos.
	Frame making practice	Oxygen gas cylinder with regulator	06 Nos.
		* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		Acetylene hose	06 Nos.
		Oxygen hose	06 Nos.
		Hose clamps / connections	24 Nos.
		Flash back arrester	24 Nos.
		Gas cylinder valve key	06 Nos.
		Gas welding torch set	06 Nos.
		Torch tips set	06 Nos.
		Tips cleaner set	06 Nos.
		Gas welder goggles	25 Nos.
		Spark lighter	06 Nos.
		Welding gloves	25 pairs
		Welder's apron	05 Nos.
95.	Pool making	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		Acetylene gas regulator	03 Nos.
		Oxygen gas regulator	03 Nos.
		* Acetylene hose	
		* Hose clamps / connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles.	
		* Spark lighter	
		* Welding gloves	
* Welder's apron			
96.	Bead making	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps / connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
		* Welding gloves	
		* Welder's apron	
		Self grip welding clamps set	06 Nos.
		Welder's chipping hammer	12 Nos.
Welder's wire brush	12 Nos.		
Tongs set	06 sets		

97.	Butt joint	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps / connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Gas welder goggles	
		* Spark lighter	
		* Welding gloves	
		* Welder's apron	
		* Self grip welding clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Bench vices	
		* Tongs sets	
98.	Lap joint	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps / connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
		* Welding gloves	
		* Welder's apron	
		* Self grip welding clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Bench vices	
* Tongs sets			
99.	Corner joint without filler rod	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps / connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
* Self grip welding clamps set			

		* Welding gloves	
		* Welder's apron	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Bench vices	
		* Tongs sets	
100.	Corner joint with filler rod	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps / connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
		* Self grip welding clamps set	
		* Welding gloves	
		* Welder's apron	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Bench vices	
		* Tongs sets	
101.	T-joint	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps I connections	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
		* Self grip welding clamps set	
		* Welding gloves	
		* Welder's apron	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Tongs sets	
102.	Edge joint	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps I connections	
		* Flash back arrester	
		* Gas cylinder valve key	

		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
		* Self grip welding clamps set	
		* Welding gloves	
		* Welder's apron	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Tongs sets	
		* Bench vices	
103.	Brazing practice	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene gas regulator	
		* Oxygen gas regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps I connections	
		* Self grip welding clamps set	
		* Flash back arrester	
		* Gas cylinder valve key	
		* Gas welding torch set	
		* Torch tips set	
		* Tips cleaner set	
		* Gas welder goggles	
		* Spark lighter	
		* Welding gloves	
		* Welder's apron	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Tongs sets	
		* Bench vices	
104.	Arc Welding Arc making current/current setting polarity selection	Welder's hand shield	25 Nos.
		Welder's apern (Leather)	25 Nos.
		Welder's gloves (Leather)	25 Nos.
		Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	06 Nos.
		* Self grip welding clamp set	
		* Tongs set	
		* Welder's chipping hammer	
		* Welder's wire brush	
105.	Beed making	* Arc welder (welding transform) with leads clamps and all standard accessories 10A -- 150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
106.	Butt joint	*Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	

		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
107.	Lap Joint	* Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
108.	Corner join t	* Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
109.	T-joint	* Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
110.	V-Butt joint	* Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
111.	Square corner joint	* Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	

		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Welder's chipping hammer	
		* Welder's wire brush	
		* Clamps set	
		* Welder's chipping hammer	
112.	Bevel butt joint	* Arc welder (welding transform) with leads clamps and all standard accessories 10A --150A	
		* Welder's hand shield	
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Tongs set	
		* Clamps set	
		* Welder's chipping hammer	
		* Welder's wire brush	
113.	Spot welding	Spot welder / spot welding machine with complete accessories	03 Nos.
		* Welder's apern (Leather)	
		* Welder's gloves (Leather)	
		* Self grip welding clamp set	
		* Welder's wire brush	
		* Goggles	
114.	FORGING (cutting with chisel (Hot & Cold)	Blacksmith hearth	06 Nos.
		Anvil 50 kgs	06 Nos.
		Blacksmith vice	06 Nos.
		Forging hammer	06 Nos.
		Sledge hammer set	06 Nos.
		Hot chisel set	06 Nos.
		Cold chisel set	06 Nos.
		Tongs set	06 Nos.
115.	Upsetting	* Blacksmith hearth	
		* Anvil 50 kgs	
		* Blacksmith vice	
		* Forging hammer	
		* Sledge hammer set	
		* Hot chisel set	
		* Cold chisel set	
		*Tongs set	
		Top & bottom fuller set	06 set
		Top & bottom swages set	06 set
116.	Twisting	* Blacksmith hearth	
		* Anvil 50 kgs	
		* Blacksmith vice	
		* Forging hammer	
		* Sledge hammer set	
		* Hot chisel set	
		* Cold chisel set	
		*Tongs set	
		*Top & bottom fuller set	
		*Top & bottom swages set	
117.	Heading	* Blacksmith hearth	
		* Anvil 50 kgs	
		* Blacksmith vice	
		* Forging hammer	
		* Sledge hammer set	
		* Hot chisel set	
		* Cold chisel set	

		* Tongs set	
		* Top & bottom fuller	
		* Top & bottom swages	
118.	Drawing by forging	* Blacksmith hearth	
		* Anvil 50 kgs	
		* Blacksmith vice	
		* Forging hammer	
		* Sledge hammer set	
		* Hot chisel set	
		* Cold chisel set	
		* Tongs set	
		* Top & bottom fuller	
		* Top & bottom swages	

1ST YEAR
WOOD WORKING MT- 116 WORKSHOP PRACTICE-1

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	Safety precautions in wood workshop	Nil	
2.	Assembly and disassembly of jack plane	Jack plane	13 Nos.
		Try square (0 -18")	13 Nos.
		0 -200 mm	
		Screw driver 12"	13 Nos.
3.	Using of various wood working planes (tool exercise)	* Jack plane	
		Smoothing plane	13 Nos.
		Block planes	13 Nos.
		Bull nose	5 Nos.
		Shoulder	5 Nos.
		Side	5 Nos.
		Duplex	5 Nos.
		Bench	5 Nos.
		Rebit plane	5 Nos.
		Curved plane	5 Nos.
		Spoke shape plane	5 Nos.
		Router plane	6 Nos.
		Plough plane	5 Nos.
4.	Planning & squaring to dimensions	* Jack plane	
		Back saw	13 Nos.
		Marking guage	13 Nos.
		* Try square	
		Carpenter's rule (Folding type)	13 Nos.
5.	Sharpening plane iron	* Jack plane	
		* Screw driver	
		* Try square	
		Sharpening oil stone	13 Nos.
6.	Introduction of different wood working and & layout tools	* Different types of planes	
		Saws	13 (each type)
		* Carpenter's rule (Folding type)	
		* Try square	
		Vices wood work	13 Nos.
		Files (Rasp & Rough)	13 each
		Pliers (Flat nose)	13 Nos.
		* Screw drivers	
		Chisels (wood work)	13 each type
		Hammers (claw type)	13 Nos.
		Mallets	13 Nos.
		Gouges	2 sets
		Braces	2 (each type)
		Bits set	4 set (each type)
		Scrapers	6 Nos.
Clamps	3 (each type)		
7.	Sawing exercise	* Rip saw	
		* Back saw	
		* Try square	
		* Marking guage	
		* Carpenter's rule	
8.	Identifying different types of hand saws & making sketches of all.	* Rip saw	
		* Cross cut saw	
		* Back tenon saw	
		* Compass saw	
		* Panel saw	

		* Coping saw	
		* Key hole saw	
		* Bow turning saw	
		* Dove tail saw	
		* Vinier saw	
9.	Sharpening blade saw	Saw vice	2 Nos.
		Flat file	2 Nos.
		Triangular file	6 Nos.
		Saw file set	2 Nos.
		Saw set plier	2 Nos.
10.	Wood chiseling (Chipping)	Firmer chisel	13 Nos.
		* Wooden mallet	
		* Carpenter vices	
11.	Making mortise and tenon joint	Mortise guage	13 Nos.
		Mortise chisel	13 Nos.
		* Firmer chisel	
		* Wooden mallet	
		* Tenon saw I Back saw	
		* Try square	
		* Carpenter's rule	
12.	Sharpening wood chisels	* Sharpening oil stones	
		* Chisels	
13.	Making Dado joint	* Markig guage	
		* Flat chisel	
		* Mallet	
		* Tenon saw	
		* Router plane	
		* Try square	
14.	Making cross- lap joint	* Marking guage	
		* Flat chisel	
		* Mallet	
		* Tenon saw	
		* Router plane	
		* Try square	
15.	Observing wood structure	Magnifier	6 Nos.
16.	Identifying and comparing soft and hard wood	* Magnifier	
17.	Spirit Polishing	* Scrapers	
18.	Boring Process	Rachet brace	13 Nos.
		Wheel brace	2 Nos.
		Auger bit set	5 Nos.
		Expansive bit	13 Nos.
		Centre bit set	1 set
		Counter sink bit	1 set
19.	Nailing and wood screwing	* Claw hammer	
		Cross peen hammer	13 Nos.
		Ball peen hammer	2 Nos.
		Screw driver flat 8"	13 Nos.
		Screw driver phlips 8"	13 Nos.
20.	Making middle half cross lap joint	* Marking guage	
		* Flat chisel	
		* Mallet	
		* Tenon saw	
		* Router plane	
		* Try square	
21.	Making dove tail joint	* Marking guage	
		Marking knife	13 Nos.
		* Dove tail saw	
		* Chisel	
22.	Wood working project	* All above tools	

2ND YEAR
MT-236 WORKSHOP PRACTICE-II (WELDING)

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	MAKING A LAP JOINT BY GAS WELDING	* Acetylene gas cylinder with regulator	
		* Oxygen gas cylinder with regulator	
		* Acetylene hose	
		* Oxygen hose	
		* Hose clamps I connections	
		* Flash back arrester	
		* Gas welding torch set	
		* Gas welder goggles	
		* Spark lighter	
		* Welding gloves	
		* Welder's apron	
		* Welder's chipping hammer	
		* Bench vice	
		* Tongs set	
2.	MAKING A BUTT JOINT BY GAS WELDING	* as above	
3.	PREPARING EDGES BY GROOVING DOUBLE V OR DOUBLE U	* as above	
4.	MAKING WALL BRACKETS BY , GAS WELDING	* as above	
5.	MAKING PLATE & SPOON	* as above	
6.	REPAIRING BROKEN PIECES OF ' CAST IRON AND STEEL	* as above	
7.	MAKING MINIATURE OF FULL SIZE GRILLS	* as above	
8.	MAKING FLOWER POTS STAND	* as above	
9.	REPAIRING & BUILDING UP OF STEEL & CAST IRON PARTS BY ARC WELDING	Arc welding plant with accessories * Welder hand shield	
10.	MAKING WELDER JOINTS OF COPPER AND ALUMINIUM	* as above	
11.	PRACTICE ARGON ARC WELDING	MIG welding m/c plant with accessories	01 Nos.
12.	PRACTICE VERTICAL AND OVERHEAD ARC WELDING	* Arc welding plant with accessories	
13.	PRACTICE SPOT WELDING	Spot welding plant	01 Nos.
14.	CUTTING OF M.S & CAST IRON BY GAS & ARC METHOD	* as above	
15.	TESTING OF WELDED JOINTS	*Welding chipping hammer * Files of all sorts	

2ND YEAR
MT-252 METROLOGY

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	PRACTICE OF FOLLOWING MARKING TOOLS		
	I. Divider D	Divider	
	ii. Scriber S	Scriber	
	iii. Trammel T	Trammel	
2.	PRACTICE OF OUTSIDE AND INSIDE CALIPER	Inside caliper	
		Out side caliper	
3.	PRACTICE OF COMBINATION SET	Combination set	
4.	PRACTICE OF FOLLOWING GRADUATED INSTRUMENTS I. Steel rule ii. Hook rule iii. Folding rule iv. Measuring tape		
		Steel rule	
		Hook rule	
		Folding rule	
5.	PRACTICE OF LINEAR MEASUREMENT WITH FOLLOWING INSTRUMENT	Surface plates	02 Nos.
		Tool maker surface plate	01 Nos.
		Glass surface plate	01 Nos.
		Angle plate with fixture	02 Nos.
		Cast iron cubes	13 Nos.
		Vee. Block	13 Nos.
		Straight edge	13 Nos.
		Spirit level	13 Nos.
		Engineer's level	13 Nos.
		Engineer's parallel	13 Nos.
6.	PRACTICE OF PRECISION INSTRUMENTS i. Micrometer ii. Vernier caliper iii. Vernier height Gauge iv. Vernier depth Gauge v. Dial vernier caliper		
		Out side micrometer	05 Nos.
		Inside micrometer	02 Nos.
		Depth micrometer	03 Nos.
		Plug micrometer	01 Nos.
		Vernier micrometer	02 Nos.
		Vernier calipers	13 Nos.
		Vernier height Gauge	03 Nos.
		Vernier depth Gauge	05 Nos.
Dial vernier caliper	05 Nos.		
7.	PRACTICE OF DIFFERENT ANGLE MEASURING INSTRUMENTS	Bevel protector	05 Nos.
		Bevel protector vernier	05 Nos.
		Sine bars	03 Nos.
8.	CALCULATION RELATING TO LIMITS, TOLERANCE AND ALLOWANCE INVOLVING DIFFERENT TYPES OF FITS	Nil	Nil
9.	STUDY OF GAUGES AND THEIR USES I. Fixed Gauges F ii. Adjustable Gauges F iii. Indicating Gauges 1		
		Plug Gauges	13 Nos.
		Plug thread Gauges	13 Nos.
		Taper plug Gauges 3	03 sets
		Snap Gauges	13 Nos.
		Ring Gauges	13 Nos.
		Taper ring Gauges	01 Nos.
Limit spherical end rod	03 Nos.		

		Feeler Gauges	13 Nos.
		Contour Gauges	13 Nos.
		Screw pitch Gauges	13 Nos.
		Gauge block .	01 set
		Sheet metal Gauge	04 Nos.
		Wire Gauge	04 Nos.
		Pin Gauge	04 Nos.
		Drill Gauge	04 Nos.
		Surface Gauge	04 Nos.
		Depth Gauge	04 Nos.
		Height Gauge	04 Nos.
		Dral Gauge	13 Nos.
		Digimatic indicator	02 Nos.
		Magnetic stand	02 Nos.
		Dial Gauge stand	13 Nos.
		Roller thread limit snap Gauge	04 Nos.
		Adjustable snap Gauge	04 Nos.
		Indicating snap Gauge	04 Nos.
		Angle Gauge	04 Nos.
		Air Gauge	04 Nos.
		Work / Test pieces	13 Nos.
10.	THREAD MEASUREMENTS AND THREAD GAUGES	Micrometer with pin Gauge in holders to determine of pitch diameter of outside thread	05 Nos.
	i. Study of thread measurement and thread Gauges and also thread fits	I Screw plug Gauge	05 Nos.
	ii. Practice of 3 -wire method for checking of external threads	Ring Guage	05 Nos.
	iii. Practice of zeises micrometer	External thread caliper snap gauge Roller thread limit Gauge Screw thread micrometer Interchangeable tips, inches and meters	05 Nos. 05 Nos. 05 Nos. 05 Nos.
11.	PRACTICE AND USE OF FOLLOWING COMPARATORS		
	i. Electrical Electronics comparator	Electrical comparator	01 Nos.
	ii. Pneumatic comparator	Electronics compartorator	01 Nos.
	iii. Mechanical comparator	Optical comparator	02 Nos.
	iv. Automatic gauge comparator	Mechanical comparator	01 Nos.
	v. Gauge block comparator	Automatic gauge comparator	01 Nos.
	vi. Tool maker microscope.	Gauge block comparator	01 Nos.
		Tool maker microscope	01 Nos.
		Pneumatic comparator	01 Nos.
		Comparator stand	01 Nos.
		Test specimen	01 Nos.

2ND YEAR
MT-236 WORKSHOP PRACTICE –II (MACHINE SHOP)

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	Practice for centering the job by surface guage	Center lathe	13 Nos.
		surface guage	13 Nos.
2.	Practice for centering the job by * dial test indicator method	* Center lathe	
		Dial indicator	13 Nos.
3.	Practice of path cutting tool	* Center lathe	
		Turning tool, Tool holder	13 Nos.
		Vernier caliper 0 -150 mm	13 Nos.
4.	Simple turning & facing practice	As above	
5.	Practice of drilling on lathe	Drill chucks with keys upto 12 mm	13 Nos.
6.	Practice of counter sinking	Countersink drill (medium)	13 Nos.
7.	Practice of step turning .	* as Sr. No. 03	
8.	Ecentric turning practice .	* Center lathe	
		* Turning tool	
		* Dial indicator	
		* surface guage	
		Vee -block	13 Nos.
		* Center drill	
9.	Knurling practice	do	
		Knurling tool (different)	13 Nos.
10.	Practice of boring straight hole	boring tool with holder	13 Nos.
11.	Practice for step counter boring	* Counter boring tool with holder	
12.	Practice of boring taper hole	* boring tool with holder	
13.	Reaming practice	Reamer set (different size)	13 sets
14.	Practice square thread in inches system	Square thread tool guage	13 Nos.
15.	Multi start threading	* Square thread tool guage	
16.	Practice of internal thread cutting on lathe	* Center lathe	
17.	Drilling & Taping practice	* Turning tool	
		* Tool guage 60°/50°	
		Bench vice	25 Nos.
		* Vernier caliper 0 -150 mm	
		Flat file bastard	25 Nos.
		Flat file smooth	25 Nos.
		Flat file double cut	25 Nos.
		Drill press (one pedestal type and one radial type)	01 each
		Twist drill set (metric / English)	10 sets
Tap set (metric / English)	10 sets		
18.	Reaming practice on drill press	* Reaming set	
19.	Practice of taper turning by compound rest method	* Center lathe	
		* Turning tool	
		* Vernier caliper 0 -150 mm	
		Pedestal grinder	02 Nos.
20.	Practice of taper turning by off - set method	* Center lathe	
21.	Practice of taper turning by taper turning attachment	* Center lathe	
		Taper turning attachment	13 Nos.
22.	Metric thread cutting practice	* Center lathe	
		* Tool guage 600	
23.	Practice of V -thread in inch Practice of square thread in metric system	*	
		*	
24.	Drill grinding practice	* Pedestal grinder	

		Lip guage	04 Nos.
25.	Tool grinding practice	* Tool guage	
26.	Practice of making flat surface on shaper machine	Shaper with accessories	02 Nos.
27.	Slotting work practice	*	
28.	Angular work practice	*	
29.	Making flat surface on planner	Industrial visit	

2ND YEAR
MT-223 ENGINEERING DRAWING & CAD-II

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	Construction of cycloid	a. Drawing instruments for instruction purpose	
2.	Construction of involute of a circle	1. Drawing instrument box	
3.	Construction of helix	2. Drawing Board	
4.	Draw welding symbols	3. T-square	
5.	Draw sectioning symbols for different material	4. Set square	
6.	Representation of breaks in line, bars, tubes, square rod	5. Protractor	One set for demonstration
7.	Conventional represent of internal and external threads	6. Drawing templates	
8.	Draw hexagonal nut	7. French curves	
9.	Draw hexagonal/square bolt and nut	8. Triangular scale	
10.	Practice in drawing sectional views from the object enlisted below 1. Gland and stuffing box 2. Fork for Hook's coupling 3. Center for Hook's coupling 4. Vee block 5. Shackle bolt 6. Flange coupling 7. Bushed bearing 8. Open bearing . 9. Arm pulley . 10. Cone and step pulley . 11. Wall bracket . 12. Engine cross head . 13. Bracket for Feb.	* b. Drafting machine * * * * * * * * * * * *	
11.	Construction conic sections, ellipse, parabola and hyperbola	*	
12.	Development of truncated square, hexagonal prism,	*	
13.	Development of truncated cylinder	*	
14.	Development of truncated and frustum of square, hexagonal, pyramid	*	
15.	Development of truncated frustum of cone	*	
16.	Development of funnel	*	
17.	Construction of line of intersection of two cylinder of a. Same diameter b. Different diameter	* * *	
18.	Construction of line of intersection of two square prism	*	
19.	Construction of line of intersection of Tee-joint	*	
20.	Drawing of rivet heads	*	
21.	Drawing of riveted joints	*	
22.	Draw detail and working drawing selection from the following	*	
	1. Gib and cotter joint	*	
	2. Fear shifter	*	
	3. Conveyer hanger	*	

	4. Bracket plate	*	
	5. Relief valve body	*	
	6. Torque tube support	*	
	7. Automotive connecting rod	*	
	8. Cone hook	*	
	9. Jig tables	*	
	10. Vee. Belt drive	*	
	11. Pivot hanger	*	
	12. Anti vibration mount	*	
	13. Boring bar holder	*	
	14. Hydraulic chuck valves	*	
	15. Stay rod pivoted	*	
	16. Arbor pin	*	
	17. Flanged vice	*	
B. AUTO CAD -II			
23.	Practice commands studied in CAD - I	* computers	25 Nos.
24.	Draw circle with circle command and center it	* Plotter / Printer	
25.	Draw two line and makes them. horizontal with change commands	* Networking hub	
26.	Practice of copy command .	* Networking card	
27.	Practice for rotate command by.moving object with drawing	* Software Auto CAD	
28.	Practice for breaking command for pre.-draw circle and trim cut.	*	
29.	Draw a pulley using previous commands and options	*	
30.	Continued above practical	*	

2ND YEAR
MT-236 WORKSHOP PRACTICE – II (FOUNDRY)

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	SAND TESTING	Moisture determination	Through lump making
	1. Moisture content	Moist balance	02 Nos.
	2. Clay content	Permeability meter	02 Nos.
	3. Green compress strength Fineness No. of sand sample	G. compressive strength m/c Industrial visit	02 Nos.
2.	MOULDING		
	1. Practice of previous (1st year) mould making	* Belows	
		* Cleaner and lifter	
		* Dust bag	
	2. Practice of split pattern	* Riddles	
	3. Practice of irregular parting line patterns	* Slicks	
		* C -clamps	
		* Rammers	
		* Trowels	
		* Vent wire	
		* Strike rod	
		* Finishing spoon	
		* Foundry riddle	
		* Sand muller	
* Moulding boxes			
* Sprue cutters			
* Gate cutters			
3.	CORE MAKING PRACTICE	* Sand riddles	
	Half core	* Mullers	
	Round one	* Sprinkling cane	
	Practice of assembling of two halves core	Core boxes (different types and size)	13 Nos.
		* Baking oven	
4.	CASTING	Cupola furnace (Medium size)	01 Nos.
	1. Practice, use of pyrometer	Laddies	
	2. Introduction, construction and operation of cupola furnace	Carrying forks (each type)	1 each type
	3. Practice of charging furnace	* Skimmer	
	4. Cleaning & finishing of casting	Plungers	04 Nos.
		* Foundry tongs	
	(a) by hand	* Pouring spoon	
	(b) Sand blasting	* Pyrometer	
	(c). Short blasting	* Pedestal grinder	
	(d) Use of grinder	* Portable grinder	
	(e) Hammer & chisel	* Safety goggles	
	(f) Steel wire brush	* Gloves	
	(g) Hand hack saw	* Apron	
5.	TESTING CASTING	* Steel rule	
	Practice of casting defects	Out side cliper	12 Nos.
	Find out weight of casting by calculation	Weighing scale (Steel yard type)	01 Nos.

3rd YEAR
MT-362 MATERIAL TESTING & HEAT TREATMENT

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	Practice for Brinell hardness test	Brinell hardness testing machine with accessories	01 Nos.
2.	Practice for Rockwell hardness test F on 'B' scale	Rockwell hardness testing machine with accessories	01 Nos.
	Practice for Rockwell hardness test on 'C' scale	do	
3.	Practice for Izod test on Cast Iron, Aluminium & Mild Steel standard I test	Izod impact testing machine with standard accessories	01 Nos.
		Standard test specimen of cast iron, Aluminium & Mild steel	01 Nos.
4.	Practice for tensile test on universal testing machine on standard test specimen and observe necking and yield point, calculate %age elongation, %age reduction in area	Universal testing machine with accessories, grinding device	01 Nos.
		Extensometer standard test specimen	01 Nos.
5.	Compression test on timber or cast iron	* Universal testing machine with accessories, grinding device	
6.	Practice for bending and shear test on universal testing machine	* Universal testing machine with accessories, grinding device	
7.	Practice for torsion test on torsion testing machine	Torsion testing machine	01 Nos.
8.	Practice of fatigue test on fatigue testing machine	Fatigue testing machine with accessories	01 Nos.
9.	Sketch metallurgical micro scope indicating its various parts	Metallurgical microscope	03 Nos.
10.	Practice for metallurgical micro scope	* Metallurgical microscope	
11.	Practice for etching of specimen		
12.	Study of grain size micro structure of mild steel specimen	* Metallurgical microscope with M.S. Specimen	
13.	Practice for flame hardening, quenching and study of grain size structure.	Acetylene gas cylinder with regulator	01 Nos.
		Oxygen gas cylinder with regulator	01 Nos.
		Acetylene hose	03 Nos.
		Oxygen hose	03 Nos.
		Hose clamps I connections	12 Nos.
		Flash back arrester	12 Nos.
		Gas cylinder valve key	03 Nos.
		Gas cylinder valve key	03 Nos.
		Gas welding torch set	03 Nos.
		Torch tips set	03 Nos.
		Tips cleaner set	03 Nos.
		Gas welder goggles	05 Nos.
		Spark lighter	03 Nos.
		Welding gloves	05 Nos.
		Welder's apron	05 Nos.
		Self grip welding clamps set	03 Nos.
Welder's chipping hammer	03 Nos.		
Welder's wire brush	03 Nos.		

		Tongs set	03 Nos.
		Bench vice	03 Nos.
		Guenching tank and metal loading basket	02 Nos.
		* Padestal grinder	
		Angle grinder	02 Nos.
		File bastard flat	10 Nos.
		File double cut	10 Nos.
		File smooth	10 Nos.
		* Metallurgical microscope	
14.	Practice for annealing and study of grain structure	Heat treating box furnace	01 Nos.
		Quenching tank	01 Nos.
		* Padestal grinder	02 Nos.
		Tongs set	02 Nos.
		Self grip welding clamps set	01 Nos.
		* Angle grinder	
		* File bastard flat	
		* File double cut	
		* File smooth	
		* Metallurgical microscope	
		* Bench vice	
15.	Practice of normalizing and study grain structure	* Heat treating box furnace	
		* Quenching tank	
		* Padestal grinder	
		* Tongs set	
		* Self grip welding clamps set	
		* Angle grinder	
		* File bastard flat	
		* File double cut	
		* File smooth	
		* Metallurgical microscope	
		* Bench vice	
16.	Practice for pack carbonizing and study grain structure	* Heat treating box furnace .	
		* Quenching tank	
		* Padestal grinder	
		* Tongs set	
		* Self grip welding clamps set	
		* Angle grinder	
		* File bastard flat	
		* File double cut	
		* File smooth	
		* Metallurgical microscope	
		* Bench vice	
17.	Practice for heat treating of non ferrous metals, cast iron and study grain structure	* Heat treating box furnace	
		* Quenching tank	
		* Padestal grinder	
		* Tongs set	
		* Self grip welding clamps set	
		* Angle grinder	
		* File bastard flat	

		* File double cut	
		* File smooth	
		* Metallurgical microscope	
		* Bench vice	

3rd YEAR
MT-382 COMPUTER INTEGRATED MANUFACTURING (CIM)

Sr #	List of Practicals	Name of Equipment	Quantity required
1.	Introduction to CNC Lathe machine	CNC Lathe with accessories	01 Nos.
2.	Study of observance of safety while operating machine	* do	do
3.	Study of programming CNC lathe machine	* do	do
4.	Study of procedure for coding & saving program	* do	do
5.	Study & working of CNC machine .	* do	do
6.	Preparation of sample job.	* do	do
	From pre-developed program supplied with the CNC lathe	* do	do
7.	Preparation of sample job from Pre-developed program supplied with CNC lathe machine	* do	do
8.	practice to prepare program of parallel turning and job preparation	* do	do
9.	Practice to prepare program of step turning and job preparation	* do	do
10.	Practice to prepare program of taper turning & job preparation	* do	do

3rd YEAR
MT-312 HYDRAULIC & HYDRAULIC MACHINES

Sr #	List Of Practicals	Name of Equipment	Quantity required
1.	SOLVE PROBLEMS ON PRESSURE INTENSITY	Nil	Nil
2.	PRACTICE FOR CALCULATION OF DISCHARGE FLOW THROUGH VENTURI METER	Hydraulic bench Venturi test apparatus	02 Nos. 02 Nos.
3.	SOLVE PROBLEMS ON HYDRAULIC PRESS POWER REQUIRED TO DERIVE IT PRESSURE HEAD AND PRESSURE CONVERSION	Nil	Nil
4.	PRACTICE FOR CALCULATION OF CO-EFFICIENT OF VELOCITY, CO-EFFICIENT OF DISCHARGE THROUGH ORIFICE APPARATUS	*Hydraulic bench Flow through an orifice test apparatus	02 Nos.
5.	SOLVE PROBLEMS ON CALCULATION OF DISCHARGE DIAMETERS AND VELOCITIES	Nil	Nil
6.	SOLVE PROBLEMS ON PUMPING POWER AGAINST PRESSURE	Nil	Nil
7.	SOLVE PROBLEMS ON CONVERSION OF VELOCITY AND VELOCITY HEAD	Nil	Nil
8.	APPLICATION OF BERNOULLIS EQUATION VENTURI METER (PROBLEM SOLVING)	Nil	Nil
9.	PRACTICE FOR THE CALCULATION OF LOSS OF HEAD DUE TO FRICTION BY USING FRICTION IN LOSSES IN PIPE APPARATUS	*Hydraulic bench Pipe friction test apparatus	02 Nos.
10.	SOLVE PROBLEMS ON HEAD AND CALCULATION OF CD, CV AND CC	Nil	
11.	PRACTICE FOR CALCULATION OF LOSS OF HEAD DUE TO SUDDEN ENLARGEMENT CONTRACTION AND ENTRANCE TO A PIPE USING FRICTION ALONG A PIPE APPARATUS	*Hydraulic bench Losses in pipe system apparatus	02 Nos. 02 Nos.
12.	CALCULATION OF FORCE OF JET IMPINGING ON A FIXED PLATE USING IMPACT OF JET	* Hydraulic bench Impact of jet Test apparatus	02 Nos.
13.	SOLVE PROBLEMS OF H.P OF JET AND IMPACT OF JET	Nil	Nil
14.	STRETCHING AND STUDY OF PELTON WHEEL	A.V. aids / Working model of pelton wheel	
15.	STRETCHING AND STUDY OF FRANCIS TURBINE	A. V. aids / Working model of pelton wheel	
16.	STRETCHING AND STUDY OF CENTRIFUGAL PUMP	Centrifugal pump I. Single stage II. Multi stage	02 Nos.
17.	SKETCHING AND STUDY OF RECIPROCATING PUMPS	Reciprocating pump I. Single acting II. Double acting	02 Nos.

3rd YEAR
MT-374 WORKSHOP PRACTICE-III

Sr #	List Of Practicals	Name of Equipment	Quantity required
1.	PLAIN MILLING OPERATION	Universal milling machine with all standard accessories and hand tools	04 Nos.
		Plain milling cutter	04 Nos.
		Out side micrometer	04 Nos.
		Vernier Caliper	04 Nos.
2.	SLOTING ON FLAT SURFACE	* Universal milling machine with all standard accessories and hand tools	
		Plain milling cutter	04 Nos.
		Slotting cutter	04 Nos.
		* Vernier Caliper	
		* Micrometer	
		End mills	04 Nos.
3.	SLOTING ON ROUND WORK	* Universal milling machine with all standard accessories and hand tools	
		Vee block	04 Nos.
		* Plain milling cutter	
		* Slotting cutter	
		* End mills	
4.	RACK CUTTING WORK	* Universal milling machine with all standard accessories and hand tools	
		* Plain milling cutter	
		Involute gear cutter (Different types)	04 Nos.
		Gear toothed vernier caliper	02 Nos.
5.	SPUR GEAR CUTTING	* Universal milling machine with all standard accessories and hand tools	
	a. Plain indexing method	* Vernier caliper	
	b. Differential indexing method	* Micrometer	
		* Involute gear cutter	
		* Gear toothed vernier caliper	
		Indexing / Dividing head with gear sets	
6.	HELICAL GEAR CUTTING	* Equipment as Sr. No.5	
7.	CYLINDRICAL GRINDING OPERATION	External and internal grinding attachment	02 Nos.
		Bench lathe	04 Nos.
		Inside caliper	04 Nos.
		Out side caliper	04 Nos.
		Tool and cutter grinding machine with all accessories and attachments	01 Nos.
		* Vernier caliper	
		* Inside caliper	
		* Out side caliper	
		Depth micrometer	02 Nos.
		Indicating dial gauge with stand	02 Nos.

ELECTRONICS TECHNOLOGY

Proposed List of Equipments / Tools required for DAE Revised Curriculum for 50 students

FIRST YEAR (Electronics)

(A) Basic Electronics Lab

Particulars		Quantity
119.	A V O Meter, 20,000 ohm/v Voltage range Ac/Dc -up to 1000 V D.C., current Range up to 1A	24 Nos.
120.	Rheostat, Zero to 1000 ohms, 5A	12 Nos.
121.	Wattmeter -(AC) 120V/240V1A/5A	06 Nos.
122.	Energy Meter- 240V AC-10A Max	06 Nos.
123.	DC Regulated Power supply 0-30V/0-25V 3A/5A	12 Nos.
124.	Cathode Ray Oscilloscope 20 MHz	05 Nos.
125.	Power factor meter	05 Nos.
126.	i) Bar Magnets ii) Horse Shoe Magnets	24 Nos. 24 Nos.
127.	LCR Meter i) Capacitance Range up to 2000 uf ii) Inductance Range up to 2H iii) Resistance Range up to 20 M ohm	04 Nos.
128.	Lead Acid Battery	04 Nos.
129.	Hydrometer	04 Nos.
130.	Battery Charger	02 Nos.
131.	Compass	06 Dozens
132.	Step down transformer Input -240 V output -6V, 12 V Current 5A	12 Nos.
133.	Transformers winding machines (Manual local made with counter)	04 Nos.
134.	Soldering Irons 40 watts 220 v along with Solders Sucker	50 Nos.
135.	Soldering Guns	25 Nos.
136.	PCB for Radio (assembling of Radio kits)	50 Nos.
137.	Vero Boards	50 Nos.
138.	Resistance Boxes	25 Nos.
139.	Choke 10 watts	25 Nos.
140.	Resistors, Capacitors, Coils, Diodes, Transistors, LDRS, Photo Diodes & Leads, Photo Electric Conductive Cells & other Components according to Syllabus.	As per requirement
141.	Computers (for conduct of Computer Applications) Pentium -III	25 Nos.

(B) Comprehensive Shop

1.	Files with handle, flat, bastard 12" Smooth 12"	25 Nos. 12 Nos.
2.	Hammer, ½ lb, cross peen Ball peen	06 Nos. 06 Nos.
3.	Hack saw frame with blade	25 Nos.
4.	Screw driver, 12" (4mm tip)	12 Nos.
5.	Chisels	12 Nos.
6.	Wire stripper	06 Nos.
7.	Wrenches adjustable 10"	12 Nos.

8.	Scrapers	12 Nos.
9.	Scale	12 Nos.
10.	Drills (High speed steel) 0.1 -25m	04 Set
11.	Reamer	04 Set
12.	Bench Vice, 4"	25 Nos.
13.	Hand-Vice	25 Nos.
14.	Shears	04 Nos.
15.	Spikes	02 Set
16.	Marking Punches (Alpha numeric)	02 Set
17.	Marking gauge	02 Set
18.	Surface Plate	02 Set
19.	Scribing block	25 Nos.
20.	Tri-square 8"	25 Nos.
21.	Vernier caliper	25 Nos.
22.	Micro Meter	06 Nos.
23.	Combination Set	10 Nos.
24.	Dies (whit worth)	04 Nos.
25.	Taps (mm), Whit worth	10 Nos.
26.	Die Handle	04 Nos.
27.	Tap Holders	10 Nos.
28.	Scriber	25 Nos.
29.	Centre Punch	10 Nos.
30.	C-Clamp	02 Nos.
31.	Swage block	02 Nos.
32.	Rivet Set	04 Nos.
33.	Screw -Extractor	04 Set
34.	Wood Saw, Rip saw, back saw	04 Set
35.	Wood chisels, ¼ ", ½ ", ¾ ", 1"	04 Set
36.	Wood Planner, joint planer, length 14", smooth planer 10"	02 Nos.
37.	Marking gauge (Wooden) Beam 8"	06 Nos.
38.	Mortise gauge 8" Beam	06 Nos.
39.	Files:- Rasp file Half round 10", Flat file 10"	06 Nos.
40.	Claw Hammer	06 Nos.
41.	Steel tape 6 ½ feet	25 Nos.
42.	Set of Wiring Tools consisting of the following:- i) Combination Plier -8" ii) Side Cutter Plier -6" iii) Screw Driver -10" iv) Screw Driver -6" v) Phase Tester 4" vi) Knife -6" vii) Awl- 4"	25 Set
43.	Hand Drill Machine with Drill Set	06 Nos.
44.	Table Drill Machine, 0-13mm drill	02 Nos.
45.	Drill Set 1 mm to 30m (HSS) (a set of 25 drills)	04 Nos.
46.	Table grinding machine (double ended)	02 Nos.
47.	Electric bell 220V	12 Nos.

SECOND YEAR (Electronics)

Advance Electronics Lab

1.	R. F. Signal generator	04 Nos.
2.	A. F. Signal generator	08 Nos.
3.	Logic Probe	12 Nos.
4.	Pulser	12 Nos.
5.	Curve Tracer	04 Nos.
6.	CRO -20 MHz	10 Nos.
7.	Frequency counter up to 200 MHz	06 Nos.
8.	D. C. Regulated power supply 0-25V /0-30V, 3A/5A	12 Nos.
9.	D. C. Motor -shunt, compound & series	02 Nos.
10.	D. C. Compound, Shunt generator	02 Nos.
11.	D. C. series motor starter, shunt motor starter	02 each
12.	Tachometer up to 5000 RPM	02 Nos.
13.	Dynamometer	01 No.
14.	Alternator	01 No.
15.	3-Phase squirrel cage motor	02 Nos.
16.	3-Phase induction motor	02 Nos.
17.	Star delta starter	02 Nos.
18.	Starter/ Reverser	02 Nos.
19.	Single Phase capacitor motor	04 Nos.
20.	Single Phase shaded pole motor	02 Nos.
21.	Single Phase Series motor	02 Nos.
22.	Galvano meter, Zero centre	06 Nos.
23.	Ohm Meter (up to 20 Mega ohm)	06 Nos.
24.	FET Vom	10 Nos.
25.	Transister Tester	04 Nos.
26.	T. V. Pattern generator with colour bar generator	02 Nos.
27.	V. U. Meter	01 No.
28.	Sound Level Meter	01 No.
29.	Q-Meter	01 No.
30.	X- Y Recorder	01 No.
31.	Clamp on Meter	02 Nos.
32.	E.H. T. Probe	04 Nos.
33.	Logic Analyzer	02 Nos.
34.	Micro Phone	06 Nos.
35.	Loud Speaker	06 Nos.
36.	Trainer for A. M. Receiver	03 Nos.
37.	Trainers for F. M. Receiver	03 Nos.
38.	Trainers for Amplifiers	03 Nos.
39.	Rotary Telephone Set	06 Nos.
40.	Digital Telephone Set	06 Nos.
41.	Fax Machine	01 No.
42.	Microphones, Various types	06 Nos.

THIRD YEAR (Electronics)

TV/Communication Lab

1.	Black & White T. V.	06
2.	Colour T. V.	12
3.	Out Door antenna connected with T. V.	04
4.	Video Camera	02
5.	VCR	04
6.	Lux Meter	02
7.	I.F. T. Allignment tool kit	06
8.	Solder Sucker	12
9.	Chip Extractor	04
10.	Video Recording Light 1000W	04
11.	UPS	02
12.	Automatic Battery Charger	02

13.	Resistance thermometer	02
14.	Dish Antenna with Receiver & LNB	02
15.	Audio Tape Recorder	02
16.	Over Head Projector	03
17.	Micro Processor Trainer (8085/8086)	03
18.	Antenna & Transmission lines trainer	02
19.	FM Transmission Trainer	01
20.	AM Transmission Trainer	01
21.	Black & White TV Trainer	01
22.	Colour TV Trainer	01
23.	Grid Dip Meter	01
24.	SWMAR Generator	02

TELECOMMUNICATION TECHNOLOGY

GENERAL ENGINEERING FUNDAMENTALS 112

WORK SHOP TOOLS AND PRACTICE

Sr. No.

1	Files, Hammers	30 Each
2	Screw Drivers	30 Each
3	Hack Saw & Blades	30 Each
4	Wrenches	30 Each
5	Seales, Drills, Reamers	30 Each
6	Bench Vice	10 Each
7	Hand Voice	30 Each
8	Metal Sheets	As Required
9	Punches	15

WOOD WORK TOOLS

1	Saws	30
2	Marking Tools	30
3	Chisels	30
4	Plane Cutters	30
5	Various Types of Screws, nuts and washers	

SOLDERING

1	Soldering Wire	5 Roles
2	Flux	3 Boxes (Small)
3	Hook up wires	Small waste places just for practice
4	Loose Electronic Components	Just for Soldering purpose
5	Soldering Iron	30
6	Soldering Wire	30
7	Small Copper Sheet	For Practice Purpose

PCB Fabrication

1	PCB Boards	30
2	PCB Markers	10
3	Acid for Etching	As requires
4	Small Plastic Tubs for Etching process	5

ELECTRONIC COMPONENTS AND CIRCULE ASSEMBLY

1	Loose Components	Resisters, Capacitors, Transformers and Semiconductors, Hook up wires etc
2	Various Types of antennas in small sizes	5
3	Wires and Cables	Coaxial Cable, twin lead and parallel wire line
4	Transistors (BJT/FETS)	30
5	Data Books	2
6	A special wooden Cupboard is with small boxes to keep the components	1
7	Cable Jointing Set	5

WIRING

1	Different Sizes of Cables	One role of each cable
2	Wiring Accessories (Complete Sets)	15 Sets
3	Wiring Boards	15

TELECOMMUNICATION LABS

Sr. No.		
1	Multiplexer and Demultiplexer Trainers	5
2	Transreceive Circuit Trainers	5
3	Trainer Demonstrating The function of optical fiber	5
4	Digital Exchange with Telephone Sets	1
5	Satellite Communication Trainers	1
6	Trainer Mobile Telephone	5
7	Trainer for AM Transmission	2
8	Trainer for FM Transmission	2
9	Trainer for FDM Transmitter	2
10	PCM Transmitter Trainer	2
11	TDM Transmitter Trainer	2
12	Transmission Lines Trainer	2
13	Switched Mode Power Supply	2
14	Walkie-Talkie Sets	5
15	Cordless Telephone Sets	5
16	Mobile Batteries Changer	5
17	Video Conferencing Facility	1
18	Net Working Facility And Necessary Equipment	1

BASIC ELECTRONIC LAB

1	Multimeter	30
2	Ampere Meters	30
3	Loose Components (Active and Passive)	1 Lot
4	Power Meters (Watt Meter)	5
5	Voltage Dividers a Rheostat	5
6	Cells 1.5	10
7	Batteries 6 to 8 Volts	10
8	BAR Magnets	10
9	Electro Magnets	10

10	Oscilloscope Double Beam	10
11	Function Generators	10
12	Power Supply	10
13	Power Factor Meter	5
14	Chokes	10
15	Digital LCR Meter	2
16	Transformers 6v / 12v	30
17	Hook up wires of different color Black, White, Orange	1 Lot
18	Energy Meter	2
19	FLUX Meter	2
20	Earth Electrode and Earth Resistance Meter	2
	Meggers	
21	Meggers	2

ADVANCE ELECTRONICS LAB

1	Oscilloscope 40MHz	10
2	Function Generators 5MHz	10
3	D.C Power suppliers	10
5	Digital Millimeters	10
6	Active / Passive Components	1 Lot
7	ICs	1 Lot
8	Transistor Checker	2
9	Curve Tracer	2
10	AM Generator	2
11	FM Generator	2
12	LCR Meter	2
13	Frequency Counter	2
14	Wave analyze	2
15	Q Meter	2
16	Micro Processor Trainer 8086/8088	2
17	Analog Electronics Trainer	5
18	Digital Electronics Trainer	5

COMPUTER TECHNOLOGY

List of Equipment in Computer Lab

Sr#	Item	Description	Qty	Remarks
1.	Computer P-III	Work Station Processor 550Mhz Ram 128 MB HDD 15 GB FDD Sony 1.44Mb M/Board 440 Bx2 VGA Card 16 Mb NIC card Bylan Monitor 14" Philips 104S Casing ATX	21 Nos.	
2.	Computer P-III	Server Processor 733 Mhz Ram 128 MB HDD 20 GB FDD Sony 1.44 Mb M/Board D815 VGA Card 16 Mb NIC Card Bylan Sound Card Speaker 120 watts A4 tech Monitor 14" Philips 104S Casing ATX	01 Nos.	
3.	Printer	HP Laser JET 1100	01 No.	
4.	Printer	Lq 300 x Dotmatrix	01 No.	
Accessories				
5.	Scanner	HP3300c	01 No.	
6.	Hub/ Switch	Planet 24 Port	01 No.	
7.	CD Rom	External Maze	01 No.	
8.	Modem	56 K US Robotics	01 No.	
9.	UPS	1200 Va King Pro	01 No.	
10.	Hard Disk	20 GB (Extra for Backup)	01 No.	
11.	Cable Tester	Baylan(for Rj 45 , Rj 11 etc)	01 No.	
12.	Crimpling Tool	For Punching Connector	01 No.	
Software				
13.	MS Window 2000 Advance Server (Server)			
14.	Ms Window 2000 Professional (Workstation)			
15.	MS Office 2000 & XP			
16.	MS Word			
17.	MS Excel			
18.	MS Power Point			
19.	MS Access			
20.	MS Front Page			
21.	MS DOS			
22.	Typing Tutor			
23.	Anti Virus			
24.	SW Basic			

COMPUTER TECHNOLOGY

Computer Hardware Lab

Sr #	Items	Remarks
1.	Power Supply Power supplies AT Power Supplies ATX A Complete Computer Model	
2.	CD-ROMs Branded and Non Branded	
3.	MotherBoards MotherBoard 286 MotherBoard 386SX MotherBoard 386DX MotherBoard 486 MotherBoard 486 DX2 MotherBoard 486 DX4 MotherBoard P-I MotherBoard P-II	
4.	Rams RAM (1MB , 4 MB , 16MB,32MB,128MB etc RAM 128mb	
5.	Mouse Mouse (Parallel) Used Mouse (Serial) Used Mouse A4 tech	
6.	Key Board Keyboard A4 tech NEW Keyboards Used	
7.	Monitors Monitors Analog (14 “ (SVGA) Monitor Digital 14” Monitor Black /White Monitor color	
8.	Disk Drives Floppy Drives Tape Drives Data Cables Hard disks 80Mb, 200Mb , 1.2 GB, 20 GB etc	
9.	Processors IC’s Processors IC 8088 Processors IC 8086 Processors IC 6800 Processors IC Z-80 IC Tester with Programmer	
10.	Networking Tools Network Adapters Twist Pair Cable Coaxial Cable Cable Tester RJ-45 Crimping Tool Punch Down Tool Connectors RJ-45 T Connectors Fiber Optic BNC Connectors Fax Modem 56K BNC Crimping tool	
11.	Printers	

	Printer Dot matrix Printer Inkjet Printer Laser Jet Printer Daisy Wheel	
12.	Scanners Scanner Color Scanner Black/ White	
13.	Complete PC's Intel P4-1.8Ghz Server Intel P4-1.8Ghz Workstation 486 Pentium I, Complete	
14.	Maintance and Repair Tools Digital Multi Meter Multi meter (analog) Screwdriver (champion) Screwdriver (Philips) Screwdriver(plate) Nose pliers Blowers Solder gun Solder sucker Twizzer Plier Mini Pliers Large Watch maker (screwdriver) File set Mini drill machine Hammer plastic Banch wise (mini) LCR Meter Signal Generator Testing leads Tool kit along with screwdriver LN key set Oscilloscope 30Mhz Logic Probes Digital Volt Meter	
15.	Microprocessors Microprocessors (486 DX-2) Microprocessors (486 DX-4) Microprocessors (P-I 133) Microprocessors (P-I 100) Microprocessors (P-I 75)	
16.	Video Adapters VGA Cards CGA, VGA, SVGA	
17.	Software Masm 611	

COMPUTER TECHNOLOGY

Computer Hardware Lab

Sr #	Items	Remarks
1.	Microprocessors Microprocessors (486 DX-2) Microprocessors (486 DX-4) Microprocessors (P-I 133) Microprocessors (P-I 100) Microprocessors (P-I 175)	
2.	P.Cs Pentium-I & Pentium-IV	
3.	I.C Tester with Programmer	
4.	Processors IC's	
5.	Processor IC 8088	
6.	Processor IC 8086	
7.	Processor IC 6800	
8.	Processor Z-80	
9.	Signature Analyser	
10.	Emulator	
11.	Plotter	
12.	Digitizer	
13.	Microprocessor Trainer	
14.	Computer Trainer	
15.	Network Trainer	
16.	SDK for 8088/8086	
17.	Time Doman Reflectrometer (TDRs)	
18.	8255A Programmable peripheral interface	
19.	8155 static Ram	
20.	8755 EPROM	

ARCHITECTURE TECHNOLOGY

Sr. No.	1st Years	Subjects
1	Phy-122	Applied Physics
2	AR-123	Architectural Drawing & Drafting
3	AR-133	Basic Computer in Architecture
4	AR- 142	Free Hand Drawing & Architectural Rendering-I
5	AR-154	Surveying and Levelling

Sr. No.	2nd Year	Subjects
1	AR-214	Structural Mechanics and R.C.C Design
2	AR-224	Arch. Design & Drawing-I
3	AR-233	Auto Cad-I
4	AR-242	Free Hand Drawing & Arch. Rendering-II
5	AR-253	Building Construction-I

Sr. No.	3rd Years	Subjects
1	AR-324	Arch. Design and Drawing-II
2	AR-332	Auto CAD-II
3	AR-342	Model Making & Arch. Project
4	AR-353	Building Construction-II
5	AR-373	Estimation and Specifications and Bye-Laws

Practical Subjects

Sr. No.	Subjects	Page No.
1	Phy-122	Allied Subject
2	AR-123 AR-142 AR-224	04

	AR-242	
3	AR-133 AR-233 AR-332	04
4	AR-324 AR-342	04
5	AR-154	05
6	AR-214 AR-253 AR-353 AR-373	No Equipment required as such

LIST OF EQUIPMENTS

DAE

ARCHITECTURE TECHNOLOGY

LIST OF EQUIPMENTS

SUBJECTS

AR-123
AR-142
AR-224
AR-242

Sr. No.	Description	Min. Qty. Required for a Group of 25-30
1	Drafting Table/Drawing Table With Stools	30 Nos.
2	Drawing Instrument Box For Demonstration	01 No.

Note: Minimum space required for drawing hall is 450-500 sft.

SUBJECTS

AR-133
AR-233
AR-332

Sr. No.	Description	Min. Qty. Required for a Group of 25-30
1	Pentium I - IV Computers with Monitor 15", Key Board, Mouse	15-20 Nos.
2	Computer Tables (3'x2')	15-20 Nos.
3	Computer Chairs/Stools (20"x20")	30 Nos.
4	Laser Printer	02 Nos.

SUBJECTS

AR-324

AR-342

Sr. No.	Description	Min. Qty. Required for a Group of 25-30
1	Drafting Table/Drafting Machines (42"x32") with stool	30 Nos.
2	Model Making Table (8'x4')	04 Nos.

Note : Minimum space required for Drawing Hall is 600 to 650 sft.

SUBJECT

AR-154

Sr. No.	Description	Min. Qty. Required for a Group Of 25-30
1	Engineer Chains	03 Nos.
2	Gunter Chains	03 Nos.
3	Metric Chain	03 Nos.
4	Ranging Rods (Standard)	15 Nos.
5	Cross Staff	03 Nos.
6	Optical Squares	03 Nos.
7	Measuring Tapes (Different sizes, steel & cloth)	03 Nos.
8	Arrows	15 Nos.
9	Pegs	15 Nos.
10	Mellats	03 Nos.
11	Hammers	03 Nos.
12	Prismatic Compass & Tripods	03 Nos.
13	Surveyor Compass	03 Nos.
14	Plan Table and its complete accessories i.e, Alidad, U. frame, Plumb bob, Trough Compass, Pegs, mallets etc	03 Nos.
15	Telescopic Alidad	03 Nos.
16	Auto Set Level	03 Nos.
17	Dumpy Level	03 Nos.
18	Tilting Level	03 Nos.
19	Levelling Staff	03 Nos.
20	Foot staff & Metric staff	03 Nos.
21	Theodelite	03 Nos.
22	Panta Graph	03 Nos.
23	Plaine Meter	03 Nos.
24	Abney Level	03 Nos.

CHEMICAL TECHNOLOGY**Chemical Required for Practicals to***1st, 2nd and 3rd year classes*

Sr . No	Names of Chemicals	Quantity
1.	Ammonia (AR)	5 kg
2.	Ammonium Acetate	½ kg
3.	Ammonium Cyanate	½ kg
4.	Ammonium Sulphate	1kg
5.	Ammonium Nitrate	1kg
6.	Ammonium Chloride	1kg
7.	Ammonium Oxalate	½ kg
8.	Ammonium Sulphocyanide	½ kg
9.	Acetone	2½ Litre
10.	Acetic Acid	10 Litre
11.	Acetamide	½ kg
12.	Acetaldehyde	1kg
13.	Acetic Anhydride	2 kg
14.	Acetyl Chloride	1 kg
15.	Aniline	250 gm
16.	Antimony Sulphide	250 gm
17.	Aluminium Chloride	500 gm
18.	Arsenic Chloride	250 gm
19.	Allyl Alcohol	500 gm
20.	Aluminium Metal Turnings	500 gm
21.	Benzene	5 Litre
22.	Benzyl Amin	500 gm
23.	n-Butane	2 ½ Litre
24.	Butanol	2.5 Litre
25.	Benzoic Acid	500 gm
26.	Buffer Solution	500 gm
27.	Boric Acid	1 kg
28.	Bonax	1 kg
29.	Bismuth Nitrate	500gm
30.	Barium Chloride	500 gm
31.	Bromine Water	4 Litre
32.	Bleaching Powder	2 kg
33.	Bone ash	500 gm
34.	Calcium Carbide	1 kg
35.	Calcium Acetate	1 kg
36.	Carbonyl Chloride	½ kg
37.	Can Sugar	5 kg
38.	Chromic Acid	½ kg
39.	Chloroform	4 Litre
40.	Chloral Hydrate	1kg
41.	Calcium Carbonate	1kg
42.	Calcium Hydroxide	1kg
43.	Calcium Oxide	1kg
44.	Calcium Chloride	1kg
45.	Cobalt Nitrate	1kg
46.	Calcium Phosphate	1 kg
47.	Copper Nitrate	1 kg
48.	Copper Sulphate	2 kg
49.	Chromium Chloride	½ kg
50.	Calcium Chloride	1kg
51.	Carbon Tetrachloride	2 Litre
52.	Cobalt Sulphate	100 gm

53.	Cotton – Seed Oil	5 Liter
54.	Cadmium Sulphate	½ kg
55.	Coconut Oil	4 Litre
56.	Diethyl Glyoxime	50 gm
57.	D.D.T	1kg
58.	Ether	1 Litre
59.	Exiochrome Black T	50 gm
60.	Ethylene Diamine Tetra Acetate (ETDA)	250 gm
61.	Ethanol	5 Litre
62.	Ethylene	½ kg
63.	Ethyl Benzoate	½ kg
64.	Ethyl Amine	2 Litre
65.	Ethyl Iodide	1kg
66.	Ethyl Ether	10 Litre
67.	Ethyl Acetate	1kg
68.	Ethyl Alcohol (Ethonal)	10 Litre
69.	Ethyne	½ kg
70.	Freon-12	One Container
71.	Formic Acid	1kg
72.	Ferrous Sulphate	1kg
73.	Ferrous Sulfide	5 kg
74.	Ferric Chloride	1kg
75.	Fructose	1kg
76.	Formaldehyde	1kg
77.	Gum Arabic	½ kg
78.	Glucose	1kg
79.	Glacial Acetic Acid	5 Litre
80.	Glycerol	2 Litre
81.	Hydrochloric Acid	50 Litre
82.	Hydrogen Peroxide	1 Litre
83.	Hydrofluoric Acid	2 Litre
84.	Iodine (Solid)	500 gm
85.	Indigo Blue	500 gm
86.	Karocene Oil	2 Litre
87.	Lead Acetate	½ kg
88.	Lead Oxide	½ kg
89.	Linseed Oil	2kg
90.	Litmus Solution	2 Litre
91.	Methyl red	50 gm
92.	Methyl Orange	50 gm
93.	Mureoxide (Amm-purporate)	50 gms
94.	Manganese Chloride	1kg
95.	Manganese Dioxide	500 gm
96.	Magnesium Sulphate	1kg
97.	Mohr's Salt	100 gm
98.	Methyl Alcohol	4 Litre
99.	Mercury Metal	½ kg
100.	Methyl Red	100 gm
101.	Methyl Cyanide	½ kg
102.	Nitro Benzene	1 kg
103.	Nitric Acid (A.R)	10 Litre
104.	Nickle Chloride	2 kg
105.	n-Butane	2 ½ Litre
106.	Naphthalein	500gm
107.	Oxalic Acid	1 kg
108.	Potassium Cyanate	1kg
109.	Potassium Dichromate	½ kg
110.	Potassium Chromate	½ kg
111.	Potassium Bromide	½ kg
112.	Potassium Iodide	½ kg
113.	Potassium Ferrocyanide	½ kg
114.	Potassium Ferricyanide	½ kg

115.	Potassium Hydroxide	1 kg
116.	Potassium Permanganate	1kg
117.	Potassium Nitrate	1kg
118.	Potassium Aluminium Sulphate	1kg
119.	Picric Acid	½ kg
120.	Phosphorus Trichloride	½ kg
121.	Phenolphthalein	100gm
122.	Potassium Meta Bisulphite	½ kg
123.	Phenol	2 Litre
124.	Phosphoric Acid	500gm
125.	Rany's Nickle	½ kg
126.	Starch	250gm
127.	Sodium Sulphite	½ kg
128.	Sodium Silicate	1kg
129.	Sodium Thiosulphate	1kg
130.	Sodium Biphosphate	1kg
131.	Sodium Chromate	½ kg
132.	Sodium Cobaltinitrate	½ kg
133.	Sodium Sulphide	½ kg
134.	Sodium Hydroxide	2kg
135.	Sodium Chloride	1kg
136.	Sodium Bicarbonate	1kg
137.	Sodium Carbonate	1kg
138.	Sodium Stearate	½ kg
139.	Sodium Potassium Tartrate	¼ kg
140.	Stronsium Chloride	½ kg
141.	Silver Nitrate	½ kg
142.	Sulphuric Acid (AR)	10 Litre
143.	Stannic Chloride	250 gm
144.	Stearic Acid	1kg
145.	Sodium Metal	250gm
146.	Sodium Acetate	1kg
147.	Succinic Acid	½ kg
148.	Sodium Permutit	5kg
149.	Tartaric Acid	½ kg
150.	Urea	1kg
151.	Uric Acid	250 gm
152.	Vinadium Pentaoxide	250gm
153.	Wax (Parafin)	1kg
154.	Yellow Ammonium Sulphide	1kg
155.	Zinc Chloride	½ kg
156.	Zinc Metal (Granular)	1kg

DAE CHEMICAL TECHNOLOGY

Apparatus Required for Practicals to

1st, 2nd and 3rd year classes.

Sr . No	Names of Apparatus	Quantity
1.	Analytical Balance	3 Nos.
2.	Ammeter range	5 Nos.
3.	Beakers 500ml	10 Nos.
4.	Beakers 250ml	25 Nos.
5.	Beakers 100ml	50 Nos.
6.	Battery (12V) D.C with adapter	5 Nos.
7.	Burette 100ml	25 Nos.
8.	Burette 50ml	25 Nos.
9.	Bunsen Burner	25 Nos.
10.	China dish 4" dia	25 Nos.
11.	Crucible with lid 1"	25 Nos.
12.	Capillary tubes	5 Packs
13.	Cork (Wooden)size ½ ",1",1½ ", 2"	20 each
14.	Cork (Rubber)size ½ " , 1",1 ½ "	20 each
15.	Copper Strip 1 ½ " × 6"	6 Nos.
16.	Conical Flask (250ml)	25 Nos.
17.	Cork Borer set	One set
18.	Desicator with lid	5 Nos.
19.	Dropper(glass) with sucker	20 Nos.
20.	Funnel 3" dia	25 Nos.
21.	Filter paper Sheet 30" × 20"	25 Sheets
22.	Filter Paper (Pack of 100) Watmann-40,41,42	5 Pkts. Each
23.	Glass rods dia ¼ "	5kg
24.	Glass tubes (I.D= ¼ " Length 3 ' /4 ')	5kg
25.	Glass tubes (I.D = ¾ " Length 3 ' Approx	2kg
26.	Glass Stirrer Length 8" to 10 "	25 Nos.
27.	Glazed Tile (White) 6" × 6"	25 Nos.
28.	Glass Slap Solid & Hollow	25 each
29.	Hoffman's Voltmeter	05 Nos.
30.	Iron Stand with Clamps	25 Nos.
31.	Kipp's apparatus	03 Nos.
32.	Measuring Flask (1 Litre)	10 Nos.
33.	Measuring Flask (500 ml)	10 Nos.
34.	Measuring Flask (250ml)	10 Nos.
35.	Measuring Flask (100ml)	10 Nos.
36.	Measuring Cylinder(1 Litre)	5 Nos.
37.	Measuring Cylinders(100ml)	10 Nos.
38.	Mirror Strips (1 ½ " × 4")	25 Nos.
39.	Oswald Viscometer	25 Nos.
40.	Pippet (glass) 20ml	25 Nos.
41.	Pippet (glass) 10ml	25 Nos.
42.	Pairs of tong	10 Nos.
43.	Petty dish porelian 3" dia	15 Nos.
44.	Platinum Wire 2" (sealed in glass red and packed in title)	10 Nos.
45.	Pipe / Blowing Pipe (copper or Brass)	15 Nos.
46.	Pestle and Mortar (glass or porclian)	02 Nos.
47.	Prism (glass)	25 Nos.
48.	Rubber tubing(¼ " I. Dia)	25 Meter
49.	Retort (glass)	05 Nos.
50.	Specific gravity bottles	25 Nos.
51.	Stop watch	10 Nos.
52.	Stalagmometer	25 Nos.

53.	Separating Funnel	05 Nos.
54.	Stainless steel spatula	05 Nos.
55.	Tripod stand 9"	25 Nos.
56.	Thermometer (0° to 110° C)	25 Nos.
57.	Thermometer (0° to 360° C)	25 Nos.
58.	Test tubes (Pyrex)	300 Nos.
59.	Test Tube stand (Wooden)	25 Nos.
60.	Test Tube brush	25 Nos.
61.	Test tube holder	25 Nos.
62.	Triangular Clag	
63.	Universal pH paper (Range 1 to 14)	10 Packets
64.	Watch-glass (dia 2 ½ ")	20 Nos.
65.	Weight box (1ml to 100gm)	03Nos.
66.	Wooden stand for burette	25 Nos.
67.	Wire Gauze (4" × 4" with insulator)	25 Nos.
68.	Wash Bottles (PVC)	25 Nos.
69.	Water Condenser	10 Nos.
70.	Water trough (glass or PVC)	10 Nos.
71.	Water Bath (copper)	5 Nos.

List of Equipment & Machinery For

Chemical Technology Practicals

To 1st year 2nd year and 3rd year classes

Sr . No	Name of Equipment / Machinery	Quantity
1.	Abbey's Refractometer	One
2.	Air Conditioner	One
3.	Boiler for steam generator	One
4.	Bubble- Cap Fractionating Column	One
5.	Ball Mill	One
6.	Cloud point apparatus	One
7.	Claw Hammer	One
8.	Centrifirgal Pump	One
9.	Clumbing and falling film eraporator	One
10.	Conductometer	One
11.	Differaction grating	5 Nos.
12.	Electro plating unit	2 Nos.
13.	Flash point apparatus	One
14.	Fire bricks	6 Nos.
15.	Furnace (0° – 2000° C) with Thermostat Control	One
16.	Flame Photometer	One
17.	Fisher's Refractometer	One
18.	Gas Chromatograph	One
19.	Hacksaw with steel hlade	5 Nos.
20.	Jaw Crusher	One
21.	Magnetic Stirrer	2Nos.
22.	Melting point apparatus	One
23.	Nephloimeter	One
24.	Oswald Viscometer	25 Nos.
25.	Orifice meter	02Nos.
26.	Orset gas apparatus	One
27.	Oven Electric (0° -200°C)	One
28.	pH-meter complete with electrodes	One
29.	pH-meter (Pocket comparator)	02 Nos.
30.	Polarimeter (Complete unit)	One
31.	Photometer Spectronic 20	One
32.	Pipes like G.I , M.S, Copper , Aluminum , Lead etc	One Length each
33.	Pipe Vice	One
34.	Pipe vice bench	One
35.	Photo- copier	One
36.	Pulverizer	One
37.	Packed Column (Rasching rings)	One
38.	Pour-point apparatus	One
39.	Pipe Lagging (a) Ashestus powder ½ kg (b) Ashestus Thread 1kg (c) Plaster of paris 1kg (d) Thermopore One sheet (e) Foam Rubber One sheet (f) Coal tar 2kg (g) Glass wool ¼ kg	
40.	Pipe Fittings (a) Socket (b) Elbow (c) Coupling (d) Plug (e) Union (f) Reducer (g) Flange	02 each

	(h) Nozzle (i) Values (<i>one each kind</i>)	
41.	Pipe Threading die complete with handles	One
42.	Pipe Threading die set ½ ", ¾ ", 1" , 1 ½ "	One each
43.	Reciprocating pump	One
44.	Rotameter	One
45.	Sieves of different mesh number	One each
46.	Sieve shaker or vibrator	One
47.	Soxhlet extractor	One
48.	Shell and Tube heat exchanger	One
49.	Storage tanks plastic with level measuring devices (3000 litre each)	Two
50.	Stalagmometer	5 Nos.
51.	Screw driver set	One
52.	Steam trap (Bucket type)	Two
53.	Transparencies (Packet of 100) 8' × 8'	One Packet
54.	Torsion balance	One
55.	Turbidimeter	One
56.	Tentometer	One
57.	Tank mixer (Electric power driven)	One
58.	Triple beam single pan balance	One
59.	U.V Spectrophotometer	One
60.	Venturimeter	One
61.	Hydraulic unit	One
62.	Visual Colorimeter	03 Nos.
63.	Wet and Dry Bulb Therometer	2 Nos.
64.	Water pressure pump	One

REFRIGERATION & AIR CONDITIONING TECHNOLOGY
(FOR 50 STUDENTS)

1.	Combination pliers	10 No.
2.	Side Cutter	10 No.
3.	Long Nose Pliers	10 No.
4.	Adjustable Wrench	05 No.
5.	Open End Wrench	05 No.
6.	Box Wrench	05 No.
7.	Screw Driver (Flat)	10 No.
8.	Screw Driver (Phillips)	10 No.
9.	Allen Key Set	03 No.
10.	Socket Wrenches Set	02 No
11.	Torque Wrench	03 No
12.	Tubing Gauge	05 No.
13.	Tube Cutter	05 No.
14.	Reamer	03 No
15.	Flaring Tool set	05 No.
16.	Swaging Tool Set	05 No.
17.	Gas Welding Set (oxy-Acetylene)	01 No.
18.	Micro Meter	05 No.
19.	Flare Nut Wrench	03 No.
20.	Tube Bending Spring	05 No.
21.	Lever Type Tube Bender	05 No.
22.	Pinch – Off Tool	05 No.
23.	Blow Lamp	02 No.
24.	Refrigerant Cylinder (R-12, R-22, R-134a)	01 each
25.	Nitrogen Cylinder with nitrogen regulator	01 No.
26.	Motor Compressor Opener	01 No.
27.	Multimeter (Analog & Digital)	05 No.
28.	Clamp-on Ammeter (Analog & Digital)	05 No.
29.	Compressor Test Cords	05 No.
30.	Capillary Tube Cleaner	02 No.
31.	Volt Meter	05 No.
32.	Am-meter	05 No.
33.	Heat Gun	02 No.
34.	Vacuum Pump	01 No.
35.	Gauge Manifold Set	05 No.
36.	Oil Cans	05 No.
37.	Hand Electric Drill Machine with Bit Set	02 No.
38.	Wire Brush	05 No.
39.	Safety Goggles	10 No.
40.	Electric Blower	02 No.
41.	Ratchet Wrench	05 No.
42.	Mill File	10 No.
43.	Square File	10 No.
44.	Round File	10 No.
45.	Bench Vice	03 No.
46.	Puller	02 No.
47.	Feeler Gauge	02 No.
48.	Hollow Punch	03 No.
49.	Centre Punch	05 No.
50.	Hand Hacksaw	05 No.
51.	Ball Pin Hammer	05 No.
52.	Straight Peen Hammer	05 No.
53.	Cross Peen Hammer	05 No.
54.	Rubber Hammer	05 No.
55.	Leak Detector (Electronic and HALIDE)	02 No each
56.	Anemometer	01 No.

57.	Thermostat Tester	02 No.
58.	Piecing Valve	02 No.
59.	Sling Psychometric	02 No.
60.	Dial -Up Thermo meter	01 No.
61.	Relay Tester (For All Types of relays)	01 No. each
62.	Process Tube Adopter & Kit	01 No.
63.	Valve Kit & Adopter	01 No.
64.	Capillary Tube Sizing Kit	03 No.
65.	Fins Straighter	02 No.
66.	Charging Cylinders	02 No.
67.	Portable Charging Station	01 No.
68.	Oil Charging Pump	01 No.
69.	Capacitor Analyzer	02 No.
70.	Anemometer Rotating	01 No.
71.	Digital Thermometer	02 No.
72.	Analog Thermometer	02 No.
73.	Electronic Humidity Meter	02 No.
74.	Digital Multimeter	02 No.
75.	Analog Multimeter	02 No.
76.	Digital Tong tester	02 No.
77.	Star Set Kit	05 No.
78.	Low Pressure Gauge	05 No.
79.	High Pressure Gauge	05 No.
80.	Measuring Tape	05 No.
81.	Compressor (Reciprocating, Sealed & Hermetic) ,Rotary, Centrifugal/, Screw, Scrol	05 No. each
82.	Service Valves (all types Of service Valves Used In RAC)	05 No.
83.	Thermostatic Switch	05 No.
84.	Capacitor (Starting, Running, Fan)	10 No. each
85.	Revert Pliers	03 No.
86.	Open Spanner Set	02 No.
87.	Ring Spanner Set	02 No.
88.	Chisel	05 No.
89.	Scissor	05 No.
90.	Ruler	10 No. each
91.	Gloves	20 No.
92.	Copper Tube	Meter
93.	Tube Expander	02 No.
94.	Compressor Oil	

1.	General Refrigeration Cycle Build-Up Trainer	01 No.
2.	Split Type Air Conditioner (Year Round)	01 No.
3.	Absorption Refrigeration Trainer	01 No.
4.	Hermetic Compressor Fault Trainer	01 No.
5.	Thermo Couple Unit	01 No.
6.	Air Conditioning Laboratory Unit	01 No.
7.	Windows Air Conditioner Build-Up Trainer	01 No.
8.	Split Air Conditioner Build-Up Trainer	01 No.
9.	Bench Type Cooling Tower	01 No.
10.	Evaporator Coil (Model)	01 No.
11.	Fan Coil Unit	01 No.
12.	Compressor Analyzer	01 No.
13.	Air Cooled Condensing Unit with Hermetic Sealed Compressor	01 No.
14.	Electric Water Cooler (Model)	01 No.
15.	Display Refrigerator	02 No.
16.	Non-Frost Refrigerator	02 No.
17.	Heat Pump	01 No.
18.	Windows Type Air Conditioner	02 No.
19.	Deep Freezer	02 No.
20.	Water Dispenser Unit (Heat & Cool)	01 No.
21.	Dryer Domestic	02 No.
22.	Dryer Industrial	02 No.
23.	Timer	05 No.
24.	Insulation Remover	02 No.
25.	Selector Switch (4 & 5 Position)	4 No. Each

CHEMISTRY LABORATORY

List of apparatus and Chemicals required for DAE Chemistry practicals of all Technologies.

(For 25 students)

1. List of Apparatus

Sr #	Apparatus	Quantity
142.	Beakers 100 ml	50 Nos.
143.	Beakers 250 ml	25 Nos.
144.	Glass Rod	25 Nos.
145.	Funnel	25 Nos.
146.	China Dish	25 Nos.
147.	Filter paper sheets	10 Sheets
148.	Spirit Lamp or Bunsen Burner	25 Nos.
149.	Tripod stand	25 Nos.
150.	Thermometer (110 C°)	25 Nos.
151.	Capillary tubes	5 Packs
152.	Universal pH Paper Range: -(1-14)	10 Packs
153.	Two, Litres Measuring Cylinder or a bell jar or a long form beaker Chromatograph Tank.	25 Nos.
154.	Cork With hook	25 Nos.
155.	Watch Glass	25 Nos.
156.	Whatman Filter Paper (No 1)	50 Nos.
157.	Ostwald Viscometer	25 Nos.
158.	Pipette 20 ml	25 Nos.
159.	Specific Gravity Bottle	25 Nos.
160.	Analytical / Electronic Balance	04 Nos.
161.	Weight Box (In case of Analytical Balance)	04 Nos.
162.	Stop Watch	10 Nos.
163.	Wooden Stand	25 Nos.
164.	Stalagmometer	25 Nos.
165.	Pinch Cock	25 Nos.
166.	Rubber Tubes	25
167.	Hoffman's Voltmeter	05 Nos.
168.	Connecting Wires	10 Meter
169.	Battery(6V) D.C/Adapter	05 Nos.
170.	Distilled Water Plant.(Gas or Electric)	01 Nos.
171.	Copper Foils (5cmx3cm)	05 Nos.
172.	Ammeter	05 Nos.
173.	Test Tubes	300 Nos.
174.	Test Tubes Stands	25 Nos.
175.	Tube Test Brush	25 Nos.
176.	Test Tube Holder	25 Nos.
177.	Platinum Wire	25 Nos.
178.	Measuring Flask (1 Litre)	10 Nos.
179.	Measuring Flask (500 ml)	10 Nos.
180.	Measuring Flask (250 ml)	10 Nos.
181.	Measuring Flask	10 Nos.
182.	Measuring Cylinder (100ml)	10 Nos.
183.	Kipps Apparatus	Two
184.	Desiccator	One
185.	Conical Flask (250 ml)	25 Nos.
186.	Burette (50ml)	25 Nos.
187.	Iron Stand with Clamps	25 Nos.
188.	Wire Gauze	25 Nos.
189.	Hot Plate	One Nos.
190.	Pipette (10ml)	25 Nos.

191.	Pestal and Mortar	One
192.	Wash Bottle	10 Nos.
193.	Dropper	10 Nos.
194.	Glass Stirrer	25 Nos.
195.	Steal Spatulla	25 Nos.
196.	Water Bath	02 Nos.

2. LIST OF CHEMICALS

Sr #	Apparatus	Quantity
1.	sodium Chloride	(500gm) Pack
2.	Copper Sulphate	500 gm
3.	Naphthalene	500 gm
4.	Hydro Chloric Acid	2 ½ Liter
5.	Nitric Acid	2 ½ Liter
6.	Acetone	2 ½ Liter
7.	Benzene	2 ½ Liter
8.	Ether	2 ½ Liter
9.	Ammonia	2 ½ Liter
10.	Ethanol	2 ½ Liter
11.	Butanol	2 ½ Liter
12.	Potassium Dichromate	500 gm
13.	Inks Black, Red, Green, Blue	One Bottle each
14.	Phenolphthalene	500 gm
15.	Carbon Tetra Chloride	2 ½ Liter
16.	Sand Paper	10 No.
17.	Silver Nitrate	100 gm
18.	Sodium Hydroxide	500 gm
19.	Potassium Hydroxide	500 gm
20.	Sodium Carbonate	500 gm
21.	Potassium Nitrate	500 gm
22.	Potassium Chromate	500 gm
23.	Cobalt Nitrate	500 gm
24.	Borax	500 gm
25.	Potassium Iodide	500 gm
26.	Sodium Thiosulphate	500 gm
27.	Stannous Chloride	500 gm
28.	Liquid Hydrogen sulphide	One Litre
29.	Disodium Hydrogen Phosphate	500gm
30.	Sodium Statnate	500 gm
31.	Ammonium Molybdate	500 gm
32.	Ammonium Chloride	500 gm
33.	Ammonium Sulfo cyanide	500 gm
34.	Sodium Phosphate	500 gm
35.	Ammonium Sulfate	500 gm
36.	Ammonium Oxalate	500 gm
37.	Ammonium Carbonate	500 gm
38.	Picric Acid	500 gm
39.	Nessler's Reagent	500 gm
40.	Tartaric Acid	500 gm
41.	Potassium Pyroantimonate	500 gm
42.	Potassium Urenal Sulphate	500 gm
43.	Magnesium Sulphate	500 gm
44.	Calcium Chloride	500 gm
45.	Lead Acetate	500 gm
46.	Starch (Powder)	500 gm
47.	Potassium Permanganate	500 gm
48.	Diphenyl amine	500 gm
49.	Barium Chloride	500 gm
50.	Ferric Chloride	500 gm
51.	Ferrous Chloride	500 gm

52.	Ferrous Sulphate	500 gm
53.	Ferric Sulphate	500 gm
54.	Barium Nitrate	500 gm
55.	Ammonium Acetate	500 gm
56.	Potassium Ferro cyanide	500 gm
57.	Methylene Orange	One Pack
58.	Yellow Ammonium Sulphide	One Liter
59.	Acetic Acid	2 ½ Liter
60.	Paraffin (Wax)	1kg
61.	Dimethyl Glyoxime (DMG)	1kg
62.	Sulphuric Acid	2 ½ Liter
63.	Sodium Cobalt nitrate	500 gm
64.	Sodium Sulphide	500 gm
65.	Methylated Spirit	2 ½ Liter
66.	Cadmium Sulphate	500 gm
67.	Mercuric Chloride	500 gm
68.	Plumbic Chloride	500 gm
69.	Bismuth Chloride	500 gm
70.	Antimony Chloride	500 gm
71.	Aluminum Sulphate	500 gm
72.	Manganese Sulphate	500 gm
73.	Nickel Sulphate	500 gm
74.	Sodium Bicarbonate	500 gm
75.	Barium Chloride	500 gm

PHYSICS LABORATORY

List of Apparatus (for 25 students)

Sr #	Apparatus	Quantity
197.	Vernier Calipers	25 Nos.
198.	Solid Cylinders (Brass)	25 Nos.
199.	Magnifying Glass	25 Nos.
200.	Micrometer (Screw Gauge)	25 Nos.
201.	Wire Pieces (Iron made) 10 cm long 2mm dia.	25 Nos.
202.	Fletcher's Trolley (With all accessories)	12 Nos.
203.	Weight boxes 0.1 mg to 100g	06 Nos.
204.	Pan (50 gm)	25
205.	Gravesand's apparatus (With pulleys, Spirit level, Plumb line).	25 Each
206.	Hanger and Slotted weights 10 x5=50grn 20x5=100gm 50x5=250gm	25 Each
207.	Set Square	25 Sets
208.	Spring Balance 100gm, 250gm, 500gm	25 Each
209.	Iron Stands	25 Nos.
210.	Meter Strips/rod (Wooden)	25 Nos.
211.	Wedges (Wooden)	25 Nos.
212.	Searl's Apparatus/young's Modulus Apparatus	06 Per Lab
213.	Slotted Weights with hanger (For Searle's apparatus) $\frac{1}{2} \times 5\text{KG} = 2.5\text{KG}$ $1 \times 5\text{KG} = 5\text{KG}$ $2 \times 5\text{KG} = 10\text{KG}$	25 Each
214.	Measuring Tape	06 Nos.
215.	Steel Wires 0.45mm dia Swg 26 Steel 0.36mm dia Swg 29 Steel 0.45mm dia Swg 26 Brass	25 each
216.	Helical Spring	25 Nos.
217.	Iron Stand (Tripod Base)	25 Nos.
218.	Pan with Pointer (Usable with helical Spring)	25 Nos.
219.	Sonometer (Wooden resonance Box)	6 Per Lab
220.	Rubber Pad (Striking hammer rubber type)	25 Nos.
221.	Tuning Forks (consisting Forks of frequency approx). (440 Hz, 512 Hz, 480 Hz)	2 Set of 8 Forks
222.	Resonance Apparatus (Complete.)	6 Per Lab
223.	Beakers 100 graduated with Spout.	25 Nos.
224.	Thermometer $\frac{1}{2}$ degree upto 110°C $\frac{1}{2}$ degree upto nearly 250°F	25 Each
225.	Kundt Tube (Complete)	6 Per Lab
226.	Screen Metal 300mmx300mm painted white	25 Nos.
227.	Electrical lamp (Table lamp type adjustable Height and direction)	6 Per Lab
228.	Point Source Adjustment (Wooden Box Type)	06 Nos.
229.	Spherical Ball (Different diameter 76mm) (with hook 19mm)	25 Each
230.	Drawing Boards	25 Nos.
231.	Mirror Strips	50 Nos.
232.	Concave Mirror (Different dia) (Focal length 150mm) (Focal length 250mm)	25 Each
233.	Up rights with needles	50 Nos.
234.	Up rights for lens holding	50 Nos.
235.	Index rod	25 Nos.
236.	Convex lens (Focal Length 150 mm) (Focal Length 250 mm)	25 Each

237.	Optical Bench	12 Nos.
238.	Glass- Slabs	25 Nos.
239.	Microscope Vernier (Traveling Type)	4 Per Lab
240.	Spectrometer (Complete Set)	4 Per Lab
241.	Sodium Lamp (18 Watt)	8 Nos.
242.	Prism	25 Nos.
243.	Spirit Level (Horizontal bubble)	25 Nos.
244.	Pin Hole Camera (kit complete made of card Board)	25 Nos.
245.	Sextant (Educational Model)	6 Per Lab
246.	Hypsometer	25 Nos.
247.	Lead Shots (1 kg packet)	6 Nos.
248.	Calorimeter (Copper ma e with wooden lid)	25 Nos.
249.	Expansion Apparatus (Complete set with spherometer arrangement)	6 Per Lab
250.	Galvanometer 3 mA	25 Nos.
251.	Power supply 0-10 volts Variable	6 Per Lab
252.	Gas Burner/Spirit lamps	25 Nos.
253.	Balance (Physical)	6 Per Lab
254.	Wet and dry bulb hygrometer	6 Nos.
255.	Beaker (250ml)	25 Nos.
256.	Blotting Paper	10 Sheets.
257.	Steam generator (complete with delivery tube and water trap system)	6 Per Lab.
258.	Tripod with wire gauze	25 Nos.
259.	Lycopodium Powder	1 Kg
260.	Resined Flannel	1 Meter