CERTIFICATE COURSE IN FITTER

(6 MONTHS COURSE)

STATE BOARD OF TECHNICAL EDUCATION & TRAINING

SANKETHIKA VIDYA BHAVAN, MASAB TANK,
Telangana, Hyderabad.

"Fitter"

SUB CODE	NAME OF THE SUJECT	PERIODS/WEEK		TOTAL PERIODS	SCHEME OF EXAMINATION			
	Theory	Theory	Practicals		Duration Hours	Sessional Marks	End Exam Marks	Total Marks
FT-101	Fitting Tools & Measuring Instruments	03	--	50	02	--	100	100
FT-102	Advanced Machine Tools	03	--	50	02	--	100	100
FT-103	Basic Machining operations Lab-I	--	06	75	03	40	60	100
FT-104	Basic Machining operations Lab-II	--	06	75	03	40	60	100
	TOTAL	06	12	250	10	--	--	400

SUBJECT TITLE : Fitting Tools & Measuring Instruments
SUBJECT CODE : FT- 101
PERIODS/WEEK : 03
PERIODS/YEAR : 50

S.NO.	MAJOR TOPICS	NUMBER OF PERIODS
01	SAFETY & FITTING TOOLS	05
02	Fitting & Reading of Measurements	05
03	Micrometers, Files & Keys	10
04	Drilling Process	10
05	Screw Threads	10
06	Boring Reaming Process	10
	TOTAL	50

Unit-1 : Importance of safety and general precautions observed in the Institute and in the section. - Introduction of First aid. Operation of electrical mains. Introduction of safety kits. - Display and explain various fitting tools like hammers , files, chisels etc., their function and specification. - uses of different types of hammers. Description, use and care of 'V' Blocks, marking off table. Bench vice construction, types, uses, care & maintenance, vice clamps, hacksaw frames and blades, specification, description, types and their uses, method of using hacksaws. -description of feeler gauge, wire gauge , try square, slip gauges and dial test indicator etc., Marking off and layout tools, dividers, scribing block, odd leg calipers, punches- description, classification, material, care & maintenance. - Calipers- types, material, constructional details, uses, care & maintenance of cold chisels- materials, types, cutting angles

Unit-2 : Display and explain various measuring instruments used in fitting and reading of measurements. - linear measurements- its units, dividers, calipers, hermaphrodite, Centre punch, dot punch, vernier calipers, vernier depth gauge, vernier height gauge , screw pitch gauge and radius gauge their description. Files- specifications, description, materials, grades, cuts, file elements, uses. Measuring standards (English, Metric Units), angular measurements, subdivisions, try square, ordinary depth gauge, protractor- description, uses and cares.

Unit-3 : Micrometer- outside and inside– principle, constructional features, parts graduation, leading, use and care.
Micrometer depth gauge, parts, graduation, leading, use and care. Digital micrometer. Surface plate and auxiliary
marking equipment, 'V' block, angle plates, parallel block, description, types and uses, workshop surface plate- their uses, accuracy, care and maintenance. Types of files - convexing, taper, needle, care and maintenance of files, various types of keys, allowable clearances & tapers, types, uses of key pullers.

Unit-4 : Drilling processes: common type (bench type, pillar type, radial type), gang and multiple drilling machine. - Drill holding devices- material, construction and their uses. --Drill- material, types, (Taper shank, straight shank) parts and sizes. Drill angle-cutting angle for different materials, cutting speed feed. R.P.M. for different materials. -Drill troubles: causes and remedy. Equality of lips, correct clearance, dead centre, length of lips. Drill kinds : Fraction, metric, letters and numbers, grinding of drill.
Unit-5 : Screw threads: terminology, parts, types and their uses. Screw pitch gauge: material parts and uses. Taps
Method of using tap and use of calculating tap hole sizes. Tap wrench: material, parts, types (solid & adjustable types) and their uses removal of broken tap, studs (tap stud extractor).

Unit-6 : Counter sink, counter bore and spot facing-tools and nomenclature- Reamer- material, types (Hand and machine reamer), kinds, parts and their uses, determining hole size (or reaming), Reaming procedure -Scrapers and their types, methods of scraping. Simple scraper- cir., flat, half round, triangular and hook scraper and their uses.

SUBJECT TITLE : Advanced Machine Tools
SUBJECT CODE : FT- 102
PERIODS/WEEK : 03
PERIODS/YEAR : 50

S.NO.	MAJOR TOPICS	NUMBER OF PERIODS
01	GRINDING WHEELS	05
02	Dies & Pipe Fittings	05
03	Keys & Keyways	10
04	Lathe Cutting Tools	10
05	WorkshopTools	10
06	Preventive Maintenance	10
	TOTAL	50

Unit-1 : Grinding wheels , grit number , grade , bond and structure and its importance -Wheel specification, use, mounting and dressing. Slip gauge: Necessity of using, classification , set of blocks . Details of slip gauge. Metric sets 46: 103: 112. Wringing and building up of slip gauge and care and maintenance. Application of slip gauges for measuring, Sine bar- Principle, application & specification

Unit-2 : Dies : British standard, metric and BIS standard, material, parts, types, Method of using dies. Die stock: material, parts and uses. - Screw thread micrometer: Construction, graduation and use. Pipes and pipe fitting- commonly used pipes. Pipe bending methods. Use of bending fixture, pipe threads-Std. Pipe threads Die and Tap, pipe vices.

Unit-3 : Keys and keyways. Types and their uses, construction (shape). Safety-importance of safety and general precautions observed in a welding shop. Precautions in electric and gas welding (Before, during, after) Introduction to safety equipment and their uses. -description on Arc and gas welding equipment - Identification of weld defects in joints

Unit-4 : Lathe cutting tools- Brief study of the nomenclature of Lathe cutting tools and necessity of correct grinding, solid and tipped, throw away type tools, cutting speed and feed and comparison for H.S.S., carbide tools. Use of coolants and lubricants. - Standard pipefitting-.-Use of tools such as pipe cutters, pipe wrenches, pipe dies, and tap, pipe bending machine etc.

Unit-5 : Anvil and swage blocks. Description and uses. Forging tools- hammers- band and sledge, description and uses. Chisels, set hammers, flatters, hardier, fuller swage & uses Preventive maintenance- objective and function of P.M., section inspection. Visual and detailed, lubrication. - simple estimation of materials. --Bolts and Nuts: Material, types (Hexagonal and square head) and their uses. - Washers: Material, types - Foundation bolt: types (rag, Lewis cotter bolt) description of each erection tools, pulley block, crow bar, spirit level, Plumb bob, pipe 2 X 4', wire rope, manila rope, wooden block.

Unit-6 : Preventive maintenance- objective and function of P.M., section inspection. Visual and detailed, lubrication. - simple estimation of materials. --Bolts and Nuts: Material, types (Hexagonal and square head) and their uses. - Washers: Material, types - Foundation bolt: types (rag, Lewis cotter bolt) description of each erection tools, pulley block, crow bar, spirit level, Plumb bob, pipe 2 X 4', wire rope, manila rope, wooden block.

SUJECT TITLE : Basic Machining operations Lab-I
SUBJECT CODE : FT 103
PERIODS/WEEK : 06
PERIODS/YEAR : 75

S.NO.	MAJOR TOPICS	NUMBER OF PERIODS
01	Marking outlines with marking tools	10
02	Filing, Punching Letters	10
03	Chipping on metals	10
04	Drilling operations	15
05	Drilling reaming and fitting parts	15
06	Fitting operations with fits	15
	TOTAL	75

Unit-1 : Marking out lines, punching and gripping suitably in vice jaws, hacksawing to given dimensions, sawing different types of metals of different sections. -Marking off straight lines and arcs using scribing block and dividers, chipping flat surfaces along a marked line. - Marking, filing, filing Square with use of tri-square. -Marking according to simple blue prints for locating, position of holes, scribing lines on chalked surfaces with marking tools, finding center of round bar with the help of 'V' block and marking block. Joining straight line to an arc.

Unit-2 : Filing- Flat and square (Rough finish). - Filing practice, surface filing, marking of straight and parallel lines with odd leg calipers and steel rule, marking practice with dividers, odd leg calipers and steel rule (circles, arcs, parallel lines). - Channel Filing - File radius along a marked line (Convex & concave) & match. Chip sheet metal (shearing). Chip step and file. - Punch letter and number (letter punch and number punch), use of different punches.

Unit-3 : Chipping, Chip slots & oils grooves (Straight). Filing flat, square, and parallel to an accuracy of 0.5mm. Chip curve along a line-mark out, key ways at various angles - File thin metal to an accuracy of 0.5 mm. Chip & chamfer, grooving and slotting -Saw along a straight line, curved line, on different sections of metal. Straight saw on thick section, M.S. angle and pipes. - File steps and finish with smooth file accuracy ±0.25 mm. File and saw on M.S. Square and pipe welds

Unit-4 : Mark off and drill through holes, drill on M.S. flat, file radius and profile to suit gauge. - Enlarge hole and increase internal dia. File cylindrical surfaces. Make open fitting of curved profiles. - Form internal threads with taps to standard size (through holes and blind holes) – Drill through hole and tap, drill blind hole and tap. - - Counter sink, counter bore and ream split fit (three piece fitting).

Unit-5 : - Drilling and reaming, small dia. holes to accuracy correct location for fitting Make male and female fitting parts, drill and ream holes not less than 12.7 mm. - Drill on cylindrical surface -Precision drilling, reaming - Scrap on flat surfaces, scrap on curved surfaces and scrap surface parallels and test. Make & assemble, sliding flats, plain surfaces. - Scrape angular mating surface, scrap on internal surface. - Scrapping cylindrical bore and to make a fit- make a cotter jib assembly. - Scrapping cylindrical taper bore, check taper angle with sine bar.

Unit-6 : Step fit, angular fit, file and make angle, surfaces (Bevel gauge accuracy 1 degree) make simple open and sliding fits. File fit- combined, open angular and sliding sides. File internal angles 30 minutes accuracy open, angular fit. - File and fit combined radius and angular surface. - Inside square fit, make combined open and sliding fit, straight sides 'T' fit. -Grinding practice. - Make sliding fit with angles other than 90^{O}, sliding fit with an angle.

SUBJECT TITLE : Basic Machining operations Lab-II
SUBJECT CODE : FT 104
PERIODS/WEEK : 06
PERIODS/YEAR : 75

S.NO.	MAJOR TOPICS	NUMBER OF PERIODS
01	Threading operations	10
02	Experiment with Keys	10
03	Lathe Operations	10
04	Pipe Fittings	15
05	Trouble shooting of Pumps	15
06	Repair & Assemble of Machine	15
	TOTAL	75

Unit-1 : Form external threads with dies to standard size. Prepare nuts and match with bolts. - Cutting threads using dies. Make sliding fits assembly with parallel and angular mating surface. (± 0.04 mm) - Cutting & Threading of pipe length. - Fitting of pipes as per sketch. Conditions used for pipe work to be followed. Bending of pipes- cold and hot.

Unit-2 : Make key and keyways on the shaft and fit. - Assembly sliding for using keys- Welding - Striking andmaintaining arc, laying straight-line bead. - Making square, butt jointand 'T' fillet joint-gas and arc. -Setting up of flames, fusion runs with and without filler rod, gas and arc. -Make butt weld and corner, fillet welding- Gas and Arc

Unit-3 : Lathe operations- facing, parting and form tools, plain turn, step turn,Knurling, holding job in three jaw chuck- deburr, chamfer- corner, round, the ends, Shoulder turn

Unit-4 : -Laying of pipes and pipe fittings as per drawing - Practice-dismantling & assembling – globe valves sluice valves, stop cocks, seat valves and non-return valve, fitting of pipes and testing for leakage.

Unit-5 : -Overhauling of centrifugal, reciprocating, jet and submersible pumps and hand bore pumps and trouble shooting and rectification Forge M.S. bar to square, Octagon and hexagon. - Forge flat chisel, grind sharp edge

Unit-6 : Simple repair work, simple assembly of machine parts as per drawings

List of Tools &Equipments for the Trade of "*Fitter*" For 30trainees

A : Trainees kit

Sl. No.	Name of the items	Qty
1	Steel Rule 15 cm with metric graduation	30 nos.
2	Try Square 10 cm blade.	30 nos.
3	Caliper inside 15 cm spring.	30 nos.
4	Caliper 15 cm hermaphrodite	30 nos.
5	Caliper outside 15 cm spring	30 nos.
6	Divider 15 cm spring	30 nos.
7	Straight Scriber 15 cm.	30 nos.
8	Centre Punch 10 cm	30 nos.
9	Screw driver 15 cm	30 nos.
10	Chisel cold flat 10 cm	30 nos.
11	Hammer ball peen 0.45 kg. With handle	30 nos.
12	Hammer ball peen 0.22 kg. With handle.	30 nos.
13	File flat 25 cm. second cut	30 nos.
14	File flat 25 cm. smooth	30 nos.
15	File half round second cut 15 cm.	30 nos.
16	Hacksaw frame fixed 30 cm.	30 nos.
17	Safety goggles.	30 nos.
18	Dot slot punch 10 cm.	30 nos.

B: **Instruments & General Shop Outfit**

Sl. No.	Name of the items	Qty
19	Steel Rule 30 cm	8 nos.
20	Steel Rule 60 cm.	8 nos.
21	Straight edge 45 cm steel	4 nos.
22	Surface plate 45 x 45 cm CI / Granite.	4 nos.
23	Marking table 91 x 91 x 122 cm.	2 no.
24	Universal scribing block 22 cm.	4 nos.
25	V-Block pair 7 cm and 15 cm with clamps	4 nos.
26	Square adjustable 15 cm blade.	4 nos.
27	Angle plate 10 x 20 cm.	4nos.
28	Spirit Level 15 cm metal	2 nos.
29	Punch letter 3 mm set.	2 nos
30	Punch number set 3 mm.	2 nos
31	Punch hollow 6 mm to 19 set of 5	4 nos.
32	Punch round 3mm x 4 mm set of 2	4 nos.
33	Portable hand drill (Electric) 0 to 6 mm	4 nos.
34	Drill twist straight shank 1.5 to 12 mm by 0.5 mm	1 Set
35	Drill twist straight shank 8 mm to 15 mm by ½ mm	1 Set

36	Taps and dies complete set in box B.A	1 no.
37	Taps and dies complete set in box with-worth.	1 no.
38	Taps and dies complete set in box 3-18 mm set of 10	1 no.
39	File warding 15 cm smooth	4 nos.
40	File knife edge 15 cm smooth	4 nos.
41	File cut saw 15 cm smooth	4 nos.
42	File feather edge 15 cm smooth	4 nos.
43	File triangular 15 cm smooth	2 nos.
44	File round 20 cm second cut	8 nos.
45	File square 15 cm second cut	4 nos.
46	File square 25 cm second cut	4 nos.
47	Feeler gauge 10 blades	2 sets
48	File triangular 20 cm second cut.	8 nos.
49	File flat 30 cm second cut.	8 nos.
50	File flat 20 cm bastard	8 nos.
51	File flat 30 cm bastard.	8 nos.
52	File Swiss type needle set of 12.	2 sets
53	File half round 25 cm second cut.	8 nos.
54	File half round 25 cm bastard.	4 nos.
55	File round 30 cm bastard.	4 nos.
56	File hand 15 cm second cut.	8 nos.
57	Card file.	8 nos.
58	Oil Stone 15 cm x 5 cm x 2.5 cm	4 nos.
59	Stone carborandum 15 cm x 5 cm x 5 cm x 4 cm.	2 nos.
60	Oil Can 0.25 liters.	2 nos.
61	Pliers combination 15 cm	2 nos.
62	Soldering Iron 350 gm.	2 nos.
63	Blow Lamp 0.50 liters.	2 nos.
64	Spanner D.E. 6 -26 mm set of 10 pcs.	8 nos.
65	Spanner adjustable 15 cm	2 nos.
66	Interchangeable ratchet socket set with a 12 mm driver, sized10-32 mm set of 18 socket & attachments.	1 set
67	Box spanner set 6-25 mm set of 8 with Tommy bar.	1 set
68	Glass magnifying 7 cm	2 nos.
69	Clamp toolmaker 5 cm and 7.5 cm set of 2.	2 nos.
70	Clamp “C” 5 cm	2 nos.
71	Clamp “C” 10 cm	2 nos.
72	Hand Reamer adjustable cover max 9 ,12,18mm – set of 3	1 set
73	Hand Reamer taper 4 -9mm set of 6 OR 4 -7 mm set of 4.	1 set
74	Reamer parallel 12 - 16mm set of 5.	1 no.

75	Scraper flat 15 cm.	15 nos.
76	Scraper triangular 15 cm	15 nos.
77	Scraper half round 15cm	15 nos.
78	Chisel cold 9 mm cross cut 9 mm diamond.	15 each
79	Chisel cold 19 mm flat	15 nos.
80	Chisel cold 9 mm round noze.	15nos.
81	Stud Extractor EZY – out	2 nos.
82	Combination Set 30 cm.	2 nos.
83	Micrometer 0 – 25 mm outside.	3 nos.
84	Micrometer 25 – 50 mm outside.	3 nos.
85	Micrometer 50 –75 mm outside.	2 nos.
86	Micrometer inside 25 - 50 mm with extension rods.	1 no.
87	Vernier caliper 15 cm	1 no.
88	Vernier height gauges 30 cm.	1 no.
89	Vernier bevel protractor.	1 no.
90	Screw pitch gauge.	1 no.
91	Wire gauge, metric standard.	1 no.
92	Drill twist Taper Shank 12 mm to 25 mm x 1.5.	1 no.
93	Drill chuck 12 mm.	1 no.
94	Pipe wrench 40 cm	1 no.
95	Pipe vice 100mm	1 no.
96	Adjustable pipe tap set BSP with die set cover pipe size 15, 20, 25,32,38,50 mm.	1 no.
97	Wheel dresser (One for 4 units).	1 no.
98	Machine vice 10 cm.	1 no.
99	Machine vice 15 cm	1 no.
100	Sleeve drill Morse 0 - 1, 1 - 2, 2 - 3.	1 Set
101	Vice bench 12 cm jaws.	16 nos.
102	Vice leg 10 cm jaw.	2 nos.
103	Bench working 240 x 120 x 90 cm.	4 nos.
104	Almirah 180 x 90 x 45 cm.	2 nos.
105	Lockers with 6 drawers (standard size).	2 nos.
106	Metal rack 182 x 182 x 45 cm	1 no.
107	Instructor Table	1 no.
108	Instructor Chair	1 no.
109	Black board with easel.	1 no.
110	Fire extinguisher (For 4 Units)	2 nos.
111	Fire buckets.	2 nos.

112	Machine vice 100mm.	2 nos.
113	Wing compass 25.4 cm or 30 cm.	2 nos.
114	Hand hammer 1 kg. with handle.	2 nos.

C: Tools for Allied Trade- Blacksmith

Sl. No.	Name of the items	Qty
115	Hammer smith 2 kg. With handle.	4 nos.
116	Tongs roving 350mm.	4nos.
117	Tongs fiat 350mm.	4 nos.
118	Smith's square 45 cm x 30 cm.	1 no.
119	Cold set rodded 25X200mm.	2 nos.
120	Hot set rodded 25X200mm.	1 no.
121	Swages top & bottom 12 mm /19	1 Each
122	Swage block 35 x 35 x 12 cm.	1 no.
123	Flatters (rodded) 55 mm square.	2 nos.
124	Fuller top & bottom 6 mm 9 mm (Pair).	2 nos.
125	Anvil 50 kg.	2 nos.
126	Anvil stand	2 nos.
127	Shovel.	2 nos.
128	Trammer 30cm.	1 no.
129	Rake.	2 nos.
130	Quenching tank (To be made in the Institute).	1 no.
131	Pocker.	2 nos.
132	Hardle.	2 nos.
133	Leather apron.	2 nos.
134	Prick punch	2 nos.
135	Mallet.	2 nos.
136	Snips straight 25 cm.	2 nos.
137	Setting hammers with handle.	2 nos.
138	Planishing hammer.	2 nos.
139	Snip bent 25 cm.	2 nos.
140	Stake hatchet.	2 nos.
141	Stake grooving.	2 nos.
142	Gauge imperial sheet.	1 no.

The specifications of the items in the above list have been given in Metric Units. The items which are available in the market nearest of the specification as mentioned above, if not available as prescribed should be procured Measuring instruments such as steel rule which are graduated both English and Metric Units may be procured, if available.

Sl.No.	Name of the Tools & Equipment	Quantity
1.	Slip Gauge as Johnson metric set.	1 Set
2.	Carbide Wear Block 1 mm – 2 mm.	2 each
3.	Gauge snap Go and Not Go 25 to 50 mm by 5mm. Set of 6 pcs.	1 Set
4.	Gauge plug single 3 ended 5 to 55 by 5 mm. Set of 11 pcs.	1 Set
5.	Gauge telescopic upto 150 mm.	1 no.
6.	Dial test indicator .01 mm on stand	1 no.
7.	Sine bar 125 mm.	1 no.
8.	Sine bar 250 mm.	1 no.
9.	Lathe tools H.S.S. tipped set.	2 nos.
10.	Lathe tools bit 6 mm x 75 mm.	4 nos.
11.	Lathe tools bit 8 mm x 75 mm.	4 nos.
12.	Lathe tools bit 10 mm x 85mm.	4 nos.
13.	Arm strong type tool bit holder R.H.	2 nos.
14.	Arm strong type tool bit holder L.H.	2 nos.
15.	Arm strong type tool bit holder straight.	2 nos.
16.	Stilson wrenches 25 cm	2 nos.
17.	Pipe cutter 6 mm to 50 mm wheel type.	1 no.
18.	Pipe bender spool type up to 25 mm. with stand manually operated.	1 no.
19.	Adjustable pipe chain tonge to take pipes up to 300 mm.	1 no.
20.	Adjustable spanner 38 cm long.	1 no.
21.	Dial vernier caliper 0 – 200 mm LCO 0.05 mm. (Universal type).	1 no.
22.	Screw thread micrometer with interchangeable 0-25mm. Pitch anvils for checking metric threads 60.	1 no.
23.	Depth micrometer 0-25 mm. 0.01 mm.	1 no.
24.	Vernier caliper 0-150 mm. L.C. 0.02 mm.	1 no.
5.	Comparators stand with dial indicator LC 0.01mm.	1 no.
26.	Engineer’s try square (knife-wedge) 150 mm blade.	1 no.
27	Surface roughness comparison plates N1-N12 grade	1 Set

E : General Machinery Installations –

Sl. No.	Name & Description of Machines	Quantity
*1.	Lathe all geared head stock S.S. and S.C. height of centre over bed 15 cm – gap head complete with accessories e.g. pump, all fittings and splash guard driving plate with drives, face plate 3 jaw and 4 jaw chucks fixed and travelling steady compound turret tool post, taper turning attachment, fixed and running centres, driving dogs straight and bent tails.	2 Nos.
2	Drilling machine pillar sensitive 0-20 mm cap with swivel table motorised with chuck & key.	1 no.
3	Drilling machine bench sensitive 0-12 mm cap motorised with chuck and key.	2 nos.
4	Forge portable hand blower 38 cm to 45 cm.	1 no.
5	Grinding machine (General purpose) D.E. pedestal with 2 cm. dia wheels rough and smooth with twist drill grinding attachment.	1 no.

F : List of additional tools for allied trade in welding

Sl. No.	Name & Description of Machines	Quantity
1.	Transformer welding set 150 amps. – continuous welding current, with all accessories and electrode holder	1 Set
2.	Welder cable to carry 200 amps. With flexible rubber cover	20 Meter
3.	Lungs for cable	12 Nos.
4.	Earth clamps.	2 Nos.
5.	Arc welding table (all metal top) 122 cm X 12 cm X 60 cm with positioner.	1 No.
6.	Oxy – acetylene gas welding set equipment with hoses, regulator and other accessories.	1 Set.
7.	Gas welding table with positioner	1 No
8.	Welding torch tips of different sizes	1 Set
9.	Gas lighter.	2 Nos
10.	Trolley for gas cylinders.	1 No
11.	Chipping hammer.	2 Nos
12.	Gloves (Leather)	2 Pairs
13.	Leather apron.	2 Nos
14.	Spindle key for cylinder valve.	2 Nos.
15.	Welding torches 5 to 10 nozzles.	1 Set.
16	Welding goggles	4 Pairs.
17.	Welding helmet with coloured glass	2 Nos.
18.	Tip cleaner	10 Sets.

LIST OF ISI BOOKS FOR REFERENCE FOR FITTER TRADE.

(For use of Instructors only)

SL.No.	Titles	Code
1.	Springcalipers.	IS : 4052 – 1967
2.	Punches	IS : 413 – 1974
3.	Matric steel scales forEngineers.	IS : 1481 - 1970
4.	Engineerssquare.	IS : 2013 – 1972
5.	V-Block.	IS : 2049 – 1974
6.	Steel straightedges.	IS : 2220 – 1962
7.	Hacksawblades.	IS : 2504 -1977
8.	Benchvices.	IS : 2586 -1975
9.	Chisels (Cold)	IS : 402 -1974
10.	Engineer'sfile.	IS : 1931 -1972
11.	Surface plates(C.I.)	IS : 2285 – 1974
12.	Twistdrill	IS : 5100 – 1960 to 5106
13.	Vernierdepthgauges.	IS : 4213 – 1967
14.	Externalmicrometers.	IS : 2967 – 1964
15.	A dimension for counter – sinks &counterbores.	IS : 3406 – 1975
16.	Internalmicrometers.	IS : 2966 – 1964
17.	Verniercalipers.	IS : 3651 – 1974
18.	Vernierheightgauges.	IS : 2021 – 1964
19.	Gib – head keys and keyways.	IS : 2203 – 1974
20.	Taper keys and keyways.	IS : 2292 – 1974
21.	Screwdriver.	IS : 884 – 1972
22.	Bevelprotractors.	IS : 4229 – 1970
23.	Reamers.	IS : 1836 – 1961
24.	Thread cuttingdies.	IS : 1859 – 1961
25.	Metric screw threads (Metric threadpitch-gauges)	IS : 4211 – 1967
26.	Dialgauges.	IS : 2092 – 1962
27.	Hexagonal bolts andnuts.	IS : 2038 – 1968
28.	Feeler gauges (m.m.ranges).	IS : 3179 – 1976
29.	Spanners, openjaw.	IS : 2028 – 1968
30.	Thickness of sheet & diameters ofwire	IS : 1137 – 1950
31.	Centredrills.	IS : 6703 – 1977
32.	Lathe, sizes for generalpurpose.	IS : 2392 – 1963
33.	Recommendations for tapping drillsizes.	IS : 3230 – 1970
34.	Needlefiles.	IS : 3152 – 1965
35.	Plain pluggauges.	IS : 6137 – 1871
36.	Plain ring gauges(Go)	IS : 3435 – 1972
37.	Snap gauges (Go &NoGo)	IS : 3477 – 1973
38.	Slipgauges.	IS : 2984 – 1966
39.	Ball & roller Bearings gauging practicefor.	IS : 4025 – 1967
40.	V-belt for Industrialpurposes.	IS : 2404 – 1974
41.	Limits & fits for engineering, recommendationsfor	IS : 919 – 1963
42.	Plain limit gauges tolerancesfor.	IS : 3455 – 1971
43.	Rivets for generalpurposes.	IS : 2155 – 1961
44.	Tapers for general engineeringpurposes.	IS : 3458 – 1966
45.	General Engineeringdrawing.	IS : 696 –