

DRAFT
Syllabus for the trade
Of
**MECHANIC MACHINE TOOL
MAINTENANCE**
UNDER
Modular pattern
Of
CRAFT INSTRUCTOR TRAINING SCHEME

**TRADE TECHNOLOGY-I
(T T-I)**

Duration:- 3 Months / 13 weeks
Designed in - 2010

Government of India
Ministry of Labour & Employment
Directorate General of Employment and Training
ADVANCED TRAINING INSTITUTE
KOLKATA
DASNAGAR, HOWRAH
WEST BENGAL - 711105

List of member attended the Trade Committee Meeting to finalise the Draft Syllabus for the trade of **Mechanic Machine Tool Maintenance** under Modular Pattern of Craft Instructor Training Scheme of **Trade Technology-I (TT-I)**, held on 26.2.2010, at Advanced Training Institute Kolkata.

SI.NO.	Name & Designation S/Shri/Smt.	Organisation
1.	N. K. CHATTERJEE, DIRECTOR	A.T.I. KOLKATA
2.	J UKIL, JDT	A.T.I.KOLKATA,
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10.	SANDIP GHOSH, HEAD – PROJECTS	TATA STEEL PROCESING AND DISTRIBUTION LTD.
11.	PALASH BHOWMIK, DEPUTY MANAGER	NATIONAL SMALL INDUSTRIES CORP.
12.	P. ADHIKARI, FACULTY	THE GEORGE TELEGRAPH TRAINING INSTITUTE, KOLKATA
13.	N. C. DE, D.G.M (HRD)	TEXMACO LTD. KOLKATA
14.	DEBJIT MUKHERJEE, SR. MAINT. ENGG	BRIDGE & ROOF CO.(I)LTD., HOWRAH
15.	ANIL KUMAR DAS, SUPERVISOR	REP. OF GOVT. OF W. B.
16.	LAKSHMI KANTA POLLEY, INSTRUCTOR	DO
17.	SUBRATA POLLEY, INSTRUCTOR	DO
18.	A. K. KARMAKAR, MD	REP. OF CII
19.	S. P. JANA, REP. OF CSAD -PRESIDENT	CENTRAL STAFF ASSOCIATION OF DGET KOLKATA
20.	G. C. SAHA, ADT	A.T.I. KOLKATA
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29.	B. N. HEMBRAM, TO	A.T.I.KOLKATA
30.	U. K. SARKAR, VI	A.T.I. KOLKATA
31.	P. K. BAIRAGI, VI	A.T.I. KOLKATA
32.	DINESH KUMAR, V.I	A.T.I. KANPUR
33.	S. GHOSH, SR. D/MAN	A.T.I. KOLKATA

GENERAL INFORMATION

- 1. Name of the Trade: Mechanic Machine Tool Maintenance**

- 2. N. C. O. Code No. : 845.50**

- 3. Name of the Module : Trade Technology – I**

- 4. Duration : 03 Months**

- 5. Entry Qualification : Candidate who have passed Diploma in relevant branch of Engineering or National Apprenticeship Certificate in the concerned trade or National Trade Certificate with one year Practical Experience in concerned trade.**

COURSE STRUCTURE

Module :- TRADE TECHNOLOGY- I (TT-I)

Sl. No.	Components	Units	Allotted Time/week	Allotted Time/module
1.	Trade Technology	a) Theory	14 hrs/wk	14x13=182hrs
		b) Practical	25hrs/wk	25x13=325hrs
2.	Library	C) Library	1hr/wk	1x13=13hrs
			40hrs. / wk	520 hrs. / module

Duration: 3 Months / 13 Weeks.

OBJECTIVE

THE OBJECTIVE OF THE COURSE IS TO TRAIN INSTRUCTORS USING I.C.T & C.B.T. IN THE TECHNIQUES FOR IMPARTING TRAINING ON LATEST KNOWLEDGE IN THE RELATED TRADE KEEPING IN VIEW OF THE PRESENT AND FUTURE GLOBAL INDUSTRIAL REQUIREMENTS, SO THAT SEMI-SKILLED / SKILLED MAN POWER OF THE COUNTRY MAY BECOME ENABLE TO COMPETE IN THE GLOBAL MARKET.

**SYLLABUS FOR MODULAR PATTERN
OF
CRAFT INSTRUCTOR TRAINING SCHEME
TRADE: MECHANIC MACHINE TOOLS MAINTENANCE
TRADE TECHNOLOGY – I (TT- I)**

WEEK NO	THEORY	PRACTICAL
1.	<ul style="list-style-type: none"> • Importance of trade in the developments of industries. • General safety rules and safe working habits. • Accidents and their causes • First aids, common causes of fire, types and fire fighting equipments. • Use of safety devices, guards and attachments. <p><u>Various types of hand tools</u></p> <ul style="list-style-type: none"> • File – Specification, types and use. peening of file, convexity of file, re-conditioning of files. • Hacksaw - specification and uses, types of hacksaw frame and blade, setting of teeth. 	<p>Maintenance and House Keeping.</p> <p>Basic fitting-practice filing, sawing, chipping, drilling, tapping, dieing, reaming, measuring and layout work.</p>
2.	<p><u>Various types of hand tools</u></p> <ul style="list-style-type: none"> • Hammer – different parts, types, specification and uses of hammer. • Chisel - types of chisel, specification, different cutting angle and their application, sharpening of chisel. • Scrapers - different types and their correct uses. • Scraping - importance of scraping, advantages, different method of scraping. Scraping procedure for producing flat surfaces, checking of scrapped surfaces. Use of spirit level. 	<p>Scraping on flat & curved surfaces taking impression for high spot using Prussian blue. Sharpening of scrapers using diamond wheel and oil stone. Inspection & checking of scrapped surfaces.</p>
3.	<p>Hand tools used for dismantling & re-assembly and their specifications:</p> <ul style="list-style-type: none"> • Types of spanner – materials and uses (box, socket, tubular, hook-spanner). • Wrenches – Kinematics, material and uses. • T-socket, monkey, ratchet, pipe wrench, chain wrench, etc. • Type of pliers - material and uses. • Punch-types, material and uses (pin 	<p>Dismantling and overhauling of different types of vices and other holding devices. Dismantling & assembly of pipe fittings.</p>

	<p>punch & hollow punch drives punch).</p> <ul style="list-style-type: none"> • Threaded fastener:- • Nut and lock Nut - types and function. • Bolt - types and function. • Screws - types and application. • Washers - types and application. • Key and cotters - classification, and comparison. • Circlips and split pin- types and use 	
4 & 5	<p>Metrology :- Introduction to measuring checking and inspection instruments. Meaning of precision and accuracy. Errors in measurements and estimation of errors. Measurement with non precision instrument linear, angular and circular measurement. Measurement with precision instrument: - linear, angular and circular measurement. Type of gauges, slip gauges and sine bar - principle of working and application thereof. Dial test indicators: - types, construction and use. Types of Comparators: - electrical, optical & pneumatic: - construction and working principle. Definition of surface finish – terms used to describe the surface finish dimensional. Tolerance of surface finish. Surface quality and symbolic re-presentation. Instruments used for testing/measuring surface quality. Unit of surface finish. Surface finishing process:- Lapping, Honing, Electro-plating. Metal spraying, Galvanizing Pickling and Metallization. Elements of inter- changeable system. Interchangeability and its terms as per BIS. Introduction to Thread and Gear Measurements.</p>	<p>Use of simple measuring instruments such as – steel rule, vernier caliper. Inside and outside micrometer: - depth micrometer precautions to be observed in handling these instruments. Layout of the work piece using vernier height gauge, engg. Square, angle plate, V-block, C-clamp and surface plate. Application and use of dial test indicator, slip gauges, height master & other measuring instruments. Measurement of co-ordinate, centre distance, angles, concentricity, eccentricity, dove tail, slot etc. Measurement of various elements of thread, spur gear etc.</p>
6.	<p>Introduction of drilling m/c construction and types. Method of drives (size capacity) and specification of drilling m/c. special features and maintenance of drilling m/c, drilling defect and their causes i.e. P.C.D., off-centre, on-centre. Safety precaution to be observed while working on a drilling m/c. work and drill holding devices. Constructional features function and use of shaping machine. Working principle used in quick return mechanism.</p>	<p>Preparation for drilling, marking out the position of holes. Marking, deepening the points with the centre punch and centre drill. Drilling practice. Sharpening of drill bits. Functional relationship of various parts of shaping m/c. Grinding of different types of shaping tools. Demonstration of Quick Return mechanism.</p>

	<p>Setting of length and position of stroke. Holding of work piece and tools (cutting). Speed and feed of shaping machine. Use of coolant for different materials. Detection of common faults and their rectification.</p>	<p>Use of different work and tool holding devices for performing different shaping operations. Safety pre-caution in handling m/c, use of lubrication system and preventive maintenance.</p>
7.	<p>Constructional feature, types, function and use of lathe m/c. and its accessories and attachments. Driving mechanism of lathe machine. Lathe tools, material and use. Cutting angles and different lathe operations. Constructional feature and working principle, types, function & use of milling m/c. Attachment and accessories. Use of dividing head for indexing. Different types of milling cutter, material use, cutting angle and different milling operations. Identification of Lubrication & oil points in lathe and milling machines.</p>	<p>Perform different lathe operations. Use of lubrication system and preventive maintenance of lathe machine. Perform different milling operations. Use of lubrication system and preventive maintenance of milling machine. Resharpener of single / multipoint cutting tools.</p>
8.	<p>Constructional features, types, function, use of different grinding m/c. Grinding wheels types and their specification. Use of grinding wheels, balancing, truing and dressing. Commonly used pipes and tubes – difference between pipes and tubes, material and specification. Use of pipes for hydraulic, pneumatic and lubricating system. Using various pipe fittings and purposes. Cold and hot bending of pipes of different diameters of ferrous materials for hydraulic pipes and non-ferrous metal i.e. copper tubes for lubricating system. Method of protecting leakage at the joint.</p>	<p>Mounting of grinding wheels, balancing, truing, dressing. Safety precaution to be observed while using grinding m/c, use of lubrication system and preventive maintenance. Demonstration of different driving mechanism (mechanical and hydraulic). Pipe cutting using pipe cutter, standard pipe thread cutting using taps, dies and chasers. Punching of holes on leather with hollow punches. Preparation of Gasket and other packing material.</p>
9.	<p>Objective & types of different types of power transmission devices and drives – Belt, Pulley, Chain, Sprocket, Gear, Rack and Pinion Clutch coupling etc. Study of individual drive system with specific uses – reciprocating, cams crank and drives. Rotary to linear drive and vice-versa, power transmission elements shafting – line shafts, type of shaft - rigid, flexible and hollow. Type of pulleys – solid, split, v-grooved step, cone, taper guided and jockey or rider pulleys their functions and uses. Specification and selection for pulleys for specific application. Consideration of drive to</p>	<p>Testing and preparation of report for selection of the type of belt with consideration of load and tension. Leather belt – method of joining the ends, their specific advantages. V-belt standard specification and their advantages and disadvantages. Using of Matched set of belts. Removing gear box from various machines for</p>

	<p>driven ratio, crowning of pulleys. Fast and loose pulleys. The function of belts, types, specification, use and material use for belt. Belt fasteners - different types, advantage and disadvantage of each other.</p> <p>Frictional and universal coupling, advantages and disadvantages over each other and their application.</p>	<p>inspection and demonstration of gear trains and their functional relationship. Assembly of the gear box and remounting to the m/c. Demonstration on coupling. Key – fitting procedure and removing. Use of keys in power transmission.</p>
10.	<p>Bearings, its types and use. Bearing materials and their properties. Constructional feature of ball and roller bearing, housing and lubrication of bearing.</p> <p>Use of filler gauge and dial test Indicator. Inspection of m/c guide ways and slides. Checking for straightness flatness, scoring marks and condition of oil grooves and wear. Study of feed mechanism – Methods of removing, dismantling, cleaning and oiling of its median elements, assembly and remounting to its position and testing. Driving mechanism of lathe - carriage, apron, feed box, head stock. Driving mechanism of Milling – feed gear box (column, knee, saddle). Rapid traverse gear box, Intermediate gear box.</p>	<p>Dimensional relationship of the shaft with bearing. The type of load, method of clamping and fitting the bearing in the housing, method of mounting and dismantling, uses of pullers and extractors, maintenance and inspection of bearing . Adjustment of job wedges for setting the gap. Dismantling simple mechanism such as machine vice, three jaw chuck, indexing head, tail stock, slotting attachment, coolant pump, using various hand tools with specific reference to functional parts of their machine elements cleaning and oiling of dismantled parts assembling and testing of operation.</p>
11.	<p><u>Tribology:</u> Friction – its effects, types and method of reducing friction, types & use of lubricants with specification. Lubrications - need and use. Properties and quality of good lubricant, Viscosity of the lubricant. Method of lubrication - by gravity feed, force feed, flash lubrication. Common lubricating oil and greases. Their specification and commercial name, selection of lubricant. Sealing and packing element. Detection of common fault and their rectification in general. Materials used for leak proof joint. Importance of periodic monitoring of Lubricants.</p>	<p>Method of repairing damage parts, major overhauling, reconditioning of machine, method of reconditioning. Measuring instruments used in reconditioning. Special tools, test mandrel, different gauges, spoiling gauges, grease used in reconditioning. Preparation of test chart. Dismantling and overhauling of pedestal grinding m/c, sensitive drilling m/c, cleaning and lubricating, assembly and testing.</p>
12.	<p>Allied Skill: <u>Welder(G & E):</u> Over view of welding, principle of fusion welding processes. Tools and equipments.</p>	<p>Connecting and setting of Arc welding plant and gas welding plant. Hands on practice on Arc, Gas and spot welding.</p>

	<p>Type of welding joints and positions. Welding defects – causes and remedies. Flame cutting-principles and use of equipments. Safety precaution and maintenance of equipments. Symbols of Welding.</p> <p><u>Sheet Metal Worker(SMW):</u> Over view of SMW, name and description of common tools and equipments. Different type of joints employed in sheet metal work. Rivet and Riveting. The object of riveting, the relation between the size of rivet and thickness of the sheet. Pitch of the rivet, rivet types, uses, method of riveting using snap and dolly. Riveted joints – defects in riveting and their remedies.</p>	<p>Safety to be observed in welding work. Flat, horizontal and vertical position of welding. Practice in brazing of ferrous and non ferrous metal.</p> <p>Familiarisation and Uses of Hand tools in the SMW trade. Development of surfaces from working drawing. Marking out location and drilling of holes for riveting. Use of dolly and snap for forming rivet heads. Lap and butt joint by cold riveting.</p>
13.	Revision, Industrial Visit and Final Examination.	

LIST OF TOOLS & EQUIPMENTS

FOR THE TRADE OF

MECHANIC MACHINE TOOL MAINTENANCE
(TT - I)
UNDER MODULAR PATTERN

FOR

CRAFTS INSTRUCTOR TRAINING SCHEME

FOR A BATCH OF

16 TRAINEES AND ONE TRAINER

LIST OF TOOLS & EQUIPMENT

Sl.No.	Name of tools & Equipments	quantity
1.	Steel rule 300 mm	5Nos.
2.	Inside Caliper 150 mm (spring)	5Nos.
3.	Outside Caliper 150 mm. (spring)	5Nos.
4.	Divider 150 mm. (spring)	5Nos.
5.	Hermaphrodite caliper 150 mm.	5Nos.
6.	Try Square 150 mm.	5Nos.
7.	Hacksaw Frame adjustable Type.	5Nos.
8.	Hammer Ball Peen 200gm.with handle.	5Nos.
9.	Hammer Ball Peen 400.with handle.	5Nos.
10.	Cold Chisel 20x200 mm	5Nos.
11.	Cross cut Chisel 10x150 mm.	5Nos.
12.	Half round Chisel 10x150 mm.	5Nos.
13.	Diamond point Chisel 10x150 mm.	5Nos.
14.	Centre Punch 100mm.	5Nos.
15.	Prick Punch 100mm.	5Nos.
16.	File Flat Bastard 300mm.	17Nos.
17.	File Flat 2nd cut250	17Nos.
18.	File Flat Bastard 350mm.	17Nos.
19.	File Flat smooth 200mm.	17Nos.
20.	Round Nose Pliers 200mm.	5Nos.
21.	Combination Pliers 200mm.	5Nos.
22.	File half Round 2nd cut 250mm.	17Nos.
23.	File Three sq. Smooth 200mm.	17Nos.
24.	File Round Smooth 200mm.	17Nos.
25.	File Square Smooth 200mm.	17Nos.
26.	File Needle Set of 12 nos.	5Sets
27.	Scraper A 250mm. (Flat)	5Nos.
28.	Scraper B 250mm(Triangular)	5Nos.
29.	Scraper D 250mm(Half Round)	5Nos.
30.	Spindle Blade Screw Driver 100mm	5Nos.
31.	Screw Driver 200 mm.	5Nos.

32.	Allen Hexagonal keys 2 to 16 mm.	5Sets
33.	File Card	17Nos.
34.	Scriber 150x3 mm.(one side offset)	5Nos.
35.	Offset Screw Driver	5 Nos.
36.	Screw Driver 300 mm heavy duty	5 Nos.

Note:- Trainees Tool kit for a Group of 4 Trainees.

TOOLS & INSTRUMENTS FOR MAINTENANCE SHOP

Sl.No.	Name of tools & Equipments	quantity
1 .	Master Flat-scraping test bar 600mm, Length 75*75mm sq. in cross section all sizes scraped to an accuracy of 0.02 mm. per 300mm. seasoned.	1 No.
2.	Tap and die set M6 to M12 with necessary tap wrench and die holder	1 Set
3.	Spanner Socket set of 25 pieces (10 to 25,27,30,32mm=18 pcs and accessories =7 Nos.)	1 Set
4.	Hammer Soft (faced 30 mm dia. Plastic tipped)	4 Nos.
5.	Pipe Wrench 450 mm .	2 Nos.
6.	Chain Pipe Wrench 650 mm.	1 No.
7.	Self alignment Roller ball bearing	1 No.
8.	Telescopic gauges 13 mm to 300 mm	1 Set
9.	Lubricant trolley 2400x200x1200mm (8 chamber)	1 No.
10.	Collapsable tool Kit 5 compartments	1 No.
11.	Tap Extractor	2 Nos.
12.	Linear Actuator (single & double acting Cylinder)	1 each
13.	Vibrometer	1 No.
14.	Machine tool calibrator	1 No.

15.	<i>Lathe tool Dynamometer</i>	<i>1 No.</i>
16.	<i>Stud Extractor.</i>	<i>2 Nos.</i>
17.	<i>Magnifying glass 75 mm.</i>	<i>2 Nos.</i>
18.	<i>Pin spanner set .</i>	<i>1 Set</i>
19.	<i>Hand keyway broacher</i>	<i>1 No.</i>
20.	<i>C.I. Surface plate 400x400 mm with wooden stand and cover</i>	<i>1 No.</i>
21.	<i>Head lamp</i>	<i>2 Nos.</i>
22.	<i>Pneumatic scraper with adjustable stroke</i>	<i>2 Nos.</i>
23.	<i>Hydraulic wheel and bearing puller</i>	<i>1 No.</i>
24.	<i>Master test Bar (Different sizes)</i>	<i>1 Set</i>
25.	<i>Spirit level 150 mm</i>	<i>2 Nos.</i>
26.	<i>Gasket Hollow Punches 5, 6,8,10,12,19,25 mm. dia .</i>	<i>1 each</i>
27.	<i>Bar Type Torque Wrench up to 14 kgf - m.</i>	<i>1 No.</i>
28.	<i>Cam Lock Type Screw Driver</i>	<i>1 No.</i>
29.	<i>Flaring Tool</i>	<i>1 No.</i>
30.	<i>Tube Expander up to 62 mm.</i>	<i>1 Set</i>
31.	<i>Circlip Pliers 150mm (inside and outside, straight & Bend)</i>	<i>1 each</i>
32.	<i>SRDG Ball Bearing DRDG Ball Bearing ,Self aligning Ball Bearing, SRAC Ball Bearing ,Needle Bearing, Single Row Cylindrical Roller Bearing, Tapered Roller Bearing, Plain Bush Bearing, Thin walled Bearing.</i>	<i>1 each</i>
33.	<i>Viscometer. (Red Wwood)</i>	<i>1 No.</i>
34.	<i>Adjustable spanner 12''</i>	<i>2Nos</i>
35.	<i>Adjustable spanner 8''</i>	<i>2Nos</i>
36.	<i>Adjustable spanner 6''</i>	<i>2Nos</i>
37.	<i>Screw driver heavyduty-12''</i>	<i>4 Nos.</i>
38.	<i>Screw driver medium duty-10''</i>	<i>4 Nos.</i>
39.	<i>Screw driver light</i>	<i>4 Nos.</i>

PRECISION INSTRUMENT

Sl.No.	Name of tools & Equipments	quantity
1.	Vernier height Gauge 0-300mm, Accuracy 0.02mm.	2 Nos.
2.	Vernier Bevel Protractor with 150 mm blade, L.C=5 (5 min)	2 Nos.
3.	Vernier Caliper 200mm (0-200mm), L.C=0.02mm.	8 Nos.
4.	Digital Caliper 200mm (0-200mm)	2 Nos.
5.	Dial Caliper 200mm (0-200mm), L.C=0.02mm, 2mm/Rev.	2 Nos.
6.	Outside Micrometer 0 to 25 mm. L.C=0.01mm and Outside Vernier Micrometer L.C.=0.001mm	Each 2 Nos.
7.	Outside Micrometer 25 to 50mm. L.C=0.01mm and Outside Vernier Micrometer L.C.=0.001mm	Each 2 Nos.
8.	Outside Micrometer 50 to 75 mm. L.C=0.01mm & Outside Vernier Micrometer L.C.=0.001mm	Each 1 Nos.
9.	Outside Micrometer 75 to 100 mm. L.C=0.01mm & Outside Vernier Micrometer L.C.=0.001mm	Each 1 Nos.
10.	Combination Set 300 mm	4 Nos.
11.	Sine Bar 200 mm .	2 Nos.
12.	Slip gauge (Tungsten carbide, Grade I 112 nos.)	1 Set
13.	Internal Micrometer 12 to 20 mm. (3 point)	2 Nos.
14.	Gear Tooth Vernier Caliper (Metric)	1 No.
15.	Bevel Gauge 200	1 No.
16.	Plunger Dial Gauge 0-10mm L.C=0.01mm with magnetic stand	2 Nos.
17.	Plunger Dial Gauge 0-1mm L.C=0.001mm with magnetic stand.	2 Nos.
18.	Feeler Gauge (0.05mm to 1.0mm)- No. of leaves =20	3 Sets.

19.	Radius Gauge upto 7.0mm & 1. 0 to 7mm. 2. 7.5mm to 15mm.	1 set each.
20.	Screw pitch gauge for metric pitches (0.35 to 6mm)	1 No.
21.	Centre gauge 60 Deg.	1 Nos.
22.	Plug Gauge Plain (5 to 25 by 2.5mm)(Go&NoGo)	1 Nos.
23.	Ring gauge morse Taper No. 1,2,3,4	1 Set
24.	Drill sleeves morse Taper 1-2, 2-3, 3-4, 4-5	1 Set
25.	Ring Gauge 5 to 25 by 2.5 mm.(Go & No Go)	1 Set
26.	Standard Wire Gauge (swa)	1 No.
27.	Dial Bore Gauge to (20-25mm) L.C.=0.01mm	2 Nos.
28.	Straight Edge 485mm to 1445mm.	1 Set

MACHINIST TOOLS

Sl.No.	Name of tools & Equipments	quantity
1.	Cylindrical Milling Cutter B 63X90	1 No.
2.	Side and Face Milling Cutter B 160X10	1 No.
3.	Side and Face Cutter B 160X10 (Inserted type)	1 No.
4.	Slot Milling Cutter B 10x6	1 No.
5.	Equal angular Cutter 45 deg. /100	1 No.
6.	Equal angular Cutter 60 deg. /100	1 No.
7.	Single angle Cutter B 63X18X45 dg.(LH) and (RH)	1 Each
8.	Single Angle Cutter B 63X18X60 deg. (LH) and (RH)	1 Each
9.	End mill cutter (key seating) 3,4,5,6,8,12 mm. parallel shank.	1 Set
10.	Slitting Saw B 80X3	1 No.
11.	Slitting Saw B 100X4	1 No.
12.	T-Slot Cutter to suit T headed bolt	1 Each

	<i>of 10,12 mm S.S</i>	
13.	Convex Milling Cutter 4,10,20 mm.	1 Each
14.	Concave Milling Cutter 4,10,20,mm	1 Each
15.	Corner rounding milling cutter 2.5,4,10,16 mm.	1 Each
16.	Woodruff key seating cutter A 13.5X3,A 16X4,A 19.5X5,A 19.5X6	1 Each
17.	End Mill Cutter SS 3,6,10,12,16,18,22, mm.	1 Each
18.	Milling gear Cutter (Involute) (1,2,3,5-3 module of 8 cutter)	1 Set each
19.	Fly Cutter Holder	1 No.
20.	Engineers Parallel	1 Set
21.	Scribing block universal 300mm.	4 Nos.
22.	V-Block 100/7-80-A	1 Pair
23.	Table Chuck 3 Jaw with tightening arrangement and graduated in degrees.	1 No.
24.	Machine Vice 200mm Swivel Base	1 No.
25.	Machine Vice Swivel Base 160 mm.	1 No.
26.	Angle plate size 4 with slots.	1 No.
27.	Angle plate adjustable 250X150X175 mm.	1 No.
28.	Twist drill 3 to 13mm. (SS)	1 Set
29.	Twist drill 13 to 25mm by 1mm step. (TS)	1 Set
30.	Grinding wheel dresser (Diamond) 1.5 carret.	1 Set
31.	"C" clamp 150mm. and 200mm.	1 Pair each
32.	Hand reamer 6to 25 mm. by 1mm.	1 Set
33.	Engraving / Etching machine	1 No
34.	Mandrel 120 mm. long different sizes.	1 No.
35.	Wheel balancing stand with its accessories.	1 Set
36.	Pin punch 3 to 10 mm by 1 mm step.	1 Set
37.	Deep cutting hacksaw frame 300mm.	4 Nos.

38.	<i>Machine reamer 6to 25 mm. by 1 mm step.</i>	1 Set
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LATHE TOOLS

Sl.No.	Name of tools & Equipments	quantity
1.	<i>Drill Chuck 13 mm.</i>	1 No.
2.	<i>Reduction Sleeve and Extension Sockets</i>	1Each
3.	<i>Centre Drill 1-5</i>	1 Set
4.	<i>Revolving Centres with Arbor</i>	2 Nos.
5.	<i>Knurling Tool with holder (straight, & diamond)</i>	1 Set each.
6.	<i>Lathe Carriers upto 7 mm (10 to 75mm)</i>	1 Set
7.	<i>Oil Stone 150X50X25 mm.</i>	4 Nos.
8.	<i>Oil can 250 ml.</i>	2 Nos.
9.	<i>Hand grease gun</i>	2 Nos.
10.	<i>Boring Tool Holder (Armstrong)L.H 8 and 10 sq. Bit SizeXLength 200mm.</i>	2each.
11.	<i>Tool Holder 8 and 10 sq. bit 2 straight</i>	2 Nos.

GENERAL MACHINE

Sl.No.	Name of tools & Equipments	quantity
1.	<i>Lathe general purpose all geared height of centre 150 mm, between centers 1000 mm with all accessories</i>	2 Nos.
2.	<i>Milling Machine, Universal horizontal (motorized) with all attachments. Such as Universal Head Vertical Head Slotting attachment Rach cutting attachment Rotary Table Dividing Heat Adaptors, Arbors & collets for ss & mill from 3mm to 30mm.</i>	1 No.

3.	Surface Grinding Machine Wheel dia .180 mm. reciprocating table longitudinal table traverse 200mm full motorized supplied with magnet chuck 250 *120mm and necessary accessories .	1 No.
4.	Cylindrical Universal Grinding Machine with All accessories.	1 No.
5.	Drilling Machine Pillar 20 mm capacity	1 No.
6.	Pedestal grinder 250 mm wheel Dia-	1 No.
7.	Flexible Hand Grinder 100 mm. dia .	1 No.
8.	Portable Drilling Machine 10 mm. capacity	1 No.
9.	C.N.C Trainer	1 No.
10.	Shaping machine 450 mm stroke (motorized)with all attachments	1 No.
11.	Pipe bending machine (Hydraulic)	1 No.

MACHINE FOR REPAIR AND RECONDITIONING

Sl.No.	Name of tools & Equipments	quantity
1.	Old centre Lathe	2 Nos.
2.	Old Milling Machine (Universal)	1 No.
3.	Old Grinding Machine (Universal)	1 No.
4.	Old Shaping Machine	1 No.
5.	Old Press (power)	1 No.
6.	Old Turret & capstan Lathe	1 No.
7.	Universal Indexing head	1 No.
8.	Revolving Centre	1 No.
9.	Tail stock	4 Nos.
10.	Gear Box (old)	4 Nos.

WELDING WORK (GAS WELDING)

Sl.No.	Name of tools & Equipments	quantity
1.	Oxy-Acetylene Welding Cylinder Trolley	1 No.
2.	Welding Hose of P.V.C. flexible 1.D=6mm Blue & Red	5 mtr.each
3.	Hose Coupling Nipples	2 Nos.
4.	Hose protractor	2 Nos.
5.	Double stage pressure regulator (oxgn.) and double stage pressure Regular (acety).	1 Each
6.	High PR. Blow pipe with Tips.	1 No.
7.	Gas Cutting Torch with cutting tips	1 No.
8.	Welding gloves pair (Leather)	4 Pairs
9.	Goggles (4 A) for Gas welding	4 Nos.
10.	Spark Lighter	4 Nos.
11.	Spindle key	1 No.
12.	Gas welding table with fire bricks	1 No.

(ARC WELDING)

Sl.No.	Name of tools & Equipments	quantity
1.	DC Welding Generator 150-300 amps .Capacity with all accessories.	1 No.

SHEET METAL WORK

Sl.No.	Name of tools & Equipments	quantity
1.	Forge Power Operated 45 mm. dia.150 mm blower	1 No.
2.	Soldering Copper Bit 450 gm, hathet Type & straight type.	1 Each
3.	Metal Cutting Shears 350mm.	2 Nos.
4.	Mallet (plastic or rose wood) rod. and	2 each.

	<i>rectangular 75*75*100 mm.</i>	
5.	<i>Conical Mallet</i>	<i>1 No.</i>
6.	<i>Half Moon Stake</i>	<i>1 No.</i>
7.	<i>Bebk Iron</i>	<i>1 No.</i>
8.	<i>Funnel Stake</i>	<i>1 No.</i>
9.	<i>Hatchet Stake</i>	<i>1 No.</i>
10.	<i>Snap Rivet set A-3,B-4.</i>	<i>1 No.</i>

ERECTION TOOLS & EQUIPMENT

<i>Sl.No.</i>	<i>Name of tools & Equipments</i>	<i>IS :Code No.</i>	<i>quantity</i>
<i>1.</i>	<i>Plum bob</i>		<i>1 No.</i>
<i>2.</i>	<i>Square box wrenches</i>		<i>1 No.</i>
<i>3.</i>	<i>Square Tee wrenches</i>		<i>1 No.</i>
<i>4.</i>	<i>Engineers square 700 mm.</i>		<i>1 No.</i>
<i>5.</i>	<i>Threaded fastner type-B</i>		<i>1 No.</i>
<i>6.</i>	<i>Threaded fastner type-C</i>		<i>1 No.</i>
<i>7.</i>	<i>Threaded fastner type-F</i>		<i>1 No.</i>

Computer & its accessories:

<i>Sl. No.</i>	<i>Name of tools & Equipments</i>	<i>quantity</i>
<i>1.</i>	<i>Computer with UPS, Printer and Necessary Software (Latest Version)</i>	<i>1 no.</i>
<i>2.</i>	<i>LCD Projector with screen</i>	<i>1 no.</i>

FURNITURE

Sl.No.	Name of tools & Equipments	quantity
1.	Metal lockers 8 lockers type with individual locks 1980X910X480 mm.	2 Nos.
2.	Metal office chair with arm, cane sit and back.	1 No.
3.	Metal office table with 3 drawers.	3 Nos.
4.	Work bench : Wooden -100ftx4 ft X 3 ft with 6 cupboards.	4 Nos.
5.	Metal shelving rack open type 1800X900X500 with adjustable shelves.	4 Nos.
6.	Drawing Desk	1 No.
7.	Stool	8 Nos.
8.	Black Board with easel Milky Glass with Graph Line	1 No.
9.	Portable fire extinguisher	2 Nos.
10.	Galvanized mild steel fire bucket 4 liters	4 Nos.
11.	Table for computer, printer and LCD projector	1 each.
12.	Computer Chair	2 Nos.
13.	Almirah for keeping computer accessories.	1 No.