

**Annexure-III**

<b>Name of the Laboratory: Workshop</b>				
<b>(a) Carpentry</b>				
<b>Sr. No.</b>	<b>Name of Equipment</b>	<b>Technical Specification</b>	<b>Minimum Qty./Nos Required</b>	<b>Remark If any</b>
1	Circular saw	Heavy duty motorized circular saw with heavy machine table, circular saw blade running on double row ball bearing, saw guard ,rib fence etc. with motorization attachment with 5HP AC440 V,3/50 Hz. motor starter, switch, Blt with with 750mm dia saw Blade size of the table about 1050mm x 680mm, maximum depth of cut 275mm	1	
2	Jig - saw	300mm x 300mm table having depth of throat 300mm, depth of cut 50mm with 1/2 HP motor, & starter.	1	
3	Wood Planer	2 HP / 440 V AC, 3 phase 50 Hz. Motor with starter Heavy duty Maximum width of plank 300mm max planning height 200mm ,length of table 1100mm.	1	
4	Drilling Machine Bench Type	13mm capacity, motorized bench Drilling Machine, 600 to 4000 r. p. m., complete with motor pulley , V- belt, 1/4 HP AC 220 V single phase 50Hz electric motor , size of table 250mm x 250mm .	1	
5	Universal wood working Machine	14 in one wood working machine with motor and operating tool circular saw blade 203mm dia 28 teeth, Bandsaw Blade 10mm wide, 4mm thick, Spindle cutter 12mm dia. Sanding disc 203mm, spindle sefety stop with top & side guide parallel fence & auxilary fence for circular saw & bandsaw . Operating Instruction & service manual Disc drive motor 2880 rpm with all attachments.	1	
6	Bench Grinder	Double ended bench grinder with 1HP 3 Phase 50 cycles 440 V and one side rough and other side smooth 250mm x 25mm x 16mm grinding wheel complete with wheel guard , tool rest and rotary switch.	1	

7	Hand Tools Kit	Tools such as chisels of various Types & Sizes and Auger Bit auger, handsaw, Tenon saws Mallets, spoke shave, Hold Fast, Clamp etc .	15 Sets	
8	Vice	Carpentry Bench Vices,	15	
9	Wood Turning Lathe	Floor model,complete with standard accessories & electricals Leangth of bed :- 1800mm Height of centre:- 200mm Distance between centre :- 1200mm H. P. of motor :- 1 AC 440 V. 50 hz 1440rpm Compound saddle, o/s turning attachment, true chuck , live centre	3	
10	Measuring Tools & Gauges	Marking Gauge, Carpenter Scale, Foot Rule, Measuring Tape etc.	15 sets	
11	Work Bench	1800 x 1200 x 750 mm	08	

**(b) Fitting Shop**

Sr. No.	Name of Equipment	Technical Specification	Minimum Qty./Nos Required	Remark If any
1	Marking Table with scribes	Black Granite surface flat, non magnetic non glaring, planing accuracy as per is of size 1000mm x 630mm x 150mm of grade P B B with slab carbide scriber 150mm.	2	
2	Surface plate	C. I. Surface plate , planed , hand swapped and seasoned , Brown & sharp type ribbing complete with handles for lifting & wooden protector cover. Conforming to IS- 2285 - 1963 .1) 450 mm x 450 mm. or 2) 450 mm x 600 mm .	2	
3	Measuring Instruments, Marking Instruments , Fitting Hand Tools	Vice block height gauges , vernier calipers, outside and inside calipers, micrometers, bevel protractor, files of different sizes and grades, Hacksaw frames, chisels, steel rules, try squares, drills, surface gauge, Number punch, dot punch, Divider , Angle plate screw drivers, spanners etc.	2 Each	
4	Tap & dia set.	Both tap and dia set complete in box with accessories 0 - 10 BA , 1/4 " to 1 " BSF, 1/2" to 3/4" NF , 1/4" to 3/4 " NC, 6mm to 16mm metric, one set each .	3 set	
5	Bench Drilling Machine	13mm capacity, motorised Drilling Machine, with 0.5 HP / AC / 230 / 1 / 1420 r. p. m., with motor starter switch ,13mm capacity drilling chuck, V belt with 100 mm machine vice.	1	
6	Bench Grinder	Double ended bench grinder wheel size 150mm x 16mm x 12mm with standard accessories with single phase 0.25 HP motor high speed. .	1	
7	Vice	Bench Vice 150 mm	10	
8	Electrically operated Hand Drilling Machine ( pistol Type )	8 mm capacity steel drilling . Power Input 300 - 400 W.	2	

9	Power Hack Saw Machine	Machanical type hacksaw machine equipped with coolant pump , vice, length gauge, machine drive belt guard , with capacity to cut / round materials upto 175mm and square materials 150mm x 150mm, Blade size 350mm x 25mm and 1 HP / AC 440 / 3 / 50 / 1440 RPM Elctric motor & starter.	1	
10	1 Pedestal Grinder	200 mm Spindle speed 2600 to 3000 rpm, diameter of wheel 200 mm width 25mm	1	
11	Hand Grinder	Two speed flexible shaft, 370watts, full load speed, 6410 rpm & 665 rpm.	1	

**(c) Smithy Shop**

<b>Sr. No.</b>	<b>Name of Equipment</b>	<b>Technical Specification</b>	<b>Minimum Qty./Nos Required</b>	<b>Remark If any</b>
1	Hearth with blower	Centrifugal motorised blower 3 HP / 440 / 3 / 50 with Foeges, pipe Fittings valves, Hearth Size Made of M. S. Sheets 750 mm x 750 mm with water jacket, Height of 2.5 m ( with chimney )	5	
2	Anvil	Single Horn 150 kg malleable cast iron with stand .	5	
3	Leg Vice	15 cm size .	5	
4	Swage Black	Wrought Iron or Malleable cast Iron. 1) 450 x 450 x100 mm. Or 2 ) 500 x500 x 150 mm.	2	
5	Tools and Gauges	Hammers of different size , Tong, Chisels flatteners pullers, Dies, Punch , Drift etc.	Ls	
6	Power Hammer	1 Tonne capacity, motorised, equipped with foot lever operated, clutch to control strokes, spring loaded hand lever for adjustment of strokes, ram and C. I. anvil and the vertical pull rod , 3HP / 440 V A.C. / 3 / 50 Hz. / 960 rpm electric motor and starter. Having ram weight about 70 kgs. maximum lift 190mm, strokes / minute 160 to 200, hammers upto diameter 56 mm to 80 mm.	1	
7	Bench Grinder	Double ended bench grinder with 1HP 3 Phase 50 cycles 440 V and one side rough and other side smooth 250mm x 25mm x 16mm grinding wheel complete with wheel guard , tool rest and rotary switch.	1	

<b>( d ) Welding Shop</b>				
<b>Sr. No.</b>	<b>Name of Equipment</b>	<b>Technical Specification</b>	<b>Minimum Qty./Nos Required</b>	<b>Remark If any</b>
1	Oil Cooled Arc Welding Transformer Three Phase With Standard Accessories	Welding Trasformer to provide current from 50 amps to 600 amps for Single operator and 25 amps to 300 amps for two operators at 80 v open current , alternate voltage of 100 V open circuit provision ,rotary switch for quick selection of current with following technical specifications conforming to IS 1851 - 1975 Standard Accessories :-1) Copper cable single single core conforming to IS - 9857 / 1981 for 600 amps . 2) Electrode holder upto 600 amps. 3) Hand Screw . 4) Earth clamp, tommy bar type. 5) Pair of welders Goggles . 6) Welders apron . 7 ) Welders glass etc.	1	
2	Single Phase Aircooled arc Welding Transformer with Accessories	Single phase air cooled arc welding , transformer, stepless variable current regulator for welding current range 40 to 300 amps. Conforming to IS- 1851 - 1975 .	1	
3	Light Duty Spot Welding Machine	Portable type spot Welder rating 2.5 KVA , for welding upto 2mm + 2mm M. S. Sheet , Max throat depth 20 cms .	1	
4	Oxy-Acetylene Gas Welding Set	a) High pressure welding blow pipe , six tip sizes, for weldingM. S. upto 10 mm thick b) Two stage oxygen regulator conforming to IS 6901- 1981 ( Max. outlet pr 2 kg / cm 2. ) c) Two stage acetylene regulator conforming to IS - 6901-1981 ( Max.Pr 1 kg / cm2 ) d) Pressure gauges to conform IS 36624 - 1979. e ) Standard Accessories 2 x 5 mm length 8 mm bore hose, four hose clips, one pair welders goggle, one pair leather hand gloves, cylinder out fit - spindle keys, spark lighter , leather apron, wire brush etc .	1	

5	Soldering Irons	Supply voltage 230 V / 1 Phase / 50 Hz . Watts 500, complete insulation with different types. Of copper soldering bits.	2	
6	Double Ended Pedestal Type Grinder	Double endd pedestal type grinder with following specifications :-1 HP / Single phase / 230 V / 2800 RPM ISI marked motor with wheel size 250 mm x 25 mm x 18 mm. one side rough and other side smooth , pedestal of C. I.	1	
7	Welding accessories	Welding fixtures, Wire brush , Chipping hammers, Clamps, etc.	1	
8	MIG Welding Equipment	Power source with integral wire feeder and rear stand for gas cylinder, for seam welding, spot welding etc. current range 35-160 amp, open circuit voltage range 16- 31 V, 3 phase, input KVA 4.5 , current 9 amp, with all accessories. Welding current At 60 % duty cycle 160 A / 22 V, At 100 % duty cycle 125 A / 21 V. To weld Ferrous and non ferrous metal alloys, with pre heater, light and heavy duty gunassembly, cooling system, and all standard accessories.	1	
9	TIG Welding set.	Ac / DC Tig welding set for welding ferrous and non ferrous alloys, Max. current capacity 150 amp. Control unit built in H. F. unit and controls, contractor , DC suppressor, water circulatory unit, torch with accessories box, set of tungsten electrodes, set of welding accessories.	1	
10	Work Bench With Vice	1800 x 1200 x 750 mm	2	
11	Welding Table	1200 x 1200 x 750 mm With sliding tray	2	

**(e) Sheet Metal & Plumbing Shop**

<b>Sr. No.</b>	<b>Name of Equipment</b>	<b>Technical Specification</b>	<b>Minimum Qty./Nos Required</b>	<b>Remark If any</b>
1	Shearing Machine	Geared type hand Shearing machine complete with handle having the following specification. Cuts steel sheet , upto 4 mm. Maximum cut in one stroke 300mmCuts flate upto 50mm x 5mm.Cuts M. S. bars upto 13mm Length of blade 400mm.	1	
2	Sheet Bending Machine	Hand operated, Maximum bending width 1200 mm with thickness 10mm.	1	
3	Pipe Bending Devices	Hand operated bender, Bends round, taper, flates, tubing, square & conduit, Complete with attachments for different bending operation .	1	
4	Hand Tools and other Equipment	Electrical Soldering iron, Different types of stakes, pneumatic chipping and rivetting hammers, Scribes dividers, trammel points, set square , punches, prick punches, centre punches, hand groover, rivet sets, chisels, hammers, ball pein hammers , mallet, snip shears, pliers, hand seamers, tongs, files, hand shears,measuring instruments for sheet metal work folding rule, common rule, steel circumference rule, vernier calipers, micrometer calipers, slip gauges.	1	
5	Pipe Threading Dies	Threading Wrench & Die Set of Assorted Sizes.	5	
6	Portable Drilling Machine	Light duty drill, 10 mm capacity, 235 V, 235 watts, 700 rpm, no load speed, 250 rpm full load speed .	1	
7	Pipe Vice	Holding capacity of pipe - 50 mm.	1	
8	Plumbers Tool Kit	Consisting of hacksaw, dies, measuring tape, hammer, files, pipe wrench, chain wrenches, adjustable spanner, etc.	Ls	

<b>(f) Machine Shop</b>				
<b>Sr. No.</b>	<b>Name of Equipment</b>	<b>Technical Specification</b>	<b>Minimum Qty./Nos Required</b>	<b>Remark If any</b>
1	Centre Lathe ( General type )	Max. swing over bed : 450 mm. Max swing in gap 770 mm Admit between centers : 555 mm Spindle bore : 52 mm . Powar of motor : 3hp , 3 phase , 50 Hz. With accessories.	02	
2	Universal Milling Machine	Length x with of working table 1200mm x 700mm. Number of T- slots 6. Longitudinal Traverse 1200 mm. Cross traverse 800 mm. Table height from floor 940 mm . Circular movement of table 360 Deg. No. of spindles 7. Manual vertical adjustment of milling head 320 mm. swivel of milling head on either side 45 deg. Throat clearance 915 Deg. (distance between main spindle and column guide) Maximum diameter of circular milling 2600 mm . Manual & Automatic feed. Accessories Draw bar, circular milling head, High speed milling head, small radius milling head, Micro- depth stop for milling head , circular dividing attachment for rotary table , coolant equipment, special cutters, boring tools, tool holder, form cutting , collets hand clamping devices for wood working.	1	
3	Vertical Milling Machine	Table size 135 x 310 mm. Axis traverse 800 x 265 x 400 Feed rate 0 - 800 rev / min. ( Manual & Automatic )	1	

4	Hydraulic Surface Grinding Machine	Maximum grinding length 750 mm. Maximum grinding width 250 mm. Distance centre of wheel , over table 125 mm ( Maximum ) Longitudinal travel speed 12 meters / minuts .Standard wheel size 250 mm. x 25 mm x 762 mm. Speed of wheel 2100 or 2625 rpm . Lubrication Centralised Automatic . Accessories Grinding wheel, wheel flange puller , wheel balancing mandrel, Table guards pump with fittings, machine lamp, Instruction manual. Permanent magnetic chuck , wheel balancing stand, coolant equipment magnetic separator, Demagnetiser, Universal machine vices, dust and exhaust equipment unit, wheel dressr over wheel head .	1	
5	Bench Grinder	Double ended, fitted with grinding wheels tool rest, on-off switch , 1 HP motor AC 3phase 400 / 440 V . Complete with steel guard 300 mm x 40 mm x 25 mm grinding Wheel. Speed 1420 rpm.	1	
6	Drilling Machine ( Piller Type )	Drilling capacity in steel 20 mm. Spindle travrse 125 mm . Vertical adjustment of spindle head 425 mm. Distance from Centre of spindle to column front 200 mm. Speed range of spindle 375 - 3220 rpm. No of spindle speeds 5 . Power of spindle 3 HP ( 3 phase ) .	1	
7	Hydraulic Power Hacksaw Machine	Length of stroke ( Max. ) 200 mm. , for cutting round and square material ( Max. ) 300 mm speed 1440 rpm . Power of motor 1.5 kw ( AC 3 phase 440 volt ) . Accessories Vice for holding bars, saw blade, coolant pump with fittings limit switchches, bar rest assembly, set of wrenches and belts.	1	

8	Shaping Machine	Max. length of stroke 630 mm. Length and width of ram bearing 914 x 279 mm. Max. distance Table to ram 490 mm . Min. distance table to ram 100 mm. Max . Horizontal travel of table 610 mm. Max. vertical travel of table 390 mm. No of speeds of ram 4. Max. travel of tool slide 152 mm. Swivelling of tool slide on either side of the vertical 60 Deg. Power of main drive motor 3 HP ,440 V, 3 phase, 950 rpm. Accessories Auto Lubrication, operating handle, Vice, key way cutting attachment .	1	
9	Measuring Instruments And Tools	Vernier Caliper-0 to 300mm, Dial Caliper-0-300mm, Vernier Depth Gauge-0 to 300 mm, Digital Height Gauge-0 to 450mm, Digital Micrometer-0 to 25mm, Combination Set	5 sets	