

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI - 51

1	Name of Course	Certificate Course in Construction & Wood Working (304207)																																																													
2	Max. Nos. of Student	25 Students																																																													
3	Duration	1 Year																																																													
4	Type	Full Time																																																													
5	Nos. of Days / Week	6 Days																																																													
6	Nos. of Hours /Days	7 Hrs																																																													
7	Space Required	Theory Class Room – 200 sqft Practical – 1500 sqft																																																													
8	Entry Qualification	S.S.C. Passed																																																													
9	Objective Of Syllabus/ introduction	Awareness of Safety precautions Knowledge of Engineering skill, use of tools in Construction & Wood Working. Awareness of Architecture. Awareness of Basic Building Construction. Awareness of Basic Carpentry, Plumbing & Electricals. Awareness of Basic quantity Surveying.																																																													
10	Employment Opportunity	The trainee will either to be able to take up jobs with agencies which Maintain Develop and repair Construction & Wood working or with working experience will be in a position to start his own independent Business.																																																													
11	Teacher’s Qualification	Vocational Diploma (Artisan to technocrat Scheme) in Interior Decorator/ Building Construction. With 3 year Teaching experience in Construction & Wood working. Diploma or Degree Civil Engineering or equivalent profession Qualification. With 1 year Teaching experience in Construction & Wood working.																																																													
12	Training System	<table><tr><th colspan="7">Training System Per Week</th></tr><tr><td>Theory</td><td>Practical</td><td colspan="5">Total</td></tr><tr><td>18 Hours</td><td>24 Hours</td><td colspan="5">42 Hours</td></tr></table>						Training System Per Week							Theory	Practical	Total					18 Hours	24 Hours	42 Hours																																							
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SYLLABUS
Theory & Practical - I
Basic Quantity Surveying & Architecture

Theory - I	Practical - I
Units of measurement for different works in M.K.S. and F.P.S. system, conversion of units.	Familiarization with institute and importance of the module. Instrument, equipments used in the module, type of work done by the trainees in the institute, nature of job done by the trainees of the module.
Linear measuring instrument used by surveyor, their descriptions and uses, types of chains, principal of chain survey, location of points, offsets and instrument used for the same. Measuring and plotting a given area with chain.	Practice in map reading including contours and drainage. Practice in folding and unfolding chain, alignment of lines, measurement of distance between given points and their booking.
LEVELING :- Types of levels, technical terms used in leveling methods of observation, booking and reduction of levels. Reciprocal leveling, common sources of error and their remedies. Simple problems on leveling.	Practice in setting out a level and performing temporary adjustments. Practice of fly leveling, differential leveling. Reduction of levels, booking of field work, height of collimation, rise and fall method. Calculation of area of cross sections.
Procedure of estimating. Metric system and primary units, International system of units, Units of measurement and units of work. Center line method and separate wall method of estimation. Different types of estimate - Primary, approximate, abstract, plinth area etc.	Estimate of one room building by center line method and separate wall method. Calculation of different material from the quantities worked out in the estimate.
Analysis of rates, overhead cost, rates of material, cost of labour for different works, preparing analysis of rate of a given work.	Preparation of estimate of a double room building. Calculation of different materials and labour required for the work. Valuation of the same.
ROAD ESTIMATE :- Earth work calculation of road work by mid sectional area method, mean sectional area method and prismoidal formula method. Different parts of road structure like base course, W.B.M., B.M. surface concrete etc.	ROAD ESTIMATE :- Practice of estimating different materials required for road work by mid sectional area method, mean sectional area method, and prismoidal formula method
SPECIFICATION :- General specification for 1 st , 2 nd , 3 rd , 4 th class building. Detailed specification of different items of work like earth work in excavation, cement concrete in foundation, brick work in foundation and super structure R.C.C., plastering and pointing, wood work, painting, white wash. General specification of a modern road.	Preparation of estimate of a modern road and writing specification of different item of work.

VALUATION :- Gross income, net income, scrap value, salvage value, annuity, capitalized value, sinking fund, depreciation, Valuation of a building. Determination of depreciation. Method of valuation, fixing rent etc.	Valuation of a two room building. Site visit of trainees to a construction site to enable them to understand different items of work.
Importance of module, importance of safety & Gen. Precautions observed in the applied module problems, architect office organization. Code of practice for general and architecture drawing.	Instrument used in the module, types of work to be done in the institute and in the section, types of jobs made. Getting ready to draw using drawing instruments. Introduction to B.I.S. conventional lines as per B.I.S. code folding of drawing sheet, layout of drawing sheet.
Importance of lettering, printing of letters and figures. Sizes proportion etc. as per B.I.S. code. Forms and proportion of single stroke lettering. Lettering stencils.	Free hand sketching of simple geometrical models. Lettering and numbering, vertical and inclined. Printing single and double stroke lettering both inclined and vertical.
Geometrical drawing. Construction of plain geometrical figures orthographic projections. Recommended method of projections as per B.I.S. Principles, representations and constructions of different types of scale, recommended scales by B.I.S.	Construction of plain geometrical figure, (line, angle, triangles, rhombus, quadrilaterals, polygons, ellipses, parabola, and hyperbola etc.) Constructions of ordinary scale. Plain scale, comparative scale, diagonal scale, Vernier scale, and scale of chords.
Dimensioning technique, order of finishing, technical sketching, technique of sketching, model drawing, orthographic sketching, conventional signs and symbol as per B.I.S.	Drawing plans elevation of point, line, surface, solids. Dimensioning technique, sketching of model, drawing orthographic sketches including dimensioning, conventional signs and symbols used in engineering drawing including conventional breaks.
Symbolic representation of architectural material. Importance of using symbols of different fittings. Principles, isometric projection and axonometric projection of objects, furniture etc. Difference between isometric projection and isometric scale.	Dimensions on isometric drawing. Different symbols used for architectural material. Symbols for different fitting. Reducing & enlarging of drawing objects by reducing & enlarging techniques. By graphical method and by instruments.
Perspective projection, definition of picture plane. Determining vanishing points, change in perspective vision, central visual ray, spectator eye level, focus.	Drawing of perspective or one perspective projection. One point perspective projection of room with furniture etc.
Two point perspective projections of a building. Method of drawing of two points perspective. Study of perspective by changing the position of spectator three-point perspective, methods of three-point perspective, bird's eye view.	Drawing of perspective view of a simple building by vanishing point. Distortion point of exactness, limitation. Three point perspective of rounded form, helix, vaults, cylinder and spiral forms.
Sciography of building, shadow of straight overhangs, pictorial techniques – shades, light blocked on straight surface, general rules for Sciography.	Sciography of building. Drawing plan, elevation of a single room building.

No.	Description	Quantity
1	Box drawing instrument one 15 cm compass with pin point, pin point & lengthening bar, one pair spring bows, rotating compass with interchangeable ink and pencil points, drawing pens with plain point & cross point, screw driver and box of leads.	10
2	Protractor celluloid 15 cm semi-circular.	10
3	Scale card board-metric set of eight A to H in a box 1:1, 1:2, 1:2: 5, 1:5, 1:10, 1:20, 1:50, 1:100, 1:200, 1:500, 1:1000, 1:2000, 1:1250, 1:6000, 1:38 1/3, 1:66 2/3.	10
4	Scale-Metric and section wooden 30 cm long marked with eight scales- 1:1, 1:2, 1:2: 5, 1:10, 1:20, 1:50, 1:100, 1:5	10
5	Scales plotting box wood 6 metric scales 30 cms long with off set scales.	10
6	Set square transparent 2 mm thick with beveled edges 45 degrees 20 cm.	10 sets
7	Set square celluloid 2mm thick beveled edges 60degrees 20cm.	10
8	Drawing Board with facility of parallel bar	10
9	Mini drafter	10
10	Erasing shield small size	10
11	Template – Architects and builders	10
12	Pantograph	02

Sr. No.	Description	Quantity
1	Geometrical Models (wooden) as per given below (1) Cube 08 mm sides. (2) Rectangular parallel piped 8 cm x 15 cm. (3) Sphere 8 cm dia. (4) Light circular core 8 cm x 15cm vertical height (5) Square pyramid 8 cm side base and 15 cm vertical height. (6) Cylinder 8 cm dia. 15 cm height. (7) Prisms triangular 8 cm side base and 15 cm length. (8) Prism hexagonal 8 cm sides hexagon and 15 cm length.	02 02 02 02 02 02 02 02
2	French curves-transparent plastic set of 12.	4
3	Flexible curves 80 cm long.	8
4	Elliptic trammel with ink and pencil for not less than 10 cm minor axis complete in a case.	1
5	Radius curve metric-3 mm to 15 mm.	4
6	Drafting Machine-Vertical type complete with drawing board adjustable table and pair of metric scales 30 cm and 40 cm..	4
7	Drafting Machine-Horizontal type complete with drawing board size adjustable table with pair of metric scales 30 cm and 40 cm.	4
8	Brass parallel rules in a case.	4
9	Calculator (pocket size) 1 (FX)	4
10	Proportional dividers 15 cm.	4
11	Tracing table with plate with plate glass 1250x 900 cm.	1
12	Stencils-complete set 6 H.	2 sets
13	Table drafting for boards.	2 sets
14	Stools draughtsman high	2 sets
15	Table working blue printing 2 m x 10m	2
16	Almirah steel (Major)	2
17	Interlock, interchangeable brass stencils with brush in a box.	4
18	Pestle and mortar-porcelain 3 mm, 6 mm, 12 mm, 18 mm	2
19	Print Trimmer cutting edge 100 cm.	1
20	Chest of draws 8 drawers (standard)	4
21	Draughtsman table	20
22	Draughtsman stool.	20
23	Instructor's table (big size, full secretariat)	1
24	Instructor's chair.	2

List of tools & Equipment for Basic Quantity Surveying

Sr. No.	Description	Qty.
1.	Box drawing instrument containing 15 cm compass with pin point, pin point & lengthening bar, one pair spring bows, rotating compass with interchangeable ink and pencil points, drawing pens with plain point & cross point, screw driver and box of leads.	10
2.	Protractor celluloid 15 cm semi-circular.	10
3.	Scale card board-metric set of eight A to H in a box.	10
4.	Scale-metric and section wooden 30 cm long marked with eight scales.	10
5.	Set square transparent 2 mm thick with beveled edges 45 degree 20 cm and 60 degree 25 cm.	10
6.	Drawing Board 1250x 900 mm.	10
7.	T-Square 1250 mm	10
8.	Erasing shield small size	10
9.	Print trimmer cutter edge 100 mm.	1
10.	Chest of drawers 8 drawers (Standard)	5
11.	Proportional divider 15 cm	5
12.	Stencil complete set 6H	2
13.	Draughtsman table and stool.	10
14.	Land measuring chain 30 mm with arms.	5
15.	Steel tape 20 meter long.	2
16.	Ranging rods wooden 2m long	10
17.	Optical square PWD pattern.	5
18.	Optical square box type circular	1
19.	Off set rod.	5
20.	Steel tap 5m & 2.5 m.	1
21.	Gunter's chain	5
22.	Engineer's chain	5
23.	Dumpy level builder 25 cm focal length x 23 mm completes with box and accessories and stand.	2
24.	Leveling staff 4 meters reading to 5mm telescopic type.	2
25.	Theodelite.	2
26.	Surveyor's umbrella.	4
27.	Spirit level 30 cm.	2
28.	Spade	2
29.	Hand hammers 1 kg.	2
30.	Pickaxe.	2

Theory & Practical - II
Basic Building Construction & Carpentry
Part – I
Basic Building Construction

Theory - II	Practical - II
Introduction about Building Construction: Its importance, types of buildings, site selection of different types of buildings, Name the different parts of the building, orientation and ventilation of the building.	Introduction with buildings about different parts of the building and draw a neat sketch passing thro' door, window, and roof of multi stories building, orientation and ventilation of building.
Construction materials like bricks, stones, tiles, cement, sand, aggregates, lime, steel, timber, earthen ware. Standard size of bricks available in the market and manufacturing of bricks, types of bricks, and types of tiles.	Introduction by showing the different types of materials i.e. bricks, stones, tiles, cement, sand, aggregates, lime, steel, timber, earthen ware, Standard size of local market bricks available in your locality, site visit of brick kiln showing the manufacturing of bricks, field test of cement. Etc.
Foundation:- why it is constructed below ground level, width of foundation, depth of foundation, types of foundation, layout of foundation plan on the ground of a given map for the excavation for foundation, laying of concrete in foundation, and filling of foundation up to the plinth level and lying of D.P.C. and definition of D.P.C.	Construction of different types of foundation, Layout of foundation plan on the ground, reading of map, laying of concrete in foundation, ratio of foundation concrete. Transfer of center line with Plumb Bob in the excavated trench, laying of D.P.C.
Brick Masonry: Technical terms, types of bonds, necessity of bonds, English Bond, Flemish Bond, Hearing Bone Bond, Header Bond, Bonds in pillars, English Bond and Flemish Bond. Tools used in Brick Masonry. Ratio of Cement & Sand in Mortar for different types of Brick masonry, preparation of mortar, and used with in the initial setting time of the cement.	Tools of Brick masonry, how to use the tools of brick masonry, construction of wall and corner junction of wall in super structure and foundation in English Bond and Flemish Bond, Streacher Bond, Header Bond in pillars and walls etc. Zig-Zag Bond, Hearing Bone Bond in Brick flooring etc.
Arches and Lintels: Its definition, parts of Arches, types of arches and lintels, technical terms, methods of construction, comparison between arches and lintels, design the depth of arches as per span. Construction of roofs, types of roofs, flat roof, and first class mud roof, second-class mud. Roof, RCC roof, Rein forced Brick Slab Roof, Jack Arch roof, Sloping Roofs, Roof covering materials, Terracing of roofs, Its methods of construction.	Centering and Shuttering of different types of Arches, Construction of Arches and construction of different types of Roofs, laying of Reinforcement of RCC flat Roof and Reinforced Brick Slab Roof, Terracing of roof, First and second class mud Roof, Jack Arch Roofs, its method of construction.

Floors: Types of Ground Floors, Technical Terms, Brick Floor, Tile Floor, Cement Concrete Floor, Terrazzo Floor, Crazy Floor, Suspended Floor, the types and its method of construction.	Construction of all types of floors, making of formation level, laying of Base Layers, laying of Topping, etc.
Surface Finishing: Plastering purpose of plaster, pointing, types of pointing, curing, purpose of curing, types of curing, curing of plaster and other construction work, Time to be given for curing of different types of construction work.	Surface plastering ½” (12.5 mm to 20 mm) thick in various ratios of cement and mortar. Ceilings plaster, Curing of plaster.
White Washing, colour washing, Cement paint like Snowcem, Terracotta (Brick Red Snowcem), Distempering, Oil Bond Distempering, its method of painting including primary coat, painting to woodwork including primary coat, painting to steel work including priming coat to the steel surface.	White Washing, three coats for new plastered surface, colour wash, lime paint, cement paints, applying enamel paints to the wood work, Steel work, etc. including primary coat.

Part - II
Basic Carpentry

Theory	Practical
Importance of the in the industrial development of the country, subject to be taught in trade, safety causes of accident, safety rules, general safety with hand tools, safety with machine, safety with power, safety with material, fire fighting, causes of fire, types of fire extinguisher, first aid, method of artificial respiration.	Importance of the subject introduction with workshop safety precautions, fire fighting equipments etc.
Measuring Tools:-Steel rules, steel tape, four fold 2 feet rule calipers. Marking tools:-pencil, marking knife, marking gauge, divider and compass, try square. Testing Tools:- Try square, Bevel square, universal bevel.	Identification of hand tools demonstration and using measuring, sawing practice using different types of saws, and plains etc.
Saws:- Types of saws, hand saw, tenon saw, compass saw and sharpening. Plane:- Types of planes-jack plane, smoothing plane, groove plane, rebate plane their working uses and sharpening. Other Tools:-working bench, vice, claw hammer, pincer, screw driver, clamps, bench hook, farmer chisel, mortise chisel, wooden mallet, file and boring tools stones etc.	Ripping , cross cutting , curve cutting , oblique sawing .use of sawhorse , bench hook , Bench vice , Bench stop etc , Identification of timber , showing defects knots , shakes , grains etc .

Types of plywood, method of manufacturing plywood, types of wood, Requirement of timber with respect to area. fevicol and its application. Preservation:- treatment of wood, charring, tarring, painting, creosoting. Ascu treatment.	Planning practice: planning face side , face edge marks use , of marking gauge etc , testing of accuracy flatness , twist ness of surface . use of straight edge bench stop , try square , cross planning , edge planning , planning piece of size , grinding , sharpening of plan blade etc .
Classification of timber, growth of tree, cross section of a trunk, felling of tree, grain of wood, parts of tree, their formation and function etc.	Demonstration and making of joints. Framing joints: halving joints, trenching, housing joints, mortised and tanon joint , Door joint , bridle joint , dovetail joint , lap dovetail joint , miter joint etc .
Defects and diseases of timber, their causes and remedies (natural and artificial), decaying of timber insects, which attack timber. Sawing of timber, types of sawing.	Broadening joint: simple butt, slot screw joint, pocket screw joint, tongue and groove butt joint, etc.
Seasoning of timber, purpose of seasoning, artificial and natural seasoning their advantages and disadvantages etc.	Lengthening joints: slopping scarf, racking scared, half lapping scarf , table scarf joint etc.

List of Tools and Equipments for Basic Building Construction.

Sr No.	Description	Quantity
1.	Chair/Stools	10
2.	Table	10
3.	Teacher table	1
4.	Teacher chairs	1
5.	Land measuring steel tape (30 mt long)	8 No.
6.	Land measuring plastic tape (30 mt long)	8 No.
7.	Steel taps (3 mt long)	10
8.	Steel taps (5 mt long)	10
9.	Shovel	8No.
10.	M.S pan 45 cm dia.	8 No.
11.	Farma of mild steel for measuring aggregate (Heaving volume 0.03472 cm)	6 No.
12.	Bucket G.i. 35 cm dia.	8 No.
13.	Mason plumb rule with spirit level	10
14.	Mason square 30x60 cm	10
15.	Sieve for sand in adjustable stand (1mm, 100cm x 60cm fixed in steel frame)	4 No.
16.	Trowel 25 cmx10cm	10
17.	Brick hammer with handle	08 No.
18.	6" pointing Trowel	10
19.	Line pin corner block	10
20.	Mortar board 2 mtx2 mt.	2 No.
21.	Wire brushes	8 No.
22.	Float wooden	10
23.	Steel float	10
24.	Sprit level 30 cm long	08 Nos.
25.	Chisel 25 cm long hammer headed	10 Nos.
26.	Bolster	8 Nos.
27.	Claw hammer	8 Nos.
28.	Spade	8 Nos.
29.	Ladder aluminium 3m long	6 Nos.
30.	Pick axe	5 Nos.
31.	Hammer 250 grams	8 Nos.
32.	Crow bar 30mm dia 1.5 m long of mild steel	6 Nos.
33.	Hand hammer 1000 grams.	6 Nos.
34.	Gloves canvas	8 Pair
35.	Gloves plastic	8 Pair
36.	Mono block pump set ½ H.P. 25mm dia inlet & outlet	5 Nos.
37.	Drums 200 liters capacity	5 Nos.
38.	Mixture machine lab	4 Nos.
39.	Vibrator pin & plot	4 each

40.	Steel centering & shutting for 20 sqm. Roof area with telescoping pipes & beams	1
41.	Grinding machine with attachment for various polishing stones	1
42.	Brush for painting & white washing	As required

List of tools for Basic Carpentry

Sr. No.	Description	Quantity
1	Flexible tape role steel (3 meter)	10
2	Try Square (20 mm)	10
3	Square bevel	10
4	Marking Gauge (Wooden)	10
5	Hand Saw 450 mm	10
6	Saw tenon 300 mm	10
7	Jack plane metal 335 mmx 50 mm cutter	10
8	Plane smoothing metal 250 mmx 50 mm cutter	10
9	Chisel firmer (bevel edge) 6, 10, 15, 20, 25mm with (5 nos.)	10
10	Chisel mort ice 6,10,15, (3nos)	10
11	Screw driver (300 mm)	10
12	Wooden mallet (medium size)	10
13	Hammer claw (500gms)	10
14	Carborandom stone (200x 50x 25mm)	10
15	Hand brush for bench cleaning (400mm)	10
16	Screw Driver 250 mm	04
17	Pincer 50mm	04
18	File Half Round 2nd Cut 250mm	08
19	File half wood rasp bastard 300mm	08
20	File slim taper 100 mm	08
21	Card File (Steel) wire brush for file	08
22	Electrically operated motorized cutter	4

Theory & Practical - III

Basic Electricals & Plumbing.

Part - I

Basic Electricals

Theory - III	Practical - III
Familiarization with trade, safety precautions, first aid in electrical shop, fire accident, symbols and measuring unit of work, power, energy and force.	Demonstration and introduction of various systems involved in the trade. Demonstration and practice of using trade hand tools.
Identification of trade tools, specifications, care, maintenance and use. Identification of electrical accessories. Fuse and its uses. Types of fuses. Fundamental of electricity and its units.	Practice of removing insulation from wires and cables, practice of joints of single and standard conductors. Twisted joint, T-joint, Crippling and soldering joint.
Definition of conductor, insulator and their properties. Types of wires, cables and wire gauges. Classification of wires and cables, their specifications. Types of wires, cable joints.	Practice of using S.W.G and micrometer, Practice of connecting of simple circuit with lamp & bell etc. verification of Ohm's law.
Ohm's law. Reading of Ammeter, voltmeter and uses. Common electrical accessories and their specifications. Introduction of cell / batteries (dry and wet) and their grouping. Types of cell. Identification of A.C. and D.C. and their terminals.	Use of Amp.-meter in circuit. Preparation of battery charger. Layout of accessories on sun mica board.
Definition of resistance, their specification, property and their uses. EMF, current and load. Circuit, open circuit, short circuit, series and parallel circuit. Working of energy meter, (industrial and domestic).	Practice of fixing and connecting accessories used in different fitting. Taking reading with voltmeters. Series and parallel circuit.
Introduction to electrical appliances, their specifications, description and working. Earthing, types of earthing, its uses and testing.	Practice of connecting electrical appliances as per their specifications. Wiring practice a) To control One lamp with one switch, two lamp with one switch b) Stair case circuit fitting. c) Godown fitting
Introduction to electrical wiring system. Explanation of fault finding in connecting and maintenance of different types of electrical appliances. Circuit on sun mica sheet.	Demonstration, testing, fault finding and replacement of defective parts. Practice of different types of wiring : - Baton fitting, conduit, P.V.C., G.I. pipe fitting etc.
Explanation and working of different types of transformers and classification.	Identification of transformer their testing and use.

Part - II
Basic Plumbing

Theory	Practical
Importance of the trade in the development of industrial economy of the country. Importance of the safety and first aid and general precaution observed in the institute and in the section. Medical facilities, recreational, extra curricular activities of the institute. Necessary guidance to be provided to the new trainees to become familiar with the working of COE.	Familiarization with the institute, importance of trade training, tools used in the trade. Types of work done by trainees in the institute. Types of job made by the trainees in the trade.
Different types of G.I. pipe and fittings used in plumber trade and water meter etc.	Simple pipe connection using G.I. Pipes, socket, elbow, tee, reducing elbow, G.I. union, cap plug, reducer, Three face elbow, reducing socket, plug, G.I. nipple etc. installation of water meter.
Material used in plumbing , non ferrous metal, brass, copper, zinc, led, tin solder, gun metal and its uses in plumbing work. While lead and Red lead.	Joining of thread joint, lead joint, flange joint, cement joint, D. Joint etc.
Storage of water, different method and structures used for storage of water. Distribution system, different types of distribution system, factors effecting storage capacity. Two pipe and one pipe system in house plumbing.	What is drill. Different types of drill. What is taping . Different types of tapings, Drilling and taping of C.I. main and fixing ferrule and connection to a house.
Description types of soil and waste pipe fitting. Door junction, door bend, H.R. Bend, Plain Bend , Double door junction, inverter junction. Cowel, Floor trap, Gully trap P- trap. etc.	Layout of soil pipe and waste pipe to the sanitary fitting using different types of fitting. Door junction, door Bend , H.R. bend, Plain Bend, Double door junction, inverter junction, cowel , floor trap, Gully trap, P-trap etc.
P.V.C. pipe, ISI specification of pipe, their properties and use in plumbing work. Method of cutting and preparing joints like elbow joint, socket joint, Tee joint, reducing elbow joint , floor trap joint, P- trap joint, H.R. bend joint, plain bend joint, Double Y junction joint. Precautions used while making P.V.C joint. Different types of valves used in plumbing.	Practice of cutting and shaping P.V.C. pipe to size, use and fixing of P.V.C. pipe. Different types of valves and fittings.
Types of damages in taps, valves and water meter and tanks, causes of damages.; Method of rectification and different methods of modification etc.	Reconditioning of taps, valves & flushing tank, testing for correct functioning. Types of tanks R.C.C., P.V.C. Iron tanks etc.

Different types of water closets Indian W.C. and E.W.C., Orisa Pan, R.W.C. , wall hanged etc. General description of W.C. Different types of W.H.B and their sizes . Different types of urinal pot, Kitchen sink, Bath tub etc. Their utility and standard sizes as per ISI recommendation	I. Fitting of I.W.C with high level cistern. II. Fitting of washbasin. III. Fitting of E.W.C. with low level cistern, IV. Fitting of kitchen sink. V. Fitting of bath tub. VI. Fitting of urinal pot with auto cistern.
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Sr. No.	Description	Quantity
1	Rule wooden 4 fold 60 mm	10
2	Scriber 150 mm (Knurled Centre position)	10
3	Pincer 150 mm	10
4	Plier insulated 150 mm	10
5	Screw driver 150 mm	10
6	Punch Centre 150 mmx 9 mm	10
7	Knife double bladed electrician	10
8	Hammer, cross pane 115 grams with handle	10
9	Electrician connector, screw driver 100 mm. Insulated handle thin stem	10
10	Electrician testing pencil I I neon Tester	10
11	Heavy duty screw driver 200 mm	10
12	Electrician screw driver 250 mm thin stem insulated handle	10
13	Rule steel 300 mm	10
14	Saw tenon 250 mm	10
15	Hammer ball pane 0.75 kg with handle	10
16	Firmer chisel wood 12 mm	10
17	Gimlet 6 mm	10
18	Bradawl	10
19	Plier sued cutting 150 mm	10

SR. NO.	DESCRIPTION	QUANTITY
1	C. Clamps 200 mm, 150 mm, 100 mm	2
2	Spanner 150 mm adjustable 15 degree as cly-burns	2
3	Blow lamp 0.5 liter	2
4	Melting pot	1
5	Ladder	2
6	Chisel cold flat 12 mmx 200 mm	2
7	Chisel firmer 25 mm and 6 mm	4
8	Drill machine hand 0 to 6 mm capacity	2
9	Electric drill machine 12 mm capacity	1
10	Out side micrometer 0 to 25 mm	1
11	Bench grinder motorized	1
12	Raw plug tool and bit	2
13	Bearing puller	1
14	Multi meter 0 to 1000 M ohms 2.5 to 5000 volt	2
15	K.W. meter 0 to 1 K.W. capacity with C.T.1: 2.	1
16	Milli voltmeter Centre zero 100-0-100m volt.	1
17	Spring balance 0 to 15 kg. And 0 to 2.5 kg.	2
18	Stop watch	1
19	Screw driver 100 mm	5
20	Square try 150mm blade	5
21	Divider 150 mm, out side and inside caliper.	4
22	Tweezers 100 mm.	5
23	Snip straight 150 mm	2
24	File flat 200 mm 2nd cut	3
25	File half round 200 mm 2nd cut	5
26	File half round 200 mm smooth	5
27	File round 200 mm 2nd cut	5
28	File flat 250 mm rough	5
29	File flat 250 mm bastard	5
30	Rasp, half round 200 bastard	5
31	Iron, soldering 225 grams 125 watt with bits	5
32	Vice hand 50mm jaw	5
33	Megger 500 volts	1
34	Fan A.C. 230 volt 1200 mm	2
35	Fan D.C. 220 volt 1200 mm	2
36	Bench working 2.5x 1.20x 0.75 meters	5
37	Almirah 2.5x1.20x0.50 meter	1
38	Metal rack 180x150x47 cm.	5
39	Wire stripper 20 cm.	1

40	Domestic appliances: (a) Electric hot plate 1500 watt. 220v with temperature control. (b) Electric kettle, 1000 watts, 230v (c) Electric iron 1200 watts, 230v with temperature control. (d) Immersion heater 750/1000/1500w-230v (e) Geyser 25 liter 240v (storage type) (f) B.A. taps and dies 0-2-4-6-8 sizes (g) Mixture grinder	2
41	Spring balance 0 –1 kg.	1
42	Motor A.C. series type 230 v, 50 cycles, ¼ HP with starter and switch	1
43	Scientific calculator	2 Nos.
44	Multi meter digital	10 Nos.
45	Motor AC single phase 230 volt, 50 cycles capacitor type with starter switch 1 HP	1
46	Motor universal 230 volt, 50 cycles with starter/switch 1 HP	1
47	Variable auto transformer 0-250 V, amps	2
48	Earth leakage ckt. Breaker	1 no.
49	M.C.B. 5 KVA	1 no.
50	Voltage stabilizer manual and automatic	1 no. Each

Sr No.	Items	For Instructor	For Trainees
1.	Rules steel 300 mm both in inch and mm	1 No.	10
2.	Hacksaw frame adjustable for 250 to 300 mm	1 No.	10
3.	Chisel cold flat 20 x 250 mm	1 No.	10
4.	Hammer ball peen 800 gms.	1 No.	10
5.	File flat rough 300 mm	1 No.	10
6.	Level spirit wooden 300 mm	1 No.	10
7.	Plumb bob 50 gms.	1 No.	10
8.	Stilson wrench 200 & 350 mm	1 No.	10
9.	Screw Driver 250 mm.	1 No.	10
10.	Wooden mallet small	1 No.	10
11.	Cutting pliers	1 No.	10
12.	Steel tape	1 No.	10

List of Tools, Measuring Instruments, Shop General Outfit

Sr No.	Items	Qty.
13.	Chisel cold flat 20 mm x 300 mm	2 Nos.
14.	Tap and die set to cut BSP Thread	1 set.
15.	Spanner monkey up to 50 mm	2 Nos.
16.	Cutter, pipe wheel type 6 mm to 25 mm.	1 No.
17.	Inside caliper 150 mm	4 Nos.
18.	Caliper outside 150 mm	4 Nos.
19.	Plumbers ladle	2 Nos.
20.	Plumbers metal melting pot 10 kg.	1 No.
21.	Pipe vice to grip pipes up to 77 mm.	2 Nos.
22.	Tool caulking set of 2	2 Sets
23.	Stillson pattern pipe wrenches 450 mm to take pipe up to 52 mm dia.	2 sets
24.	Stillson pattern pipe wrenches 300 mm to take pipe to 20 mm to 32 mm.	2 sets
25.	Chain pipe wrenches 90 mm-650 mm	2 sets
26.	Adjustable spanner A 375	2 Nos.
27.	Flat Smithy tong.	2 Nos.
28.	Working Bench 2400 x 1200 x 750 mm	2 Nos.
29.	Ratchet rack with post and clamp flat 5 drill 6 to 35 mm by 0.2 mm.	1 Set
30.	Ratchet pipe die 15 mm to 32 mm	2 No.
31.	Double face hammers	4 Nos.
32.	Monkey Plier (gas pliers)	4 Nos.
33.	Electric handling machine 6 to 35 mm by 0.2 mm. for drilling	1 No.
34.	Trowel 125	2 Nos.
35.	Saw plumber 300 mm	2 Nos.