

**MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION ,  
MUMBAI-51**

1	Name of Syllabus	C.C. IN ARCHITECTURAL DRAUGHTSMAN WITH CAD (304211)																																																													
2	Max. No's of Student	25 students.																																																													
3	Duration	1 YEAR																																																													
4	Type	Full Time																																																													
5	No Of Days/Week	6 Days																																																													
6	No Of Hours /Days	7 Hrs																																																													
7	Space Required	Lab = 1000 Sq feet Class Room = 200 Sq feet TOTAL = 1200 Sq feet																																																													
8	Entry Qualification	S.S.C. passed																																																													
9	Objective Of Syllabus/ introduction	Knowledge of various construction techniques from substructure to superstructure and finishing operations																																																													
10	Employment Opportunity	Wage Employment / Self Employment																																																													
11	Teacher's Qualification	Diploma/Certificate in concern subject																																																													
12	Training System	<table><tr><th colspan="3">Training System Per Week</th></tr><tr><td>Theory</td><td>Practical</td><td>Total</td></tr><tr><td>18 Hours</td><td>24 Hours</td><td>42 Hours</td></tr></table>						Training System Per Week			Theory	Practical	Total	18 Hours	24 Hours	42 Hours																																															
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13	Exam. System	<table><tr><th>Sr. No.</th><th>Paper Code</th><th>Name of Subject</th><th>TH/ PR</th><th>Hours</th><th>Max. Marks</th><th>Mini. Marks</th></tr><tr><td>1</td><td>30421111</td><td>ENGINEEING DRAWING &amp; CIVIL ENGG. DRAWING</td><td>TH I</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>2</td><td>30421112</td><td>SURVEYING , LEVELING &amp; CONSTRUCTION</td><td>TH II</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>3</td><td>30421113</td><td>CIVIL MATERIALS &amp; ESTIMATING AND COSTING</td><td>TH III</td><td>3 hrs.</td><td>100</td><td>35</td></tr><tr><td>4</td><td>30421121</td><td>ENGINEEING DRAWING &amp; CIVIL ENGG. DRAWING</td><td>PR I</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>5</td><td>30421122</td><td>SURVEYING , LEVELING &amp; CONSTRUCTION</td><td>PR II</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td>6</td><td>30421123</td><td>CIVIL MATERIALS &amp; ESTIMATING AND COSTING</td><td>PR III</td><td>3 hrs.</td><td>100</td><td>50</td></tr><tr><td></td><td></td><td>Total</td><td></td><td></td><td>600</td><td>255</td></tr></table>						Sr. No.	Paper Code	Name of Subject	TH/ PR	Hours	Max. Marks	Mini. Marks	1	30421111	ENGINEEING DRAWING & CIVIL ENGG. DRAWING	TH I	3 hrs.	100	35	2	30421112	SURVEYING , LEVELING & CONSTRUCTION	TH II	3 hrs.	100	35	3	30421113	CIVIL MATERIALS & ESTIMATING AND COSTING	TH III	3 hrs.	100	35	4	30421121	ENGINEEING DRAWING & CIVIL ENGG. DRAWING	PR I	3 hrs.	100	50	5	30421122	SURVEYING , LEVELING & CONSTRUCTION	PR II	3 hrs.	100	50	6	30421123	CIVIL MATERIALS & ESTIMATING AND COSTING	PR III	3 hrs.	100	50			Total			600	255
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## **THEORY I**

### **PART A**

#### **ENGINEERING DRAWING & CIVIL ENGG. DRAWING**

<b>CHAP TER</b>	<b>CONTENTS</b>
1	INTRODUCTION: Introduction to Engineering Drawing Importance in the Engineering Profession
2	DRAWING INSTRUMENTS AND THEIR USES Various drawing Instruments and their uses Lines, Lettering, Dimensioning techniques
3	SCALES: Introduction, Types of scales Representative fraction
4	LETTERING: Lettering techniques and practice, Free hand lettering, Vertical and inclined
5	LINES : Different types of lines, Practice in free hand sketching of horizontal vertical dotted and inclined lines Geometrical figures, Triangles, rectangles and circles.
6	PRINCIPLES OF PROJECTION : Recognition of objects from the given pictorial , Pictorial view Identification of surfaces from different objects, Meaning and principle of projection , Methods projection – First angle and Third angle projection, Four quadrants, Orthographic projection, Symbols methods of projection
7	FREE HAND SKETCHING : Definition, Necessity, Practice in free hand sketching of various object
8	SECTIONS : Meaning and Importance, Methods of representing the section, Conventional sections for various material
9	ISOMETRIC : Isometric projection, Isometric axes, Lines and line planes, Isometric projection of planes, Prisms, Pyramids, To draw object from given view
10	DIMENSIONING : Dimensioning technique and requirement of views, Necessity of dimensioning, Method and principles of dimensioning as per ISI, Requirement of view for complete dimensioning

## THEORY I

### PART B

CHAPTER	CONTENTS
1	<b>INTRODUCTION :</b> Introduction, Importance of Engineering Drawing, Drawing Instruments, Equipments and Materials, Lettering Technique, Lines Lettering and Dimensioning, Types of Lettering, scales used in Drawing
2	<b>GENERAL CIVIL CONVENTIONS :</b> Meaning of F.S.I., Built up area, Carpet area, Rules for selecting different types of room and their size and floor heights
3	<b>DOORS AND WINDOW :</b> Types of Door, Types of window, Scaled Drawing of various Door, Scaled Drawing of Various window, Fixtures and fastening for window, Fixture for door
4	<b>SYMBOLS :</b> Construction symbols, Plumbing and sanitary symbols, Electrical symbols
5	<b>PLUMBING :</b> Plumbing accessories, Types of accessories Layout for sanitary work
6	<b>R.C.C. :</b> Different Types of stair, Structural steel work, Roof Truss, Drawing of slabs ( one way and two way ), Beams, column, R.C.C. Foundations, Bar bending schedule
7	<b>FREE HAND SKETCHING :</b> Definition ,Necessity, Practice in free hand sketching of various object
8	<b>PERSPECTIVE :</b> Perspective views, Definitions of perspective, Elements, Station point, Picture plane, Methods of perspective projections
9	<b>BUILDING BY LAWS AND STANDARD NORMS</b> Definition of Marginal Distance and their necessity,  Normal Marginal Distances provided for Residential Building, Minimum Dimensions of Living Room, Bed Room, Master bed Room, W.C. Bath, Toilet, Permissible Built up area for Residential Building, Public Building
10	<b>INTRODUCTION TO AUTO CAD :</b> The Auto CAD Interface, Auto CAD's main window, How to access commands, Creating a standard symbols – block, Viewing drawing – zoom pan, Setting up a drawing increment, Creating objects, Drawing lines, Drawing spline curves, Editing methods, Renaming objects, Selecting, Copying objects, coping within a drawing, multiple copying using grips, copying with the clipboard, Objects – offsetting, mirroring, moving, Erasing Aligning, Rotating, Dimensioning

## **PRACTICAL I**

### **PART A**

<b>CHAP TER</b>	<b>CONTENTS</b>
1	Drawing Instruments
2	Drawing Equipment and Material
3	Lettering
4	Sections of Materials and types of lines
5	Geometrical construction
6	Orthographic projection – First angle method
7	Orthographic projection – Third angle method
8	Lines, Lettering and Dimensioning
9	Scale – Plain , Isometric
10	Projection of plans/ points / line
11	Isometric projection
12	Free hand sketching
13	Dimensioning
14	Different types drawings sections
15	Sections of Different material

## PRACTICAL I

### PART B

SR.NO	CONTENTS	NO.OF SHEETS
1	Lines, Lettering, Dimensioning	2
2	Plain Scales and Isometric Scales	1
3	General Conventions	1
4	Door and Window	2
5	Different Fixtures and Faster	2
6	Symbols	1
7	Plumbing – Types of accessories	2
8	Different stairs	2
9	Different R.C.C. work	2
10	Free hand sketching	1
11	Perspective drawing 2 point simple – object – 2 sheet other two point, Perspective of Building	4
12	Visit to P.W.D.office and Site	
13	Visit to Municipal civil office	
14	AUTO CAD PRACTICE : To study Auto CAD's main window,  To practice and access commands, To practice creating a standard symbols – block, To practice viewing drawing – zoom pan,  To practice setting up a drawing increment, To practice creating objects, To practice Drawing lines, To practice Drawing spline curves, To study Editing methods, To study Renaming objects, To study Copying objects, coping within a drawing, multiple copying using grips, copying with the clipboard, To study Objects – offsetting, mirroring, moving, Erasing Aligning, Rotating, To practice drawing various orthographic objects, To practice drawing isometric objects, To practice drawing plan, elevation	

## THEORY II

### PART A

#### SURVEYING ,LEVELING & CONSTRUCTION

CHAP TER	CONTENTS
1	INTRODUCTION : Definition of Surveying, Objects of Surveying, Use of Surveying, Principles of Surveying, Plain Scales
2	LINER MEASUREMENT : Study of Chain and tape ranging rod, peg etc., Methods of ranging , chaining on slope, Error in chain, Correction of Area if chain is too long or too short
3	CHAIN AND CROSS STAFF SURVEYING : Study of cross staff and optical square and their use, Chain triangulation, Selection of stations, Conventional symbols  Chaining across an obstacle, Chain and cross staff survey for calculating area of field on plot
4	CHAIN AND COMPASS SURVEY : Open and close traversing ,Prismatic compass, Definition of Bearing, Traversing methods, Fore and Back bearing of a line, Definition of local attraction, Calculations of Included angle ,Correcting of Included angle bearings line,  Method of plotting Traverse
5	LEVELING : Definition of Terms, Types of Bench mark,  Study of Dumpy level, Tilting level, leveling stones, Terms used in leveling fore sight Intermediate sight Back sight, Classification of leveling – simple, Differential, Fly, Profile and cross sectioning leveling, Errors in leveling
6	CONTOURING : Definition of contour, Characteristics of contour, Uses of contour Map,Methods of plotting contour
7	PLANIMETER : Study of Planimeter parts, Digital Planimeter, Use of Planimeter
8	PLANE TABLE SURVEYING : Principles of Plane table Survey, Setting of Plane table, leveling, centering & orientation, Radiation, Situations where plane table used
9	THEODOLITE : Study of Theodolite, Centering and temporary adjustments of Theodolite, Measurement -  Horizontal angle by Repetition Method, Measurement - of vertical angle

## THEORY II

### PART B

CHAPTER	CONTENTS
1	INTRODUCTION : Importance of subject, Introduction to different , components of building Inspection of site, center line, job lay out for construction of structures
2	FOUNDATION : Importance of foundation – purpose, types and Materials, Shallow foundation – purpose and limitations of Foundation on sandy and clayed soils, wall footings, coloumn footings, raft foundation, Deep foundation – purpose of piles cast in situ piles, Foundation on black cotton soils
3	BRICK MASONRY : Brick – Sun dried and burnt bricks, conventional size , In practice, standard size according to IS. Qualities of good bricks, field and laboratory tests, Definition of different terms used in brick masonry, Requirements of good brick work, English, Flemish, Header and Stretcher bonds , Laving of brick work, Empirical and simple rules of design of brick walls
4	STONE MASONRY : Occurrence, Characteristics of good building stone, Construction of stone masonry in various parts of structures, Types of stone masonry, Tools and equipment used in stone masonry
5	LINTEL SILLS AND ARCHES : Lintel, purpose, bearing, thickness, various materials Used, Types of Arches, Technical term
6	DOORS AND WINDOWS : Purpose, Location different types and their functions, Types of door and window
7	FLOOR : General terms, Types of floors, Method of construction of cement, Concrete, Mosaic & Terrazo floors
8	ROOFS : Definition, Classification of Roofs, Pitched roof, Steel stresses, Roof covering material
9	FROM WORK : Requirement of form work, Material used for form work, Failure of from work, Form work – column, footing, columns and stairs
10	SCAFFLADING : Scaffolding shoring and under pinning, Definition , types of scaffolding, shoring and under pinning
11	CARPENTARY
!2	SURFACE FINISHING

## PRACTICAL II

### PART A

CHAP TER	CONTENTS
1	Study of chain and its parts 20 m and 30m chain arrows, pegs, Ranging rod.
2	Fixing of station and measuring length of line joining them and entering field book Ranging a line using Ranging Rod
3	Information of Electronic Distance meter
4	Study of cross – staff and optical square
5	Location sketch of a station
6	Chain and cross staff survey to measure area of a field or plot
7	Study and use of prismatic compass
8	Setting up of compass on a station and taking bearings and included angles between lines
9	Study of Dumpy level, Parts of Dumpy level. Temporary Adjustment of level. Axis of Dumpy level
10	Study of leveling
11	Taking reading with Dumpy level from leveling staff
12	Differential leveling Taking Reading recording in field Book calculating of Reduced level
13	Block contouring
14	Study of Planimeter parts
15	Digital Planimeter
16	Study of component parts of plane Table
17	Setting up of plane table temporary Adjustments locating points by method of Radiation and Intersection
18	Study of parts of Theodolite
19	Setting up of theodolite, centering and temporary adjustments
20	Measurement of Vertical Angle



## **PRACTICAL II**

### **PART B**

<b>CHAPTER</b>	<b>CONTENTS</b>
1	Visit to new construction site study to line plan
2	Study to Excavation line plan
3	Study to different type of foundation
4	Draw the Different type of foundation
5	Visit to foundation work
6	Study to various types of brick bond
7	Study to various types of stone masonry
8	Different types of brick bat
9	Quality good brick
10	Supervising points to be observed in brick and stone masonry Draw the different types of brick masonry and stone masonry
11	Technical terms to stairs case
12	Types of staircase, Draw the different types of stairs case
13	Draw the different types of stair case
14	Various types of Arch
15	Draw the Different types of Arch and Technical terms
16	Various type of Door and Window and their use
17	Draw the Different types of Door and Window
18	Draw fixtures and fastenings to door and window
19	Various types of floor and their use
20	Draw the different types of floor
21	Various types of roofs and their use
22	Draw the different types of roof
23	Requirement to form work and use
24	Visit to form work in site
25	Study to different scaffolding and use
26	Draw the different types of scaffolding
27	Study to carpentry tool and joints
28	Study to plastering work

### **THEORY III**

#### **PART A**

#### **CIVIL MATERIALS & ESTIMATING AND COSTING**

<b>CHAPTER</b>	<b>CONTENTS</b>
1	BRICK : General Information, Use of bricks, Composition of good brick earth, Field testing of bricks, Texture, colour, shape, Water absorption, Stocking and counting of bricks
2	STONES : Different types of rocks and their classifications Various building stones, their uses, units of purchase, Aggregate – Its meaning, classifications and use, Commercial names and units of purchase, types of aggregate
3	TERRACOTTA : Meaning – Earthen ware and atone ware, Properties and uses of earthen ware and stone ware pipes, Different types of traps
4	CEMENT : Meaning General Information, Various types of cement, Properties and use, Laboratory Tests, Field Tests, Units of measurements and purchase, Requirements of godown for cement, Method of stocking
5	TILES : Clay flooring tiles, Manufacture of tiles, Different types of tiles, General properties and uses of tiles
6	CONCRETE : Meaning – Types of concrete and use, Ingredients of cement concrete, Properties, Cement , concrete, lime concrete, Surkhi concrete Reinforcement concrete, Vibrated concrete, Grading of concrete
7	LIME : Meaning – Quick hydraulic lime, Classification of lime, Properties and use, Field tests of hydraulic lime
8	MORTAR : Meaning and uses of mortar, Preparation of lime and cement concrete, Preparation of surkhi mortar, Ingredients of mud mortar, Types of mortar, Properties of mortar and their use
9	TIMBER AND ITS ALLIED PRODUCTS : Meaning and importance, Different Types of timber, Preservation of timber, names of different preservatives and their use , General defects in timber, Characteristics of good Timber, Seasoned Timber, Defects in timber, Plywood, veneers, card board, lamin boards, fibre boards ply boards, sumica etc.
10	BUILDING FINISHING MATERIALS : Distempering , White washing, Colour washing, Distempering, Wall papering, Varnishes, Polish, Paints, Hard – wars
11	FIRE PROOFING MATERIALS : Characteristics of good fire proofing materials, Different fire proofing materials
12	MISCELLANEOUS MATERIALS : D.P.C. material Glass, Sand paper, Emery paper, Adhesives , Linoleum , Metals Ferrous

### THEORY III

#### PART B

CHAPTER	CONTENTS
1	<b>INTRODUCTION :</b> Meaning of Term Estimating, costing Estimate, Approximate Estimate, Detailed Estimate
2	<b>APPROXIMATE ESTIMATE :</b> Definition of approximate Estimate, Uses of Approximate Estimate for building, Method of preparing Approximate and Estimate for building, Plinth Area method, Cubical unit, Service unit Bay unit
3	<b>DETAIL ESTIMATE :</b> Definition of Detail Estimate, Uses of Detail Estimate, Procedure of preparing detailed estimate of any work, Preparation of Recapitulation sheet, Types of Detail Estimates, Procedure of calculating, Multiplying factor related to oil painting
4	<b>MODES OF MEASUREMENT :</b> Points considered while fixing unit of measurement, Modes of measurement
5	<b>RATE ANALYSIS :</b> Meaning of Term Rate Analysis, Necessity of Rate Analysis, Definition of Task work, Methods of payment to labour, Preparing rate analysis, Standard Schedule of Rate
6	<b>CONTRACTS :</b> Definition of contract, Object of contract, Requirement of valid contract, Types of contract, Lump sum contract, Percentage item Rate contract, Classes of contractor
7	<b>SPECIFICATIONS :</b> Necessity of specifications, Type of specifications, Preparation of specification, Standard specification book
8	<b>CONDITIONS OF CONTRACT :</b> Necessity of conditions of contract, Tender Document, Bill of Quantity, Contract Drawing, Permission of contract, Extra item, Payment to contractor, Clearance of file and completion certificate, Arbitration
9	<b>PAYMENT TO CONTRACTORS :</b> Modes of payment to contractor, Types of interim payment, Payment- Advance, secured, Advance, Account Final, First and final, Petty Advance, Measurement book
10	<b>TENDER DOCUMENT AND TENDER NOTICE :</b> List of Trends document, Necessity of Trends, Points to be observed while framing Tender, Corrigendum tender Notice Opening of Tender, comparative statement, Scrutiny of Tender, Work order, Rejection of all tenders, Point to be observed by contractor

### **PRACTICAL III**

#### **PART A**

<b>CHAP TER</b>	<b>CONTENTS</b>
1	Market survey for various types of bricks
2	Market survey for Stone, aggregate, sand, etc.
3	Market survey for earthenware and stone ware products
4	Market survey for cement product like, tank, pipe, jail, kundi etc
5	Market survey for cement
6	Market survey for Flooring, roofing and wall tiles
7	Market survey for Steel of various types and Diameter, Binding wire
8	Market survey for various types of timber
9	Market survey for allied products such as plywood
10	Market survey for plastic PVC product
11	Market survey for building Hardware
12	Market survey for Various types of wall paper
13	Market survey for White wash
14	Market survey for Varnish and polishing materials
15	Market survey for paints
16	Field test of cement and bricks
17	Market survey for D.P.C. and water proofing materials
18	Market survey for Adhesive materials
19	Market survey for types of glasses
20	Market survey for cleaning materials

## **PRACTICAL III**

### **PART B**

<b>CHAP TER</b>	<b>CONTENTS</b>
1	Preparing approximate estimate of a building using approximate method
2	Preparation of Detail Estimate of Residential Building ( load Bearing structure )
3	Details estimate of septic Tank
4	Details estimate of Sump well
5	Collecting Market rates of material and labours
6	Preparation of rate analysis
7	Preparation of specification
8	Write about contract
9	Draft tender notice
10	Tender form
11	General Directions to contractor
12	Schedule A
13	Schedule B
14	Schedule C
15	Calculating quantity of concrete and steel for 2 to 3 R.C.C. building
16	Preparation of bar chart for a small work
17	Preparation of CPM chart for small work

### List of Reference Books

Sr. No.	Author	Book	Publications
01.	Sandeep Mantri	The A to Z of Practical Building Construction and Its Management	Staya Prakashan, New Delhi
02.	Sushil Kumar	Building Construction	
03.	Ahuja Birdi	Fundamentals of Building Construction	
04.	Rangwala	A Text Book of Building Construction	
05.	Philbin	Basic Plumbing	Prentice Hall
06.	Inness J. H.	Teach yourself plumbing	The English University press Ltd.
07.	Rules and Regulations by laws of Corporation/ municipal Corporation		
08.	I.S. Code for Materials and Building work		
09.	Schedule Of Rates – B and C		
10.	Specification Rate book – B and C		
11.	Chaudhari – Building Material		
12.	Dutta B.N. – A Text Book of Estimating and Costing		
13.	Ithart M – Teach yourself House Repairs		
14.	Vastu shilpa yojna va Abhikalpana (Marathi)	Maharashtra Vidyapith	Grantha Nirmal Mandal – Nagpur
15.	Surveying and Levelling (Vol I)	T. P. Kulkarni and S.V. Kulkarni	
16.	Parbat Singh	Lini Engineering Materials	
17.	B.C.Punmia	Building Costruction	
18.	N.D.Bhatt and V.M. Panchal	Engineering Drawing	Charotar Publications, Anand
19.	M.Y.Subnis	Cement concrete mix design	Vipu Publications, Bombay
20.	R.S.Malik, G.S.Deo	Civil Engineering Drawing	
21.	W.B.mckay	Building Construction Volume – 1, 2, 3, 4	Orient Longman
22.	B.Shri Kapare	Concrete – Ek Tantra (Marathi)	
23.	Dhabale / Patwardhan	Bandhkamacha Onama (Marathi)	
24.	B.D.Erande	Bandhkam Andazpatrak shastra (Marathi)	
25.	Shah, Kale, Patki	Building Drawing	

26.	B.S.Patil	Civil Engineering Contracts	Orient Longman
27.	Vazrani, Chandola	Construction Management	
28.	Harpal Singh	Construction Management	
29.	B.C.Gupta	Construction Management and Accounts	Standard Publishers
30.	Hajra Choudhari	Elements of Workshop Technology Part I	

#### List of Tools and Equipments

Sr. NO.	Name	Qty.
01.	Sensitive Balance with weights	1 Set
02.	Ventilated Oven	1
03.	Slump Cone	1
04.	90 micron sieve	1
05.	Sand sieves	1
06.	Needle Vibrator	1 each
07.	Screened Vibrator	1
08.	Vicat's Apparatus	1
09.	Drilling machine	1
10.	Tile cutting machine	1
11.	Mini mixer (1/2 cement bag)	1
12.	Over Head projector with screen	1
13.	Bar Bending table	1 Set
14.	Different size of Trays	1 Set
15.	Carpenatry Vice	2
16.	G cramp	1
17.	Batching Box	2
18.	Dumpy level with staff	1
19.	Cross staff survey set	2
20.	Prismatic compass with stand	1
21.	Steel Tapes – 3m , 5m , 10m	5 Each
22.	Metallic tape – 15m , 30 m	2 Each
23.	Scale – 1 m	1
24.	Trowels	10
25.	Steel Buckets	5
26.	Iron pans	5
27.	Rammer	1
28.	Linedori Bundles	2
29.	Plumb bob	5
30.	Spirit level	5
31.	Tube level	5
32.	Spade	2
33.	Measuring Cylinder	2
34.	Pickaxe	2
35.	L square	5
36.	Scabbling hammer	2
37.	Claw hammer	2
38.	Sledge hammer	2
39.	Ball peen hammer	2
40.	Cross peen hammer	2

41.	Wooden Mallets	2
42.	Punch, point and Gauge	1 Set
43.	Spanner set	1
44.	Screw Drivers	5
45.	Aluminium Float	2
46.	Wooden Float	2
47.	Spong	2
48.	Plastering Drum machine	1
49.	Metal float	2
50.	Corner float	2
51.	Corner float	3 Each
52.	Painting Brush – 1” , 2” , 3” , 4” , 6”	2
53.	Scraping Tool	1
54.	Spray Gun	1
55.	Palti Patra	5
56.	Ratchet Brace	1
57.	Bradawal	1
58.	Gimlet	2
59.	Hand saw	2
60.	Compass saw	2
61.	Mortise chisel	2
62.	Firmer chisel	2
63.	Jack plane	5
64.	Plier	2
65.	Oil stone	2
66.	Saw setting plier	1
67.	Glass cutter	2
68.	Augar	2
69.	Marking Gauge	2
70.	Channi , Katawani	2
71.	Various dags for bar bending – 6mm,8 mm,10 mm,12 mm	2 Sets
72.	Pipe vice	2
73.	Pipe Die set – ½” , 1”	1
74.	Tap wrench	1
75.	Pipe wrench	2
76.	Tennon saw	2
77.	Pincers	2
78.	Try squares	5
79.	Compass	2

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