

Maharashtra State Board of Vocational Examination, Mumbai 400 051

1	Name of Course	Diploma Course in Building Construction Supervisor									
2	Course Code	304405									
3	Max no. of Students	25									
4	Duration	2 year									
5	Course Type	Full Time									
6	No. of Days per week	6 days									
7	No. of hours per day	7 Hrs									
8	Space require	Theory Class Room – 200 sqft Three Practical Lab – 500 sqft each									
9	Entry qualification	S.S.C. Pass									
10	Objective of syllabus	To get Knowledge of Building Construction, To Understanding Building Drawing, To Prepare Estimate, To Prepare Building Drawing on CAD, To do Building Supervision Work									
11	Employment opportunities	Office of Architect, Office of Consultant Civil Engineer, Office of Builder, any Civil Engineering Firm, his own practice as Building Supervisor									
12	Teachers Qualification	1) For Vocational subject - B.E.Civil 2) For Non Vocational Subject - Master Degree in Concern subject									
13	Teaching Scheme –										
	Sr.	Subject	Subject Code	Clock Hours / Week				Total			
				Theory	Practical						
	1	English (Communication Skill)	90000001	2 Hrs	1 Hrs			3 Hrs			
	2	Elective – I		2 Hrs	1 Hrs			3 Hrs			
	3	Elective – II		2 Hrs	1 Hrs			3 Hrs			
	4	Building Material and Construction	30440001	3 Hrs	8 Hrs			11 Hrs			
	5	Building Drawing and CAD	30440002	3 Hrs	8 Hrs			11 Hrs			
	6	Construction Practice and Estimation	30440008	3 Hrs	8 Hrs			11 Hrs			
	Total								42 Hrs		
14	Internship	Two Months Summer Internship from 1 st May to 30 th June is Compulsory.									
15	Examination Scheme – Final Examination will be based on syllabus of both years.										
	Paper	Subject	Subject Code	Theory			Practical		Total		
				Duration	Max	Min	Duration	Max	Min	Max	Min
	1	English (Communication Skill)	90000001	3 Hrs	70	25	3 Hrs	30	15	100	40
	2	Elective – I		3 Hrs	70	25	3 Hrs	30	15	100	40
	3	Elective – II		3 Hrs	70	25	3 Hrs	30	15	100	40
	4	Building Material and Construction	30440001	3 Hrs	100	35	3 Hrs	100	50	200	85
	5	Building Drawing and CAD	30440002	3 Hrs	100	35	3 Hrs	100	50	200	85
	6	Construction Practice and Estimation	30440008	3 Hrs	100	35	3 Hrs	100	50	200	85
										900	375
16	Teachers – Three Teachers per batch for vocational component. For English, Elective-I & II guest faculty on clock hour basis.										
17	a) For Elective I – Student can choose any one subject						b) For Elective II – Student can choose any one subject				
	Code	Subject Name					Code	Subject Name			
	90000011	Applied Mathematics					90000021	Applied Sciences (Physics & Chemistry)			
	90000012	Business Economics					90000022	Computer Application			
	90000013	Physical Biology (Botany & Zoology)					90000023	Business Mathematics			
	90000014	Entrepreneurship									
	90000015	Psychology									

Subject - Building Material and Construction

Code No – 30440001

Theory	Practical
Chapter 1: Stone and Coarse Aggregate 1.1. Classifications of Rocks 1.2. Quarrying for stone 1.3. Commonly used stones in building 1.4. Requirements of good building stone 1.5. Study of crushers for obtaining coarse Aggregate 1.6. Common sizes of coarse Aggregate used in concrete 1.7. Properties of coarse Aggregate	Practical 1) Visit to Quarry to observe quarrying operations 2) Conduct Compressive strength Test on stone 3) Conduct Abrasion Test of Metal
Chapter 2: Bricks 2.1. Study of earth (Soils) used in manufacturing of Brick 2.2. Procedure of manufacture of Bricks 2.3. Classification of Bricks 2.4. Properties of a good Brick 2.5. Other types of Brick	Practical 1. Field Tests of Brick 2. Conduct Compressive Test on Brick 3. Conduct Water absorption on Brick
Chapter 3: Cement 3.1 Grades of cement as per IS 12269 – 1987, IS 8182 - 1989 and IS 289 - 1989 3.2 Ingredients of Cement, Manufacture of Cement (only introduction) 3.3 Various Types of Cements and its uses 3.4 Effect of Cement on properties of concrete 3.5 Storing of Cement	Practical 1. Field Tests of Cement 2. Determining initial & final setting time of Cement 3. Determining fineness Modulus of Cement 4. Determination of Compressive strength of cement
Chapter 4: Fine Aggregates 4.1. Types of fine aggregates used in preparation of cement mortar and concrete 4.2. Sources of fine aggregate 4.3. Properties of River Sand 4.4. Silt content and necessity of Screening & Washing of fine Aggregates	Practical 1. Sieve Analysis of Sand for finding fineness modulus 2. Finding Silt content in Sand
Chapter 5: Cement Mortar 5.1. Ingredients of Cement Mortar 5.2. Preparation of Cement Mortar – Hand Mixing, Machine Mixing – Advantages and Disadvantages 5.3. Various Proportions of Cement Mortar 5.4. Lime Mortar, its properties and use	Practical 1. Preparation of Cement Mortar 1:6
Chapter 6: Concrete 6.1) Ingredients of Concrete 6.2) Types of Concrete Plain Cement Concrete, (PCC) and Reinforced cement concrete (RCC) 6.3) Various proportion of Concrete and its uses, Batching of concrete- Volume batching and weigh batching 6.4) Procedure for preparing concrete – Hand Mixing, Machine Mixing 6.5) Transportation of concrete, precautions to taken . 6.6) Laying of concrete & precautions to taken 6.7) Necessity of compacting of concrete, equipments used for compacting concrete 6.8) Necessity of curing, Methods of curing 6.9) Workability - water cement ratio and its importance 6.10) Hydration of Cement 6.11) Quality of water	Practical 1) Conduct Compressive Test on Concrete (cube Test) 2) Conduct Test for Workability (slump test) 3) Conduct Compaction factor Test 4) Introduction to Non Destructive Tests on Concrete

6.12) Finishing of concrete surface 6.13) Admixtures used in concrete and properties of such concrete 6.14) Ready mix concrete, Properties, Manufacturing and its uses 6.15) Advances in concreting such as self compacted concrete, Trimix Concrete, etc	
Chapter 7: Steel 7.1) Types of steel used in RCC as per ISI 7.2) High Tensile Steel its properties, study of IS 1786 7.3) Cover for steel as per IS 456 - 2000 7.4) Types of sections used in Steel Structure and its properties 7.5) Rolled steel Joist of different sections and its uses	Practical 1) Conduct Tensile Test on mild steel bar / HYSD Bars
Chapter 8: Flooring Tiles 8.1) Shahabad Tiles, Kotah Tiles, Cuddappa Tiles, Marble Tiles, Granite, its occurrence, Sources of availability and its uses 8.2) Cutting of tiles 8.3) Cement tiles, marble mosaic tiles, chequered tiles- process of manufacture, and its uses 8.4) Ceramic Tiles, process of manufacture, Normal sizes & its uses 8.5) Cement mortar Briquettes , Process of manufactures and its uses	Practical 1) Conduct Bending Test of tiles 2) Conduct Abbreviation test of tile
Chapter 9: Timber 9.1) Types of Timber. 9.2) Sections of Timber. 9.3) Characteristics of Good Timber. 9.4) Defects in Timber. 9.5) Decay of Timber and remedies. 9.6) Seasoning of Timber, necessity and methods. 9.7) Preservation of Timber. 9.8) Timber based Product Plywood; Block Board, Veneers, Particle wood 9.9) Finishing to Timber a) Painting b) Polishing c) Sun mica	Practical Report on Visit to a Timber Factory
Advance Building Materials 10.1) Study of latest materials used in Flooring, Thermal Insulation, Sound proofing, Wall finishing, structural glazing, Metal Cladding & rendering, Partitioning, and Painting	

Chapter 10: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 8.4) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, cover for bars. 8.5) Standard Hook length for plan M. S. bar, Standard length of "EL" for Torque steel bar 8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints.	Practical i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule v) Perform bar bending and binding by using G.I. wire for forming Hook, EL, Bend, Lap, stirrups of 6 mm bar for column and beam
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Subject - Building Material and Construction - 2nd Year

Code No – 30440001

Theory	Practical
Chapter 1: Foundation 1.1) Necessity and Purpose of Foundation 1.2) Shallow Foundation 1.2.1) Spread Foundation 1.2.1.1) Footing for load Bearing Structure 1.2.1.2) Column Footing and combined Footing 1.3) Raft Foundation 1.4) Grillage Foundation 1.5) Deep Foundation and its types 1.5.1) Cast in-situ R.C.C. concrete pile 1.5.2) Pre cast concrete piles 1.6) Foundation in Black cotton soil, Under reamed pile	Practical 1) Line out for 3 to 4 Room Load Bearing Building 2) Line out for Framed structure
Chapter 2: Excavation 2.1) Manual method of Excavation 2.2) Mechanical Method of Excavation 2.3) Machines used for excavation 2.4) Disposal of Excavated Material 2.5) Dewatering of trenches different methods used 2.6) Shoring and strutting of Trenches 3.0) Precaution while excavation, Fencing, caution signs, removing excavated material	Practical Visit to Site to study different methods of Excavation
Chapter 3: Plain cement concrete 3.1) Mix design of concrete and uses of different mix of concrete 3.2) Procedure of preparing concrete. Manual and machine mixing, Transporting Laying, compacting and curing of concrete 3.3) Admixtures used in concrete 3.4) Ready mix concrete	Practical 1) Visit to site showing ingredients and process of mixing, transportation, laying, compacting and curing of concrete

Chapter 4: Stone Masonry 4.1) Terms used in stone masonry 4.2) Procedure of constructing un coursed Rubble and Coursed masonry, purpose of through stone in stone masonry 4.3) Points to be observed while constructing stone Masonry	Practical 1) Construction of UCR stone masonry in foundation work, UCR stone masonry for compound wall (ht 1.2 m to 1.5 m)
Chapter 5: Brick Masonry 5.1) Terms used in Brick Masonry. 5.2) Construction of Brick Masonry in English bond and Flemish Bond in cement mortar, pre-construction preparation, procedure of construction, post construction precaution 5.3) Brick Masonry stretcher bond and half brick thick masonry. 5.4) Hollow and solid concrete block masonry 5.5) Fixing of Door and window Frame in masonry 5.6) Brief information of Siporex block masonry 5.7) Brief information of Concrete Block masonry	Practical 1) Construction of Burnt Brick Masonry in superstructures in English Bond / Flemish Bond 2) Construction of concrete block masonry in superstructure
Chapter 6: Scaffolding 6.1) Purpose and Necessity of Scaffolding 6.2) Single and Double Scaffolding, name of parts erecting Scaffolding. 6.3) Materials used for Scaffolding, Tubular steel scaffolding	Practical 1) Erecting Single Scaffolding up to G + 1 floor 2) Erecting Double Scaffolding up to G + 1 floor
Chapter 7: Lintels and Sills 7.1) Necessity of lintels 7.2) R.C.C. Lintels 7.3) Jambs, Sills, Head cladding, its purpose, materials used and construction procedures.	1) Study of Laying Lintels and Sills on Construction Site
Theory	Practical
Chapter 8: Reinforced Cement Concrete 8.1) Different types of RCC members Definitions, its properties and its locations 8.2) Ingredients of for R. C. C. Concrete 8.3) Batching of concrete ingredients- Definition and methods, volumetric method and weight batching method of concrete mixing 8.4) Shape and types of Reinforcing steel bars used in RCC members. Explain Terms used - Cutting of bar; Straightening of bar; Bending of bar; Hooking of bar; lapping of bar, Binding of bars, use of G.I. wire, cover for bars. 8.5) Standard Hook length for plain M. S. bar, Standard length of "EL" for Torque steel bar 8.6) Joints in RCC work, Necessity, Types of joints in RCC work, Construction Joint, Expansion Joint, location of joints, Material used, & Procedure of construction of Providing Joints.	Practical i) Visit to site for observing Bar bending, laying of Reinforcement bars ii) Observe method of providing cover, placing concrete in RCC Members iii) Draw Figures – RCC Bars reinforcement in column Footing, column, beam, slab, lintel, Chajja, Loft iv) Exercise on preparing standard Bar bending Schedule v) Perform bar bending and binding by using G.I. wire for forming Hook, EL, Bend, Lap, stirrups of 6 mm bar for column and beam
Chapter 9: Centering and Form work 9.1) Definitions, Different members used in Form work and centering 9.2) Materials used in preparing centering and form work 9.3) Procedure of Erecting Centering and form work 9.4) Precautions while erecting centering and form for RCC work.	Practical 1) Draw Sketches of form work for column, Beams, Slab, Lintel and Chajja 2) Visit to site to study Centering and form work for abovementioned members and table formwork, Mivon formwork etc.

<p>Chapter 10: Pointing and Plastering</p> <p>10.1 Necessity of Pointing</p> <p>10.1.1) Materials used for Pointing</p> <p>10.1.2) Procedure of applying Pointing, preparation of surface to receive pointing, Procedure of applying pointing & post applying precautions</p> <p>10.1.3) Type of Pointing</p> <p>10.2 Necessity of Plastering</p> <p>10.2.1 Materials used for plastering</p> <p>10.2.2 Types of plaster internal wall plaster, External wall plaster, Ceiling plaster, different types of furnishings, Stucco plaster.</p> <p>10.2.3 Procedure of plastering for each of above type, Use of machines for plastering</p> <p>10.2.4 P.O.P. finish to wall</p>	<p>Practical</p> <p>1) Visit to site for observing procedure for different type of plaster work</p> <p>2) Hands on experience of applying plaster of size 3m x 3 m on internal & external wall surface</p>
<p>Chapter 11: Painting</p> <p>11.1. Necessity of painting, Types of paints, thinner, varnishes. Surface preparation, Use of Primers</p> <p>11.2. Anti corrosive paints, its primers, its necessity</p> <p>11.3. White Washing to walls and ceiling, Materials used, procedure for new and old surface</p> <p>11.4. Applying Dry Distemper to walls, Material, Procedure for new and old surface</p> <p>11.5. Applying Oil Bound Distemper and Emulsion, Materials used, Procedure for new and old surface</p> <p>11.6. Applying Cement Paint to External walls, Materials used, Procedure for New and old surface</p> <p>11.7. Applying Oil Paint Primer coat, procedure of applying oil paint to woodwork, steel work and walls.</p> <p>11.8. Melamine / French polish, its application on old and new wooden surfaces</p>	<p>Practical</p> <p>Hands on experience of Painting of surface with</p> <p>a) White wash 3m x 3m surface area</p> <p>b) Dry Distemper 3m x 3m surface area</p> <p>c) Oil Bound Distemper 3m x 3m surface area</p> <p>d) Cement Paint 3m x 3m surface area</p> <p>e) Oil Paint on new Steel work and old wood work</p>
<p>Stairs</p> <p>1.1) Definitions of Terms used in Stair.</p> <p>1.2) Classification of stairs based on shape and materials used for construction.</p> <p>1.3) Requirements of good stairs</p> <p>1.4) Design of stair Thumb Rules for Design of Dog legged stair</p> <p>1.5) Hand Rails Types and Fixing Procedure</p>	<p>Practical</p> <p>1) Draw neat Sketches of any 4 types of stairs</p> <p>2) Prepare design for RCC Dog-legged stair</p> <p>3) Draw its plan and sectional elevation</p> <p>4) Visit site to site for observing various type of stair</p>
<p>Roofs</p> <p>2.1 Definition & Purpose of Roof</p> <p>2.2 Technical Terms used in Roof</p> <p>2.3 Types of Roofs</p> <p>2.3.1 Pitched Roof</p> <p>2.3.2 Lean to Roof</p> <p>2.3.3 Couple Roof</p> <p>2.3.4. King Post Truss and Queen Post Truss</p> <p>2.3.5 Steel Trusses</p> <p>2.3.6 Roof Coverings necessity & Purpose</p> <p>2.4 Types of Roof Covering and Procedure of fixing</p> <p>a) Country Tile b) Mangalore Tile</p> <p>c) CGI sheet Roof – Size and procedure of fixing</p> <p>d) Acc sheet Roof – Type, Sizes and Procedure of fixing</p> <p>2.5 Flat Roof only R.C.C. Slab</p>	<p>Practical</p> <p>1. Draw sketch of couple Roof</p> <p>2. Draw sketch of King post and Queen post Truss.</p> <p>3. Draw Line Diagrams of steel Truss</p> <p>4. Draw sketch showing details of Joint King Post for steel Truss</p>

<p>Flooring</p> <p>3.1 Definition and terms used in flooring</p> <p>3.2 Flooring at Plinth level, Plinth filling & Plinth PCC</p> <p>3.2 Types of Floor finishes and its suitability</p> <p>3.3 Procedure of Laying Tiles such as Rough Shahabad for Pavement. Cement Briquette for pavement</p> <p>3.4 Procedure of Laying polished Shahabad Tile floor.</p> <p>3.5 Procedure for Laying cement Tiles, Marble Mosaic Tile, ceramic Tiles and Marble Tiles on floors.</p> <p>3.6 Procedure for fixing PVC tiles on floors</p> <p>3.7 Skirting – Function, materials used and procedure for fixing tiles.</p> <p>3.8 Dado - Function, materials used and procedure for fixing.</p>	<p>Practical</p> <p>1. Fixing of Tiles for Pavement</p> <p>2. Fixing of Tiles in area 3mX4m</p> <p>3. Fixing Tiles for Dado</p>
<p>Door And Window</p> <p>4.1 Functions of Door, Functions of window</p> <p>4.2 Rules for providing Doors & windows</p> <p>4.3 Parts of a Door and Window</p> <p>4.4 Materials used in making of Door & window</p> <p>4.5 Wooden and Steel Door and Window frame</p> <p>4.6 Types of Door Shutters</p> <p>a) Fully paneled Shutter</p> <p>b) Fully glazed shutter</p> <p>c) Flush Door</p> <p>4.7 Fixtures & fastenings for Doors</p> <p>4.8 Rolling shutter, collapsible shutters, sliding doors</p> <p>4.9 Types of Windows Shutter</p> <p>a) Fully Paneled shutter</p> <p>b) Fully glazed</p> <p>c) Sliding shutters.</p> <p>d) Lowered window</p> <p>e) Steel Window</p> <p>f) Aluminum sliding windows</p> <p>4.10 Fixtures and Fastening for windows</p> <p>4.11 Grills for window</p>	<p>Practical</p> <p>1. Draw to a scale, drawing of fully paneled</p> <p>2. Draw to a scale, drawing of fully glazed window</p> <p>3. Visit to observe different types of doors and Windows</p> <p>4. Draw Sketches of commonly used fixtures for Door & windows</p>

List of Books

Building Material

- 1] TTTI Chandigarh Civil Engg. Materials N. Delhi, McGraw Hill, 1992
- 2] Rangwala S. C. Engg. Materials Chariot or Book Publications,
- 3] Anand Gujrath Kulkarni G. J. A Textbook of engg. Materials

Building Construction

- 1] Mackay Building Construction Vol. 1 to 4 VaynStrand
- 2] Mitchell Elementary Building Construction B. T. Batsford, London
- 3] Molnar Building Construction Drafting and Design CBS Publications. Delhi
- 4] Sushil Kumar Building Construction Delhi : Standard Publishers, 1999, 18th Ed.
- 5] Arora S. P. & Bindra S. P. Building Construction Jaipur : Dhanapat rai & Sons
- 6] Rangwala S. C. Building Construction Anand : Charotar & Publishing House

Raw Material:

Sufficient Raw Material for the Syllabus Practical should be compulsorily made available to perform the practical. (e.g. Bricks, Sand, Cement, Aggregate, Lime powder, white cement, Tiles, Reinforcement Bars, Binding wire, Color, Paint, Turpentine, Brush and other such consumable raw material)

List of Tools and Equipment

A] General Class room

Sr	Name of Item	No.
1	Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm)	4
2	Chair with writing pad	25
3	Steel almari with self 6.5' x 3' (18 gauge)	2
4	Steel table 4' x 3'	2
5	Teacher chair	2

B] For Building Material and Construction Practical

Sr	Name of Item	No.
1	Compression Testing Machine 100 Ton Capacity (Hand Operated.)	1
2	Universal Testing Machine 40 T	1
3	Table Vibrator	1
4	Cube Mould (Small And Big)	4
5	Compaction Factor Test Apparatus	1
6	Aggregate Impact Test Apparatus	1
7	Shieve Shaker	1
8	Weighing Machine 100 Kg.	1
9	Small Sieve (All Type)	1
10	Mortar And Half Bag Concrete Mixer	1
11	Marble Cutter	1
12	High Speed Imact Drill	1
13	Marble Angle Grinder	1
14	Bench Grinder Double Ended Wheel Size 15 Cm	1
15	Vibratory Sand Screen	1

Sr	Name of Item	No.
16	Bolster 4" (100mm)	1
17	Pitching Tool (Mason)	1
18	Chisel Mason Hammer Headed Flat 200 Mm	10
19	Hammer Mason (Cube) 1.5 Lbs.	10
20	Hammer Mason	10
21	Level Masons 36" (1 Metre)	10
22	Plumb Bob.	10
23	Square (Steel) 2' X 1'	10
24	Trowel Plastering Double Hand	10
25	Trowel Brick 10"	10
26	Tasla (Tin) Pans	10
27	Spade	10
28	Measuring Steel Tape 15 Mtr.	5
29	Measuring Steel Tape 30 Mtr.	5
30	Wooden Straight Edges For Ft.	10
31	Ladders 2 To 4 Mtr.	2
32	Sledge Hammer 10 Lbs.	2
33	Buckets 14 Lits.	10
34	Bar Bending Tools And Cutting Tools 6mm To 12 Mm	2 set
35	Screw Driver 12 Inch	5
36	Pocket Steel Tape 2 Mtr.	25
37	Pick Axes	5
38	Wheel Barrow	3
39	Tubular Scaffolding 25 Mm Die With Coupling And Compete Fitting.	400 RFT
40	Steel Measuring Boxes 3 Nos. (6cft C Fts), 3 Nos. (12cfts)	6
41	Adjustable Props Steel	20
42	Platform 4 Ft X 4 Ft X 6 Ft.	2
43	Boaning Rods	2
44	Spanner Sets	1
45	Carpenter Claw Hammer	10
46	Mortise Chisel 6 Mm.	10
47	Firmer Chisel	10
48	Mallet	10
49	Pane (Iron)	10
50	Handsaw 1'6"	10
51	Drilling Machines	1
52	Sieve IS No. 9	1
53	Vicat'apparatus	1
54	Needle measuring flask	1
55	A set of 10 IS sieves 80mm, 40mm, 20mm, 10mm, 4.75mm, 1.18mm, 600u, 150u.	1 each
56	Top cover & bottom pan for sieves	1
57	Hacksaw frame	1
58	BSP Tap & Die set 18,20,25 mm	1 set
59	Pipe vice ½ " to 18" 2 each	2
60	Alluminum Level	2
61	Pipe Tube Level	2

Subject - Building Drawing and CAD - 1st Year

Code No – 30440002

Theory	Practical
A] Building Drawing	1 Year
Chapter 1: Introduction to Drawing 1.1) Different Drawing Instrument and their use 1.2) Letters its types, Sizes and its use in Drawing 1.3) Convention of different lines 1.4) Giving dimensions 1.5) Scales and its uses 1.6) Study of IS 962	Practical 1) Prepare Sheet on lettering 2) Prepare Sheet on lines 3) Prepare Sheets on Geometrical Construction 4) Prepare Sheets on Conventional Sign and Symbols
Chapter 2: Orthographic Projection 2.1) Introduction to orthographic projections 2.2) First Angle Projections Method 2.3) Third Angle Projections Method 2.4) Drawing orthographic Projections of simple pictorial view	Practical 1) 1 st Angle Projections ----- 2 Solids 2) 3 rd Angle Projections ----- 2 Solids
Chapter 3: Isometric View 3.1) Method of Preparing Isometric Views 3.2) Isometric View of Rectangular Objects 3.3) Isometric View of Circular Objects 3.4) Isometric View of Building	Practical 1) Isometric View of Rectangular Objects 2) Isometric Vies of Circular Objects 3) Isometric View of Building
Chapter 4: Building Drawing Dimensions and Details of Foundation C/S. DPC, Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi, Staircase etc.	Practical Detailed Drawing of Foundation C/S. DPC, Different Types of Door and Windows, Roof Trusses, Flooring C/S, Staircase, Brick Masonry, Lintel, Arches, Chajja, C/S details of RCC Chajja, Lintel, Beam, Footing, Column, Slab, Pardi, Staircase etc.
Chapter 5: Building By Laws and Standard Norms 3.1) Definitions of Plot Area, Plinth Area, Built up Area, Carpet Area, Floor Space Index (FSI) 3.3) Permissible Built up Area for Residential Bldg., Public Building 3.4) Definition of Marginal Distance and their necessity, Normal Marginal Distances provided for Residential Buildings 3.5) Definition and Necessity of Building Line, Development Line 3.6) Min Dimensions for following 3.6.1) Plinth height, Sill height, Head Room in Residential Bldg, Public Buildings, Mezzanine floor, Basements and stilts for car parking 3.7) Minimum Dimensions of: Living Room, Bed Room, Master Bed Room, W.C. Bath, Toilet. 3.7.1) Min. Width for passage and Balcony 3.8) Rules for Window Opening 3.9) Min. width of step and Landing, Head Room, Thumb Rules for fixing Rise and Tread. 3.9.1) Permissible Height of Pardi, of Building as per FSI and Road Width	Practical 1) Student to Draw for A Residential. Bungalow (Load Bearing) i.e. minimum 2 Bedrooms (one Bed room with attached Toilet), 1Hall, 1Kitchen, Veranda, Staircase, Toilet block, and Car Parking. a) Plan, b) Elevation c) Two sections d) Schedule of door and window e) Site plan, f) Area statement, g) Construction notes. h) Schedule of finishes

Chapter 6: Development of Line Plan of a Building 4.1) Symbols and notations as per BIS 696 in Civil Engg. Drawing. 4.2) Preparing Line Plan of Building, necessity of preparing line plan. 4.3) Development of Plan of Residential Building having living Room, Kitchen Room, Bed Room, Bath room and w.c. with slab. Draw to scale – Plan, Elevation Sections in 3 directions 4.4) Working drawings and its necessity.	2) Draw tracing of above drawing 3) Prepare ammonia sheet 4) Prepare a working drawing for Staircase, Toilet block and kitchen
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Subject - Building Drawing and CAD - 2nd Year

Code No – 30440002

Theory	Practical
B] Computer Fundamental	6 Month
1] Fundamentals Of Computer Introduction Components of PC The system Unit Front part of system Unit Back part of system Unit CPU Memory of computer Monitor Mouse, Keyboard Disk, Printer, Scanner, Modem, Video, Sound cards, Speakers	List of Practical 1. Working with Windows 2000 desktop ,start icon, taskbar, Recycle Bin, My Computer icon ,The Recycle Bin and deleted files Creating shortcuts on the desktop 2. The Windows 2000 accessories, WordPad – editing an existing document, Use of Paint – drawing tools The Calculator, Clock 3. The Windows Explorer window, concept of drives, folders and files? Folder selection techniques, Switching drives, Folder creation, Moving or copying files, Renaming, Deleting files and folders 4. Printing, Installing a printer driver, Setting up a printer, Default and installed printers, Controlling print queues, Viewing installed fonts, The clipboard and 'drag and drop', Basic clipboard concepts Linking vs. embedding,
2] Introduction To Windows 2000/Xp Working with window Desktop Components of window Menu bar option Starting window Getting familiar with desktop Moving from one window to another Reverting windows to its previous size Opening task bar buttons into a windows Creating shortcut of program Quitting windows	5. Moving through a Word document menu bar and drop down menus toolbars 6. Entering text into a Word 2000 document, selection techniques Deleting text 7. Font formatting keyboard shortcuts 8. Paragraph formatting Bullets and numbering 9. Page formatting What is page formatting? Page margins Page size and orientation Page breaks, Headers and footers 10. Introducing tables and columns

<p>3] GUI Based Editing, Spreadsheets, Tables & Presentation</p> <p>Application Using MS Office 2000 & Open Office.Org Menus Opening, menus, Toolbars, standard toolbars, formatting toolbars & closing Quitting Document , Editing & designing your document Spreadsheets Working & Manipulating data with Excel Changing the layout Working with simple graphs Presentation Working With PowerPoint and Presentation</p>	<p>11. Printing within Word 2000 Print setup Printing options Print preview</p> <p>12. Development of application using mail merge Mail merging addresses for envelopes Printing an addressed envelope and letter</p> <p>13. Creating and using macros in a document</p> <p>14. Creating and opening workbooks Entering data</p> <p>15. Navigating in the worksheet Selecting items within Excel 2000 Inserting and deleting cells, rows and column Moving between worksheets, saving worksheet, workbook</p>
<p>4] Introduction To Internet</p> <p>What is Internet Equipment Required for Internet connection Sending &receiving Emails Browsing the WWW Creating own Email Account Internet chatting</p>	<p>16. Formatting and customizing data</p> <p>17. Formulas, functions and named ranges</p> <p>18. Creating, manipulating & changing the chart type</p> <p>19. Printing, Page setup, Margins Sheet printing options, Printing a worksheet</p> <p>20. * Preparing presentations with Microsoft Power Point. Slides and presentations, Opening an existing presentation , Saving a presentation</p>
<p>5] Usage of Computer System in various Domains</p> <p>Computer application in Offices, books publication data analysis ,accounting , investment, inventory control, graphics, database management, Instrumentation, Airline and railway ticket reservation, robotics, artificial intelligence, military, banks, design and research work, real-time, point of sale terminals, financial transaction terminals.</p>	<p>21. Using the AutoContent wizard ,Starting the AutoContent wizard, Selecting a presentation type within the AutoContent wizard Presentation type Presentation titles, footers and slide number</p> <p>22. Creating a simple text slide, Selecting a slide Layout Manipulating slide information within normal and outline view, Formatting and proofing text, Pictures and backgrounds, drawing toolbar, AutoShapes, Using clipart, Selecting objects, Grouping and un-grouping objects, The format painter</p>
	<p>23. Creating and running a slide show, Navigating through a slide show, Slide show transitions, Slide show timings. Animation effects</p> <p>24. Microsoft Internet Explorer 5 & the Internet Connecting to the Internet The Internet Explorer program window, The on-line web tutorial Using hyper links, Responding to an email link on a web page</p> <p>25. Searching the Internet, Searching the web via Microsoft Internet Explorer, Searching the Internet using Web Crawler, Searching the Internet using Yahoo, Commonly used search engines</p>

<p>6] Information technology for benefits of community Impact of computer on society Social responsibilities Applications of IT Impact of IT Ethics and information technology Future with information technology</p>	<p>26. Favorites, security & customizing Explorer Organizing Favorite web sites Customizing options – general, security, contents, connection, programs, advanced 27. * Using the Address Book Adding a new contact Creating a mailing group, Addressing a message, Finding an e-mail address 28. Using electronic mail, Starting Outlook Express Using the Outlook Express window, Changing the window layout, Reading file attachment, Taking action on message-deleting, forwarding, replying 29. Email & newsgroups, Creating and sending Emails Attached files, Receiving emails, Locating and subscribing to newsgroups, Posting a message to a newsgroup 30. Chatting on internet, Understating Microsoft chat environment, Chat toolbar</p>
<p>C] Computer Aided Designing and Drafting</p>	<p>6 Month</p>
<p>1.0 CAD Software Meaning, various CAD software available in the market AutoCAD, Felix Cad, Auto Civil, 3D Max; etc.) Starting up of CAD, CAD Window, Tool bar, Drop down menu, Command window, Saving the drawing. Introduction of Graphic screen.</p>	<p>Practical related Creating New file, Closing Drawing, Saving Drawing, Startup Methods, Modes in AutoCAD, Use of Function Keys, Use of Keyboard and Mouse in AutoCAD Practice.</p>
<p>2.0 CAD Commands WCS icon, UCS icon, co-ordinates, drawing limits, grid, snap, ortho features. All Drawing commands, line, circle, polyline, multiline, ellipse, polygon etc. All Editing commands – Copy, move, offset, fillet, chamfer, trim, lengthen, mirror, rotate, array etc. Working with Layers, Block, hatches, fills, dimensioning, text etc.</p>	<p>Practice on Small Drawing Objects using Commands in Draw Menu Practice of Editing command on above drawing objects, Dimensioning Drawing, Creating Title block, Area Statement and Schedule of Opening using Text in AutoCAD,</p>
<p>3.0 Use of Cad software for practice of: Generation of line plan, Detailed Plan, elevation, section, site plan, Area statement and print commands Generation of 3D view using 3D Modeling commands and 3d Operation commands, Creating 3D of Building Introduction to Auto desk Architect , 3D Max</p>	<p>Drawing Plan, Elevation, Section, Site Plan in AutoCAD Creating 3D Model of Building and Generating required 3D view from all sides. Other CAD Practical based on the Theory.</p>

List of Books

Building Drawing

- 1] Malik, R.S. & Meo G.S. Civil Engg Drawing Delhi: New Asian Publishing
- 2] Shah P. J. Engg. Drawing – 1 Ahmedabad : D. J. Shah Publishing
- 3] Bhat N. D. Engg. Drawing Anand : Charotor
- 4] Gurucharan Singh Civil Engg. Drawing Delhi : Standard Publishers
- 5] Sane Y.S Building planning
- 6] Shaha Kale & Patki Building Drawing
- 7] Mackay W. B. IS962 Beuro of standards India (ISI)

Computer Fundamental

- 1] Vikas Gupta Comdex Computer Course Kit First Dreamtech
- 2] Henry Lucas Information Technology for management 7Th Tata Mc-Graw Hills
- 3] B.Ram Computer Fundamentals Architecture and Organisation Revised 3rd New Age International Publisher

CAD Books

- 1] Reference Manual of AutoCAD AutoDesk
- 2] Reference Manual of Felix cad Felix CAD
- 3] Reference Manual of Intel CAD
- 4] Reference Manual of Auto Civil
- 5] Reference Manual of 3D-Max

List of Tools and Equipment

A] General Class room

Sr	Name of Item	No.
1	Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm)	4
2	Chair with writing pad	25
3	Steel almari with self 6.5' x 3' (18 gauge)	2
4	Steel table 4' x 3'	2
5	Teacher chair	2

B] For Building Drawing Practical

Sr	Name of Item	No.
1	Drawing Board	25
2	Drawing Table	25
3	Mini Drafter	25
4	Triangular Scale	10
5	Glass board 8' x 4'	2

C] For Computer Fundamental and CAD Practical

Sr	Name of Item	No.
1	Computer System P4 with accessories Complete with license OS. compatible for- to run AutoCAD 2010 and Windows 7 OS.	5+1
2	Plotter- HP Design Jet 500 latest model	1
3	Scanner	1
4	Computer table	5+2
5	Chair for computer	10+2
6	Laser Printer	1
7	AutoCAD 2010 or above Software	1
8	M. S. Office Software	1

Construction Practice and Estimation – 1st Year

Code No – 30440008

Theory	Practical
To make the trainees familiar with workshop discipline, layout of the shop Tools & equipment safety precaution	Explanation - To make the trainees familiar with workshop discipline, layout of the shop Tools & equipment safety precaution
Marking out for carpentry work, use of carpentry basic hand tools for simple operation , Viz. Sawing, planing chiselling, drilling, etc. Complete. grinding of tools	Introduction to various carpentry tools & their use for Angle halving joint & Preparing door frame
Making simple carpentry joints used in door & roof trusses, timber floor, stairs, & centering work.	Preparing Mortise & Tennon joint A) For Door panel B) For King post truss
Use of joining devices, nails, screws, nuts & bolts.	Preparing Lapping scarf joint
Making centering for arches, door frames, formwork for pre-cast concrete member, jalli work etc.	Preparing centering & formwork for Slab, beam, Column, & Chajja etc.
Turning brick for stretcher & header face, gripping trowel, shaping mortar & lifting the same to spread on the bed, jointing bricks for stretcher and header courses	Types of Bricks as per their size & shape, Use of Tools for construction Brick masonry
Building a 4 ½ inch straight wall of about 6" stretcher bricks length and about 6 coursed high with one end stepped and other raked brick. Preparation of various types of mortars.	Construction of Brick wall in Stretcher bond in half brick thick wall
Building a 4 ½ quoin wall with one end raked back and the other end stopped use of plumb rule, setting out a quoin, straightening the tails use of line pins and line	Construction of Brick wall in Header bond in one brick thick wall
Building 9" wall and 13 ½ " wall in English bond with quoin one end stepped and other end raked back. Plumbing the first three and setting quoin bricks, use of corner blocks and line laying bricks to line raking out the joints and finishing it flush .	A) Constructing 9" thick corner wall (with Quoin) in English bond with one end raked back & other end toothing B) Constructing 13 ½ " thick corner wall (with Quoin) in English bond with one end raked back & other end toothing
Building a 9" and 13 ½" wall in Flemish bond with quoin, stepped end and toothing , method of setting out a bond pointing the joints in weather key and raised types.	A) Constructing 9" thick corner wall (with Quoin) in Flemish bond with one end raked back & other end toothing B) Constructing 13 ½ " thick corner wall (with Quoin) in Flemish bond with one end raked back & other end toothing
Construction of 9" wide English & Flemish garden wall bond, forming of coping with brick on edge.	Constructing Straight wall in A) English garden wall bond B) Flemish garden wall bond
Construction of 9" main wall and 9" cross walls in English bond, tying junctions of walls block bending	Constructing 'T' junction wall in brick masonry with Main wall 13 ½" thick & other 9" wall
Forming a door opening in a wall of English bond, bonding of jambs & reveals	Forming a door opening in a wall of English bond,
Forming a window opening in a wall in English bond , constructing sill with tile bricks with a ever sailing course , use of gauge rod, method of fixing door and window frames.	Forming a Window opening in a wall of English bond,
Spanning of opening with a Semi-circular Arch, setting out a Semi circular arch and making of centring cutting of templates for voussoirs & preparing voussoirs setting up rights if arch centering, placing wedges , braces and fixing of centering , construction of arch, fixing of key removing of centering	Constructing Semi-circular Brick Arch over window opening.

Spanning of openings , per-casting a lintel curing & setting the same in position, checking for equal bearing, plumb and solid bed	Preparing & Constructing Pre-cast R.C.C. 1:2:4 Lintel
Spanning of opening by casting a lintel in site construction of shuttering and supports with uprights and wedges placing reinforcement	Preparing & Constructing Cast in situ R.C.C. 1:2:4 Lintel
Construction of detached pillar, square and rectangular footing to pillars	Constructing Brick pillar over Stepped Footing with bed concrete base.
Construction of cavity walls, setting out both leaves, provision of wall ties, use of cavity road.	Constructing cavity wall with pre-cast wall tiles
Setting out of building obtaining first, second, third, and fourth lines, marking of diagonals, setting out of cross walls and offsets marking the lines of excavation, fixing of plinth and floors level pegs or burji dead man, measuring down from the plinth level , levelling pegs for concrete foundation, laying of concrete foundation	Laying of layout of building on ground
Plastering of walls setting of spots, applying of mortar,	Providing & applying Rough plaster, Sponge plaster, Ceiling plaster, Neeru finishing & pointing to brick or concrete surface
Fixing of screed to soffit of door and window openings, revering the screeds and squaring	Providing Kaddapa stone at window sills
Plastering of ceiling application of mortar, straightening and finishing	Providing & applying Ceiling plaster, Neeru finishing & pointing to brick or concrete surface
Flooring, formation of pane by fixing screeds for flooring, laying of base course concrete 1:2:4 , 1 ½" thick, formation of slope, application of slurry for finishing, setting out of skirting by water *level, method of formation of spots for skirting, use of screeds of required thickness formation of curve at the junction of skirting and flooring	Providing & laying Flooring A) 1:2:4 concrete flooring B) Brick flooring in diagonal bond
Laying of concrete foundation for drainage pipe, laying of pipes and joining, use of Damp proofing and slurry, checking of alignment, cutting the pipe to the required length, covering of drain pipe with concrete as per local PWD specification	Laying of concrete foundation for drainage pipe, laying of pipes and joining, use of Damp proofing and slurry, checking of alignment, cutting the pipe to the required length, covering of drain pipe with concrete as per local PWD specification
Setting out of foundation manhole, laying of foundation concrete, construction of manhole, method of providing foot rest forming of drain and benching.	Constructing of Manhole & Inspection chamber of size 60x60x30cm

Construction Practice and Estimation – 2nd Year

Theory	Practical
Plastering the manhole walls, casting of R.C.C. manhole cover, fixing of cast iron manhole frame , construction of drops, method of connecting drainage line with existing manhole or sewer testing of drain for water *tightness	Plastering & finishing of Manhole & Inspection chamber etc. Complete.
Fixing of brackets for wash basin & flushing cistern, fixing of WC pan , kitchen & bathroom traps, sinks, fixing of vent pipe to walls	Fixing in position Basin, W.C. Pan, Sink, Flushing cistern, Floor traps, Nhani trap, P trap, S trap & outlet pipe etc. Complete.
Stone masonry type, Information Random rubble masonry,	Constructing Random rubble masonry in foundation trench.
Construction of compound with attached piers and wall panel wall provision of coping with tile pre-cast slab construction of reinforced brick wall.	Construction of reinforced Half brick thick wall with 9" pillars with Pre-cast concrete coping at top.
Circular Brick work 4 ½" and 9" wall on the curving of wells	Constructing Circular Brick wall 4½" & 9" thick for one meter inside diameter
Circular brick wall construction of pillars in alternate brick and tile work with moulded work on top	Constructing Circular brick pillar with circular stepped footing
Construction of walls with hollow blocks . construction of roofs with pre fabricated hollow brick and beams and	Constructing Pre-cast Hollow concrete block masonry wall
External finishes, rough casting, pebble dash, stucco, finish, Fixing Cement concrete jalli	Providing & Applying Sponge plaster, Pebble dash plaster, Stucco plaster & making 1" groove in it.
Flooring, mosaic, terrazzo and tile flooring, laying out a stair on the ground.	Providing & laying Mosaic Cement *tiles flooring Providing & laying Terrazzo flooring Providing & laying Mosaic flooring
Laying of glazed tiles, fixing the thread-filling	Cutting & fixing glazed tiles for flooring & dado

Estimating and Costing

Theory	Practical
Introduction Meaning of Term Estimating, costing Types of Estimate 1.2.1. Approximate Estimate 1.2.2 Details Estimate	Practical 1. Reading of Building Drawing for measurement 2. Filling of Measurement Sheet
Approximate Estimate 2.1 Definition of approximate estimate 2.2 Uses of Approximate Estimate 2.3 Preparing Approximate Estimate for Building Methods of preparing Approximate Estimate for Buildings 2.3.1 Plinth Area Method 2.3.2 Cubical Unit 2.3.3 Service Unit 2.3.4 Bay Unit	Practical 1. Preparing approximate estimate of a building using approximate method.
Detail Estimate 3.1 Definition of Detail Estimate 3.2 Uses of Detail Estimate 3.3 Data required to prepare detailed estimate 3.4 Procedure of preparing detailed estimate of any work 3.4.1 Taking out quantities and entering the data in measurement sheet and completing abstract sheet. 3.4.2 Abstracting using Abstract sheet 3.5 List of items with their unit of measurement. 3.6 Definition of contingencies, work charge establishment 3.7 Provisions in details estimate for sanitary, water supply, Electrification.	Practical 1. Preparation of Detail Estimate of a Residential Building (Load Bearing Structure) 2. Details estimate of septic Tank 3. Details estimate of sump well Note: No. 1 is Compulsory and any one out of 2 and 3

Construction Practice and Estimation – 2nd Year

<p>3.8 Types of Estimates, Detail Estimate, Revised Estimate, Supplementary Estimate, Annual report and Maintenance Estimate, Special Report Estimate, Additions and Alteration Estimate.</p> <p>3.10 Procedure of calculating Quantities for excavation, Foundation concrete, Foundation & plinth Masonry, Super Structure Masonry using</p> <p>i) Long wall – Short Wall method</p> <p>ii) Center Line Method</p> <p>3.11 Rules for Deduction in concrete, Masonry, Pointing & Plastering, Painting,</p> <p>3.12 Multiplying factor related to oil painting</p>	
<p>Chapter No. 4: Working out of quantities of Steel for R.C.C work</p> <p>12.1 Division of R.C.C work into concrete Steel and Form work</p> <p>12.2 Study of Reinforced steel for Bar diameter, its weight,</p> <p>12.3 Calculating Length and weight of steel for</p> <p>12.3.1 Straight bar with hook or EL at ends</p> <p>12.3.2 Bent up bar with hook or EL at ends</p> <p>12.3.3 Stirrups</p> <p>12.4 preparing Bar bending schedule and calculating Steel for: Footing, Column, Lintel, Beam, Slab, Chajja, Staircase etc</p>	<p>Practicals</p> <p>1) Calculating Quantity of concrete & Steel for 2 to 3 room RCC Building or Hall.</p>
<p>Chapter 5: Specifications</p> <p>6.1 Necessity of Specification</p> <p>6.2 Points to be observed while framing specifications</p> <p>6.3 Types of Specifications</p> <p>General, Details, Standard and manufactures Specifications</p> <p>6.4 Writing detailed Specifications of minimum 5 important items of building work</p> <p>6.5 Study of Standard specification Book from organizations such as PWD, MHADA, CIDCO etc.</p>	<p>Practicals :</p> <p>Preparation of Specification for 5 items.</p>

List of Books

Building Material

- 1] TTTI Chandigarh Civil Engg. Materials N. Delhi, McGraw Hill, 1992
- 2] Rangwala S. C. Engg. Materials Chariot or Book Publications,
- 3] Anand Gujrath Kulkarni G. J. A Textbook of engg. Materials

Building Construction

- 1] Mackay Building Construction Vol. 1 to 4 VaynStrand
- 2] Mitchell Elementary Building Construction B. T. Batsford, London
- 3] Molnar Building Construction Drafting and Design CBS Publications. Delhi
- 4] Sushil Kumar Building Construction Delhi : Standard Publishers, 1999, 18th Ed.
- 5] Arora S. P. & Bindra S. P. Building Construction Jaipur : Dhanapat rai & Sons
- 6] Rangwala S. C. Building Construction Anand : Charotar & Publishing House

Estimating and Costing

- 1] Estimating and Costing by B.N. Dutta and Dutta
- 2] B. S. Patil Estimating and Costing

List of Tools and Equipment

A] General Class room

Sr	Name of Item	No.
1	Steel lockers 8 compartments with individual lockers (1980 x 910 x 480 mm)	4
2	Chair with writing pad	25
3	Steel almari with self 6.5' x 3' (18 gauge)	2
4	Steel table 4' x 3'	2
5	Teacher chair	2

D] For Building Material and Construction Practical

Sr	Name of Item	No.
1	Compression Testing Machine 100 Ton Capacity (Hand Operated.)	1
2	Universal Testing Machine 40 T	1
3	Table Vibrator	1
4	Cube Mould (Small And Big)	4
5	Compaction Factor Test Apparatus	1
6	Aggregate Impact Test Apparatus	1
7	Shieve Shaker	1
8	Weighing Machine 100 Kg.	1
9	Small Sieve (All Type)	1
10	Mortar And Half Bag Concrete Mixer	1
11	Marble Cutter	1
12	High Speed Imact Drill	1
13	Marble Angle Grinder	1
14	Bench Grinder Double Ended Wheel Size 15 Cm	1
15	Vibratory Sand Screen	1
16	Bolster 4" (100mm)	1
17	Pitching Tool (Mason)	1
18	Chisel Mason Hammer Headed Flat 200 Mm	10
19	Hammer Mason (Cube) 1.5 Lbs.	10
20	Hammer Mason	10
21	Level Masons 36" (1 Metre)	10
22	Plumb Bob.	10
23	Square (Steel) 2' X 1'	10
24	Trowel Plastering Double Hand	10
25	Trowel Brick 10"	10
26	Tasla (Tin) Pans	10
27	Spade	10
28	Measuring Steel Tape 15 Mtr.	5
29	Measuring Steel Tape 30 Mtr.	5
30	Wooden Straight Edges For Ft.	10
31	Ladders 2 To 4 Mtr.	2
32	Sledge Hammer 10 Lbs.	2
33	Buckets 14 Lits.	10
34	Bar Bending Tools And Cutting Tools 6mm To 12 Mm	2 set
35	Screw Driver 12 Inch	5
36	Pocket Steel Tape 2 Mtr.	25
37	Pick Axes	5
38	Wheel Barrow	3
39	Tubular Scaffolding 25 Mm Die With Coupling And Compete Fitting.	400 RFT
40	Steel Measuring Boxes 3 Nos. (6cft C Fts), 3 Nos. (12cfts)	6
41	Adjustable Props Steel	20
42	Platform 4 Ft X 4 Ft X 6 Ft.	2
43	Boaning Rods	2
44	Spanner Sets	1
45	Carpenter Claw Hammer	10

46	Mortise Chisel 6 Mm.	10
47	Firmer Chisel	10
48	Mallet	10
49	Pane (Iron)	10
50	Handsaw 1'6"	10
51	Drilling Machines	1
52	Sieve IS No. 9	1
53	Vicat'apparatus	1
54	Needle measuring flask	1
55	A set of 10 IS sieves 80mm, 40mm, 20mm, 10mm, 4.75mm, 1.18mm, 600u, 150u.	1 each
56	Top cover & bottom pan for sieves	1
57	Hacksaw frame	1
58	BSP Tap & Die set 18,20,25 mm	1 set
59	Pipe vice ½ " to 18" 2 each	2
60	Alluminum Level	2
61	Pipe Tube Level	2
