

MAHARASHTRA STATE BOARD OF VOCATIONAL EDUCATION EXAMINATION, MUMBAI

1	Name of Syllabus	C.C. in QUANTITY SURVEYOR (304212)																																																													
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	1. Analyzing cost; 2. Assessing design; 3. Assessing risks; 4. Trending costs; 5. Advising clients; 6. Managing cash flows; 7. Preparing feasibility analyses; and 8. Assessing life-cycle costs.																																																													
10	Employment Opportunity	a) Wage Employment : 1. As a quantity surveyor in Civil works 2. As a Designer first stage in Civil Project 3. Estimator in Multistory Buildings and Infrastructures 4. Quantity surveyors for roads and design sections b) Self Employment: 1. Govt. Licensed Quantity surveyor 2. Private Estimators 3. Estimator in Architects Organisation 4. Consultants																																																													
11	Teacher's Qualification	Diploma/Certificate in concern subject																																																													
12	Training System	Training System Per Week <table><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>						Theory	Practical	Total	18 Hours	24 Hours	42 Hours																																																		
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THEORY I
PART A
SOIL MACHANICS

CHAP TER	CONTENTS
1	INTRODUCTION 1.1 Definition of soil 1.2 Importance of soil Mechanics and its necessity
2	PHYSICAL PROPERTIES OF SOIL 2.1 Soil mass, soil as three phase system 2.2 Definition of water content, void ratio, porosity, degree of saturation, bulk density, unit weight, specific gravity saturated density, submerged density, dry density 2.3 Relation among different properties simple numerical problems on these relations
3	MECHANICAL ANALYSIS OF A SOIL 3.1 Sieve analysis of soil, particle size distribution 3.2 Sedimentation analysis – stoke’s law and it’s use in pipette method 3.3 Particle – size distribution curves, effective size of a particle coefficient of curvature coefficient of uniformity
4	CLASSIFICATION OF SOILS 4.1 Purpose of classification system 4.2 Types of classification system – unified soil classification system, Indian soil classification system as per IS 1498
5	CONSISTENCY OF SOILS 5.1 Attrberg limits and their determination, plasticity Index, Consistency Index, liquidity Index, Flow Index, Toughness Index, Shrinkage ratio
6	PERMEABILITY OF SOILS 6.2 Definition, Darcy low, factors affecting permeability Importance of permeability 6.2 Determination of permeability by laboratory method 6.3 Definitions of flow lines, equipotential lines, prelatric lines, seepage pressure, effective pressure, pore pressure 6.4 Quick condition of sand

7	<p>SHEAR STRENGTH OF SOILS</p> <p>7.1 Constituents of shear resistance of soil, definition of cohesion, angle of shear resistance.</p> <p>7.2 Coulomb equation and failure envelope, significance of “C” and “Q” soils.</p> <p>7.3 Introduction to determination of shearing strength of soil in laboratory by direct shear test, unconfined compression test and vane shear test merits and de-merits of these test.</p> <p>7.4 Introduction to Rankine’s theory for earth pressure.</p>
8	<p>BEARING CAPACITY OF SOILS</p> <p>8.1 Definition of bearing capacity of soil, Ultimate bearing capacity, Net ultimate bearing capacity, Net safe bearing capacity, Safe bearing capacity and allowance bearing capacity.</p> <p>8.2 Plate load test – Procedure, Interpretation of results and limitations of test</p> <p>8.3 Bearing capacity from building codes.</p>
9	<p>COMPACTION AND CONSOLIDATION OF SOILS</p> <p>9.1 Definition of compaction, difference between Compaction and consolidation optimum moisture content</p> <p>9.2 Factors affecting compaction, Measurements of field compaction by sand replacement method and core cutter method</p> <p>9.3 Definition of consolidation primary and secondary consolidation, one dimensional, consolidation, consolidation tests</p>
10	<p>SOIL STABILIZATION</p> <p>10.1 Concept and definition</p> <p>10.2 Different method of stabilization Mechanical, lime cement and bitumen</p> <p>10.3 Procedure of Mechanical stabilization</p> <p>10.4 C.B.R. test and its Importance</p>

THEORY I

PART B

ENGINEERING DRAWING

CHAP TER	CONTENTS
1	<p>CONVENTIONAL SIGNS</p> <p>1.1 Sketch the conventional signs for material like – Brick, Cement, Sand, Concrete, Wood, Glass, Earth, Steel etc.</p> <p>1.2 Sketch the conventional sign for electrical fixtures – Switch, Belt, Bell push, Ceiling point, Ceiling fan, Bulb, Main switch, AC motors</p> <p>1.3 Sketch the conventional sign for water supply and Sanitation fixtures like – wash basin, Tap, Sink, WC pan</p>
2	<p>BONDS IN BRICK MASONRY</p> <p>2.1 Draw the plan of odd and even course of English and Flemish bond of 1 brick wall and 1 ½ brick wall that meeting at a corner</p>
3	<p>DOORS AND WINDOWS</p> <p>3.1 Draw the sectional plan and elevation of a fully Paneled window</p> <p>3.2 Draw the sectional plan and elevation of a fully Paneled doors</p>
4	<p>4.1 Draw the cross section of the wall of a building and Show the component parts and foundation details</p>
5	<p>5.1 Residential building load bearing type</p>
6	<p>6.1 Residential building framed structure type</p>
7	<p>7.1 Stairs</p>
8	<p>BUILDING INDUSTRY</p> <p>8.1 Role of different agencies in building construction</p> <p>8.2 Owner, Architect, Structural, Engineer, Contractor</p> <p>8.3 Specialists in Air conditioning</p> <p>8.4 Plumbing consultant and electrification consultant</p>
	<p>8.5 Acoustical treatment lifts</p> <p>8.6 Interior decoration</p> <p>8.7 Their inter – relationship from planning completion of work</p>

9	<p>PLAN SANCTIONING</p> <p>9.1 Plan sanctioning authorities, Gram Panchayat, Municipality, Municipal Corporation, Town Planning</p> <p>9.2 Building rules and bye laws of plan sanctioning Authority regarding</p> <p>9.3 Plot area – floor space Index</p> <p>9.4 Side margins – Built up area / Plinth area</p> <p>9.5 Minimum heights for plinth and floor to floor height</p> <p>9.6 Minimum dimensions of living room, kitchen bath W.C. and other units such as balcony, staircase and verandah</p> <p>9.7 Procedure of submitting plans for approval to plan</p> <p>Sanctioning authority, Number of copies scale and</p> <p>Other equipment</p>
10	<p>PIANNING OF BUILDING</p> <p>10.1 Principles of planning of residential buildings, Aspects, prospect, orientation privacy circulation, Grouping, roominess, furniture, requirements, sanitation, elegance, economy, architectural composition climate and its affects, people and their requirements</p> <p>10.2 Planning of residential building from given data site Plan, plot area, plinth area, arrangements of rooms, size of rooms, sanitary blocks, staircase passages, corridors and verandahs</p>

PRACTICAL I
PART A
SOIL MECHANICS
PRACTICAL

CHAP TER	CONTENTS
1	Definition of Soil
2	Different types of soils and their use
3	Common types of soil
4	Particle size of soil and distribution
5	Types index
6	Draw the plasticity chart and A line diagram
7	Sieve analysis of soil
8	Definitions of flow lines, equipotential line etc.
9	Quick condition of sand
10	Types of classification soil
11	Strength of soil
12	Laboratory test of soil
13	Unconfined compression test
14	Bearing capacity
15	Building capacity from Building codes
16	Plate capacity load test
17	Definition of compaction
18	Soil stabilization
19	Method of Stabilization
20	What is C.B.R. test – its importance

PRACTICAL I
PART B
ENGINEERING DRAWING

CHAP TER	CONTENTS
1	Draw the types of all brick and stone masonry bond (1 sheet)
2	Draw the various types of door and window
3	Draw the types of foundation
4	Draw the residential building (plan elevation and section, construction notes)
5	Draw the type of stair case
6	Student to understand the designing of a residential / public building with given data considering basic requirements and the use of guiding principle of design of residential / public buildings. It is meant to develop the skill of drawing of plan from conceived line plan and the drawing of elevation and section
7	Preparation of line plans of different public buildings such as hostel, bank, market, post office, library, school, community centre, public health centre on graph paper is meant to acquaint to student with basic requirements of above building and introduce him to designing of above buildings
8	Measured drawing of small building 1 unit plan elevation two sections, site plan, construction notes, schedule of door and window area statements
9	Data drawing of a small single storied load bearing structure having partly pitched conventional plinth and plan, section, elevation, side elevation, schedule of openings, construction notes, area statement scale 1 :50 component part of residential building such as staircase foundation to be drawn by computer software
10	Data drawing of two storied residential building framed structures type with flat roof. Ground and first floor plan, elevation, part section passing through toilet. Foundation plan, site plan and schedule for doors and windows construction notes and area statement
11	Reading and study of submission, working and representation drawings drawn by Architect will enable the student to understand the procedure of various drawings and method of submission of drawing and for sanctioning of plan.

THEORY II

PART A SURVEYING AND LEVELLING

CHAP TER	CONTENTS
1	<p>BASIC IDEAS</p> <p>1.1 INTRODUCTION – Definition of surveying</p> <p>1.2 Objects of surveying – Use of surveying</p> <p>1.3 Principles</p> <p>1.4 Types of survey- Plane and geodetic</p> <p>1.5 Scales, representative fraction plain scale diagonal scale and vernier scale</p>
2	<p>LINEAR MEASUREMENT</p> <p>2.1 Degree of accuracy in chaining errors due to incorrect Length of chain corrections in length and area, simple numerical problems</p> <p>2.2 Least count use of metallil steel and invar type errors and correction</p>
3	<p>CHAIN AND CROSS STAFF SURVEYING</p> <p>3.1 Chain triangulation – survey stations and their selection Survey lines, base lines, check lines, tie lines. Taking offsets long and short offsets degree of precision in the measurement of offsets</p> <p>3.2 Conventional signs on survey maps for – cutting, Embankment, marshy land, road, railway, stream river, bridge, tunnel, fencing orchard. Cultivated land, transmission line, places of worship etc.</p> <p>3.3 Chain and cross staff survey – calculation of areas from The recorded observation of areas from the recorded observations</p>
4	<p>CHAIN AND COMPASS SURVEY 4.1 Open and close traversing</p> <p>4.2 Bearing of lines – fore bearing whole circle and Quadrant system, reduced bearing conversion of bearing Finding included angles from bearing</p> <p>4.3 Local attraction – errors due to local attractions precaut- Ions to be taken to avoid the local attraction, correction of bearing due to local attraction</p>
	<p>4.4 Traversing method – Included angle method entering the Readings in field books, calculations of in clued angle and corrections to them plotting of traverse graphical adjustments for closing errors</p>

5	<p>LEVELING</p> <p>5.1 Definitions – level surface, level line. Horizontal line, Datum surface, reduced level Bench mark and its types, temporary, permanent GTS</p> <p>5.2 Dumpy level – components line of sight, line of collimation, bubble tube axis, temporary and permanent adjustment</p> <p>5.3 Terms used in leveling – fore sight, back sight, intermediate sight, change point, height of collimation</p> <p>5.4 Recordings in leveling book – height of collimation Method and rise and fall method</p> <p>5.5 Classification of leveling – simple leveling, differential Leveling, fly leveling with single and double checks</p> <p>Profile leveling and cross sectioning</p>
6	<p>CONTOURING</p> <p>6.1 Definitions – contour, contour interval, horizontal Equivalent</p> <p>6.2 Characteristics of contour lines</p> <p>6.3 Uses of contour maps</p> <p>6.4 Direct and indirect method of contouring</p> <p>6.5 Establishing grade contours</p>
7	<p>PLANE TABLE SURVEYING</p> <p>7.1 Principles of plane table survey</p> <p>7.2 Setting of plane table, leveling, centering and orientation</p> <p>7.3 Method of plane surveying – Radiation intersection , traversing and resection</p> <p>7.4 Merits and demerits of plane table surveying</p> <p>7.5 Situations where plane table survey is preferred</p>
8	<p>THEODOLITE</p> <p>8.1 Angular Measurements in both horizontal and vertical Plane Transit Theodolite</p> <p>8.2 Technical terms used in theodolite surveying</p> <p>8.3 Temporary adjustment of Theodolite</p> <p>8.4 Swinging the telescope, transiting the telescope, changing the face</p> <p>8.5 Permanent adjustment of transit theodolite</p> <p>8.6 Traversing with theodolite – method of included angle locating details, checks in closed traverse calculation of bearings from angles</p> <p>8.7 Brief idea about micro – optic theodolite</p> <p>8.8 Brief idea about – total station</p>
9	<p>TACHEOMETRY</p> <p>9.1 Principles of Tacheometry</p> <p>9.2 Use of theodolite as Tacheometry with vertical staff and fixed hair system</p> <p>9.3 Determination of tachometric constants simple numerical problems on above topics</p>

10	<p data-bbox="475 56 927 86">SETTING OUT SIMPLE CURVES</p> <p data-bbox="475 96 997 126">curves used in road and railway alignments</p> <p data-bbox="475 161 1105 224">10.2 Notations for circular curve and corresponding Calculations</p> <p data-bbox="475 260 1141 289">10.3 Methods of setting out curves by offset from long</p> <p data-bbox="542 325 1131 354">Chord method and rankines method of tangential</p> <p data-bbox="542 390 1146 420">Angle simple numerical problems on above topics</p> <p data-bbox="475 455 1167 485">10.4 Commonly used radii and degree of curves for roads</p> <p data-bbox="513 520 675 550">And railways</p>
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THEORY II

PART B

BUILDING CONSTRUCTION

CHAP TER	CONTENTS
1	INTRODUCTION 1.1 Classification of building as per NBC component part of a building
2	FOUNDATIONS 2.1 Definition – Functions of foundations 2.2 Classification of soil 2.3 Plate load test 2.4 Essential requirements of good foundation 2.5 Classification of foundations 2.6 Special foundation 2.7 Raft and grillage foundations 2.8 Causes of failure of foundation and remedial measures
3	MASONRY 3.1 Stone masonry Definition – Material required for stone masonry Classification of stone masonry Rubble and ashlar masonry Tools required for stone masonry Types of joints in stones masonry Supervising points to be observed in stone masonry 3.2 Brick masonry Definition – Types of brick masonry English bond Flemish bond 1 ½ brick walls Defects in brick masonry Structures in brick masonry Tools required Supervising points to be observed in brick masonry

4	<p>OPENINGS</p> <p>4.1 Doors and windows</p> <p>4.2 General Terms</p> <p>4.3 Types of doors and window</p> <p>4.4 Fixtures and fastenings for door and windows</p> <p>Ventilators – Types of ventilators, fixed, swing, loured</p>
5	<p>LINTELS AND SUN SHADES</p> <p>5.1 Types of lintels – definition of sun shade</p>
6	<p>FLOORS</p> <p>6.1 General terms – Types pf floors</p> <p>6.2 Method of construction of cement concrete. Mosaic and Terrazo floors</p>
7	<p>ROOFS</p> <p>7.1 Definition</p> <p>7.2 Classification of roofs</p> <p>7.3 Pitched roofs</p> <p>7.4 Types of King post, Queen post and steel strusses</p> <p>7.5 Roof covering material for pitched roofs</p> <p>7.6 Flat roof</p> <p>7.7 R.C>C. roof</p> <p>7.8 General requirements – weather proof course on R.C.C. roof</p>
8	<p>STAIRS AND STAIR CASES</p> <p>8.1 Technical terms</p> <p>8.2 Types of stairs – Straight, Quarter turn, Half turn, Doglegged, open well, Bifurcated and spiral stairs</p>
9	<p>FROM WORK</p> <p>9.1 Requirement of form work</p> <p>9.2 Material used for form work</p> <p>9.3 Removal of form work</p> <p>9.4 Failure of form work</p> <p>9.5 Form work for – coloumn, footing, columns and stairs</p>
10	<p>SCAFFLODING, SHORING AND UNDER PINNING</p> <p>10.1 Definition and type of scaffolding, shoring and Under pinning</p>
11	<p>CARPENTARY AND JOINARY</p> <p>11.1 Technical terms</p> <p>11.2 Classification of joints</p> <p>11.3 Tools used in carpentary</p>

12	SURFACE FINISHING 12.1 Plastering 12.2 Purpose 12.3 Types of plastering 12.4 Procedure of plastering and pointing 12.5 Types of pointing 12.6 Painting 12.7 Method of painting new and old surfaces 12.8 Wood and metal surface
13	BASIC KNOWLEDGE OF EQUIPMENT AND CONSTRUCTION MACCHINARY 13.1 Bull dozers 13.2 Concrete mixers 13.3 Cranes 13.4 Pully blocks 13.5 Pumps 13.6 Winches 13.7 Excavators etc.
14	BUILDING SERVICES 14.1 Basic concepts of electrical wiring 14.2 House wiring 14.3 Various types of wires and fittings 14.4 Various types of electrical switches 14.5 Power plugs 14.6 Destination boards, circuit boards and earthing concepts
15	BASIC CONCEPTS OF SANITATON AND PLUMBING 15.1 Types of drainage pipes 15.2 Pipes used in sewage and water lines 15.3 Types of fittings used in sanitary and water line

PRACTICAL II

PART A

SURVEYING AND LEVELLING

CHAP TER	CONTENTS
1	Study and use of 20m and 30m chain components, folding and unfolding of chain. Measurement of distances with chain and tape
2	Reciprocal ranging
3	Study and use of optical square and open cross staff for setting out perpendicular
4	Chain and cross staff survey for finding out area of given field
5	Study and use of prismatic compass for observing fore bearings and back bearings calculation of included angle from the observed bearings
6	Chain and compass transverse survey A simple closed traverse of 5 – 6 sides enclosing a building, calculation of included angle, locating details and plotting there on A1 size imperial drawing sheet
7	Study and use of dumpy level, carrying out temporary adjustments and practice of simple leveling recording the readings in leveling book arithmetic checks
8	Study and use of leveling staff
9	Carrying bench marks from one point to another about 500 m away by fly leveling with double check
10	Study and use of tilting level, temporary adjustments study of auto set level by demonstration
11	Plane table method – orientation of plane table by back sighting and locating details by method of intersection
12	Understanding the components of theodolite and their function, reading the vernier temporary adjustments of theodolite
13	Measurement of horizontal angle by repetition method
14	Measurement of vertical angle
15	Measurement of deflection angle by taking an open traverse of 4 – 5 sides
16	To find the constants of a given tachometer
17	Observation of magnetic bearing of line using theodolite
18	Setting out simple curve by offset from long chord method
19	Setting out simple curve by rankine's method

PRACTICAL II

PART B

BUILDING CONTRCUTION

CHAPTER	CONTENTS
1	Study and use of 20 and 30m chain components, folding and unfolding of chain. Measurement of distances with chain and tape
2	Reciprocal ranging
3	Study and use of optical square and open cross staff for setting out perpendicular
4	Chain and cross staff survey for finding out area of given field
5	Study and use of prismatic compass for observing fore bearings and back bearings calculation of included angles from the observed bearings
6	Chain and compass transverse survey – A simple closed traverse of 5-6 sides enclosing a building , calculation of included angle , locating details and plotting them on A1 size imperial drawing sheet
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8	Study and use leveling staff
9	Carrying bench marks from one point to another about 500 meters away by fly leveling with double check.
10	Study and use of tilting level, temporary adjustments , study of auto set by demonstration
11	Plane table method – orientation of plane table by back sighting and locating details by methods of intersection
12	Understanding the components of theodolite and their function, reading the vernier temporary adjustments of theodolite
13	Measurements of vertical angle
14	Measurement of horizontal angle by repetition method
15	Measurement of deflection angle by taking an open traverse of 4.5 sides
16	To find the constants of a given technometer
17	Observation of magnetic bearing of line using theodolite
18	Setting out simple curve by offset from long chord method
19	Setting out simple curve by Mankines method

THEORY III

PART A

CONCRETE TECHNOLOGY

CHAP TER	CONTENTS
1	<p>INTRODUCTION</p> <p>1.1 Scope and definition of concrete, role of concrete in Construction need for supervisory skills in concreting operations concept of concrete chain</p>
2	<p>CEMENT</p> <p>2.1 Method of manufacture of Portland cement by dry Process. Basic chemical constituents of cement and their effects on the properties of cement hydration of cement</p> <p>2.2 Characteristics and uses of following types of cement</p> <p>2.3 Ordinary Portland cement</p> <p>2.4 Rapid hardening cement</p> <p>2.5 Low hart cement</p> <p>2.6 Sulphate resisting cement</p> <p>2.7 Blast furnace slag cement</p> <p>2.8 Colored cement</p> <p>2.9 Portland pozzolana cement</p> <p>2.10 Standard tests o cement</p> <p>2.11 Consistency</p> <p>2.12 Fineness</p> <p>2.13 Initial and final setting time</p> <p>2.14 Compressive strength of cement and grades of cement</p> <p>2.15 Field testing of cement</p>
3	<p>AGGREGATES</p> <p>3.1 Classification of aggregates according to nature of Formation</p> <p>3.2 Size</p> <p>3.3 Shap</p> <p>3.4 Characteristics of aggregate</p> <p>3.5 Composition</p> <p>3.6 Porosity and absorption</p> <p>3.7 Strength and Soundness</p> <p>3.8 Soundness and Sieve analysis of aggregates</p>

4	<p>ADMIXTURE AND WATER</p> <p>4.1 Quality of water for concrete and curing limits of Impurities of water</p> <p>4.2 Definition of admixture, purpose of admixture types of admixture and its test</p> <p>4.3 Bonding agents and marsh concrete test</p>
5	<p>PROPERTIES OF CONCRETE</p> <p>5.1 Fresh concrete – Workability, segregation and Bleeding measurement of workability slump cone test compaction factor test</p> <p>5.2 Hardened concrete – Duff Abram’s W/C ratio, Compressive strength, creep of concrete durability of concrete as per IS 456 : 2000 fire resistance water binder ratio</p>
6	<p>CONCRETEING OPERATION</p> <p>6.1 Batching mixing, transporting, placing and compact – ion of concrete</p> <p>6.2 All conversion method of curing, chemical and steam curing of concrete</p> <p>6.3 Finishing – purpose of finishing, types / methods of finishing</p> <p>6.4 Concreting in Hot weather, under water concreting</p>
7	<p>QUALITY CONTROL TESTING</p> <p>7.1 Factors causing variations, concrete quality, field control, advantages of O.C.</p> <p>7.2 Necessity of Non – Destructive testing of concrete</p> <p>7.3 Quality assurances and testing</p>
8	<p>MIX DESIGN OF CONCRETE</p> <p>8.1 Objectives of mix design nominal mix design mix. Introduction to various method</p> <p>8.2 Introduction to controlled concrete, different grades of concrete, estimation of concrete, cement factor</p> <p>8.3 Special concretes – properties, advantages and limitations</p>

THEORY III

PART B

ESTIMATING COSTING

CHAP	CONTENTS
1	Introduction to the subject : 1 Definition of Estimating and Costing 2 Need for Estimation and Costing
2	Measurement of materials and works : 1 Units of measurement for various items of Civil Engineering works 2 Rules of measurements 3 Different methods of taking out quantities – centre line method , long wall short wall method
3	Types of estimates : 1 Detailed Estimate – definition, stages of preparation , details of measurement and calculation of quantities and abstract of estimated cost. 2 Preliminary or approximate estimate – plinth area estimate, cubic content estimate, estimate per unit basis. 3 Problems in preliminary estimate
4	Detailed and abstract estimate of buildings by using centre line method/ long and short wall methods : 1 Single roomed building (load bearing type structure) 2 Two roomed building (load bearing type structure) 3 Single storeyed Residential building with number of rooms (load bearing type structure) 4 Single storeyed Residential building (frames structure type) 5 Primary school building with sloped roof 6 R.C.C. Dog-legged –open well stairs 7 Two storeyed Residential building (Framed structure type) 8 Detailed estimate of compound wall and steps
5	Analysis of Rates : 1 Specifications for different items of work. 2 Cost of materials at sources and at site. 3 Cost of labour – types of labour , standard schedule of rates 4 Lead and lift – leads statements 5 Preparation of unit rates for finished items of works – cement concrete in foundation. 6 R.C.C. works 7 Brick masonry in cement mortar 8 C.R.S. masonry 9 Plastering in c.m. 10 Pointing in c.m. 11 Cement concrete flooring 12 Doors and windows – paneled and glazed
6	Estimation of quantities of steel of R.C.C. elements : 1 R.C.C. beam 2 R.C.C. lintel 3 R.C.C. slab
7	Earthwork calculations : 1 Trapezoid – prismoidal – mid ordinate – mean sectional area rules for computing volumes in level sections for roads.

PRACTICAL III
PART A
CONCRETE TECHNOLOGY

CHAP TER	CONTENTS
1	Minimum Two visit shall be arranged for whole class to RMC plant to observer understand various operations and quality control in concrete
2	One visit shall be arranged on a site where RMC is to be used
3	CEMENT Fineness test on cement by sieving Standard consistency test Initial and final setting time Compression test Soundness test
4	Coarse aggregate Fineness modulus and particle size distribution Aggregate crushing value Abrasion test
5	Fine aggregate Determinations of silt content Bulking of sand Fineness modulus and particle size distribution
6	Concrete Slump test Compaction factor test Compressive strength test for different W / C ratios Rebound Hammer test Concrete mix design

PRACTICAL III
PART B
ESTIMATING COSTING

CHAPTER	CONTENTS
1	Types of estimate and use
2	Units of measurements
3	Various types of Civil Construction material
4	Detailed Estimate
5	Approximate Estimate
6	Preparing approximate estimate of a building using approximate method
7	Preparation of detailed estimate of a residential building (load bearing structure)
8	Preparation of Detailed estimate of a Residential building (Frames structure)
9	Collecting market rates of material and labours
10	Preparation of rate analysis for at east 5 items
11	Preparation of specification for 5 items
12	Detailed estimate for R.C.C. elements of total construction work
13	Various types of Earthwork calculations
14	Road work Estimate and Volumes

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

(For a batch of 30 students)

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
