Course Code: 18CE0118 **R18**

SIDDHARTH GROUP OF INSTITUTIONS:: PUTTUR
(AUTONOMOUS)
Siddharth Nagar, Narayanavanam Road – 517583

QUESTION BANK (DESCRIPTIVE)

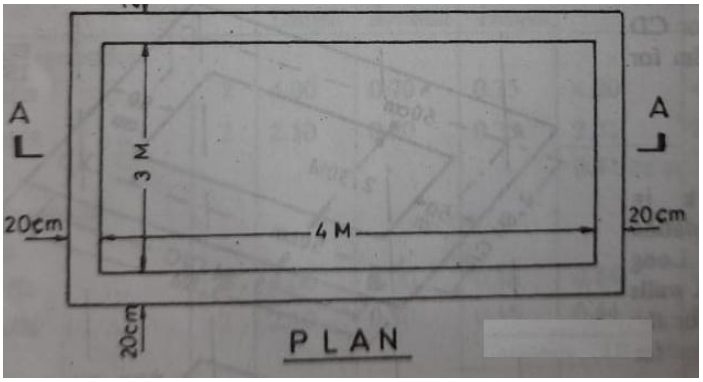
Subject with Code: Estimation, Costing and Valuation (18CE0118)

Course & Branch: B.Tech - CE

Regulation: R18

UNIT –I
ESTIMATING AND ESTIMATE OF BUILDINGS

1	**a**	Define estimate. What is the purpose of estimate?	[L1][CO1]	**[2M]**
	b	What are differences between revised and supplementary estimate?	[L2][CO1]	**[2M]**
	c	Enumerate any eight items of estimate of a building.	[L1][CO1]	**[2M]**
	d	Calculate the center centre length of brick silo having 2.5 m radius. Thickness of brick is 10 cm.	[L3][CO1]	**[2M]**
	e	Find the centre length of a garage of 5 m x 8 m (outer dimensions) having 20 cm brick wall.	[L3][CO1]	**[2M]**
2	List and explain different types of estimates in detail.		[L1][CO1]	**[10M]**
3	Write brief note on following main items of work (a) Earthwork (b) Concrete in foundation (c) Damp proof course (d) Masonry (e) Plastering		[L2][CO1]	**[10M]**
4	Mention units of dimensions for various materials and works in construction.		[L2][CO1]	**[10M]**
5	Estimate the cost of an under ground masonry water tank from the given drawing and specifications. Take local market rates. Genera specifications: Foundation – CC (1:2:4). Masonry – 1st class brickwork in CM (1:4). Flooring – 2.5 cm thick artificial floor and wall finishing. Inside – 20 mm cement plaster (1:3) finished with neat cement. Top and outside up to 20 cm below GL – 12 mm cement plaster (1:4). (Ref. Fig.1)		[L3][CO1]	**[10M]**



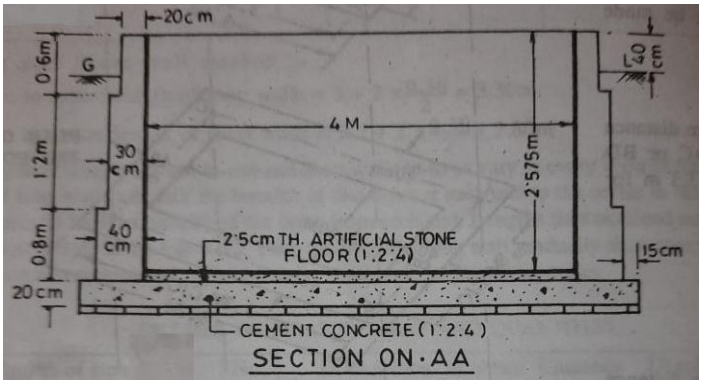
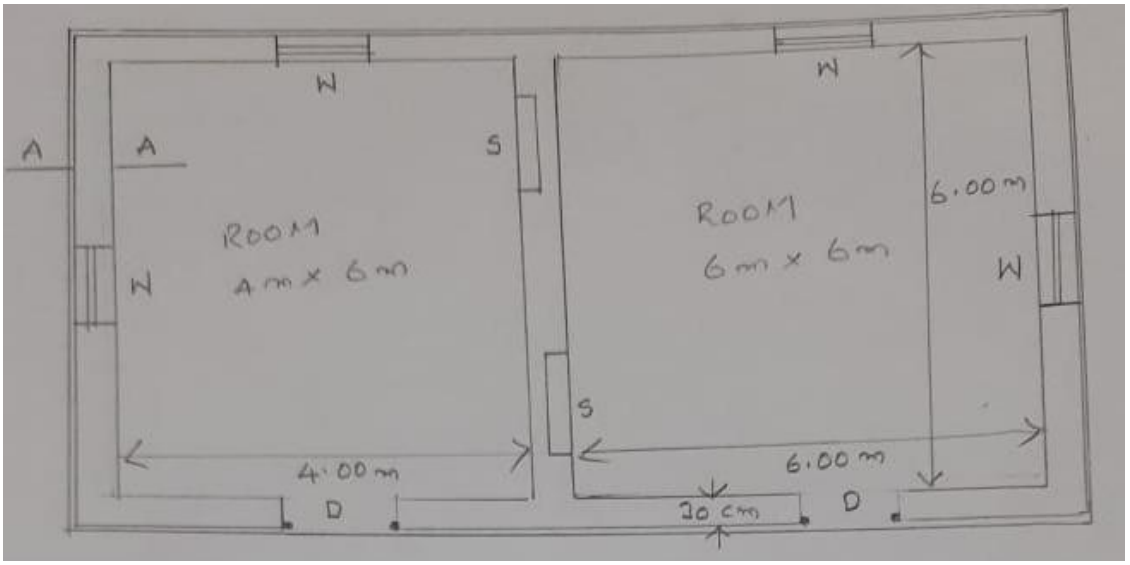
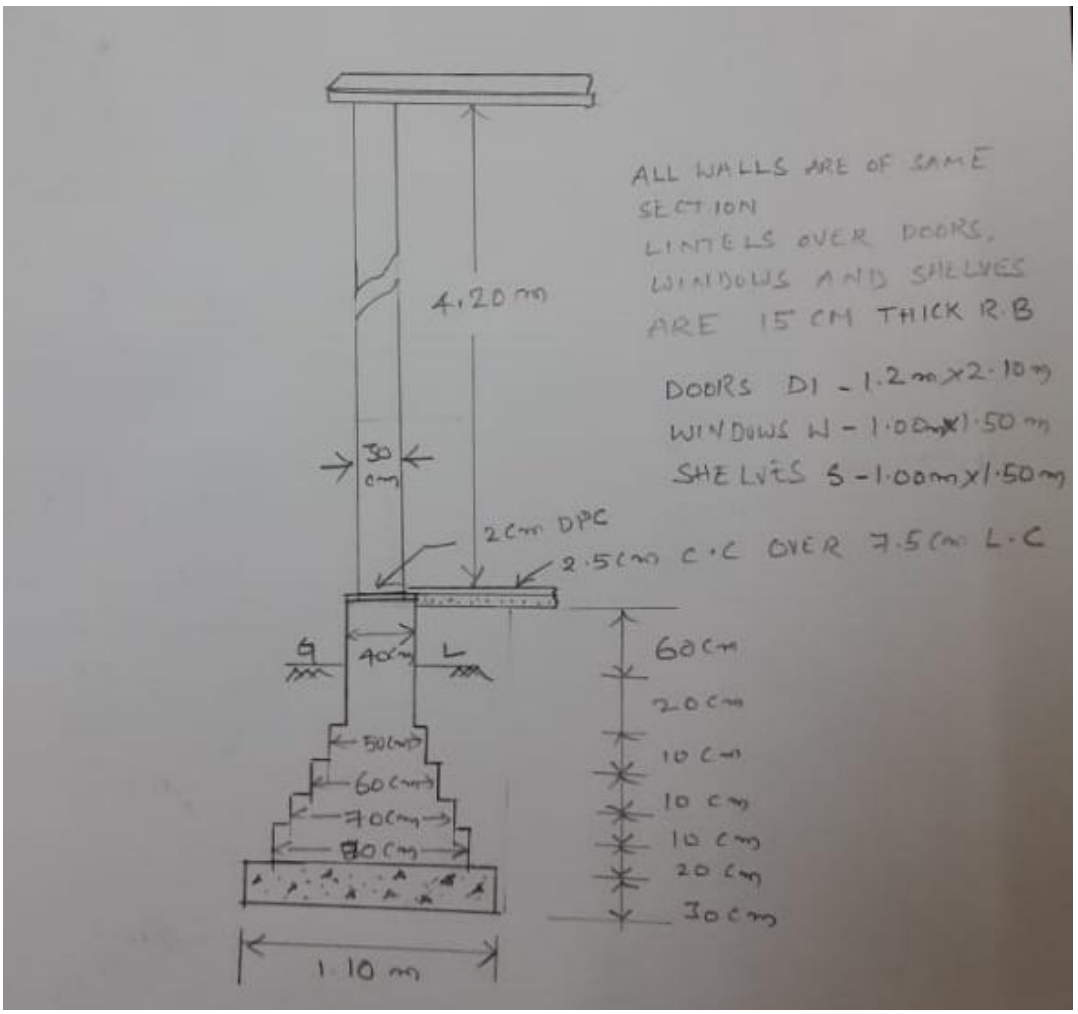


Fig.1

6	Estimate the quantities of the following items of a two roomed building from the given plan and section. The general specifications are as follows: (a) Earthwork in exaction in foundation, (b) Lime concrete in foundation (c) 1st class brickwork in cement mortar in foundation and plinth (d) 2.5 cm cement concrete damp proof course, and (e) 1st class brickwork in lime mortar in super structure. Adopt Long Wall Short Wall method. (Ref. Fig.2)	[L3][CO1]	**[10M]**
7	Estimate the quantities of the following items of a two roomed building from the given plan and section. The general specifications are as follows: (a) Earthwork in exaction in foundation, (b) Lime concrete in foundation (c) 1st class brickwork in cement mortar	[L3][CO1]	**[10M]**

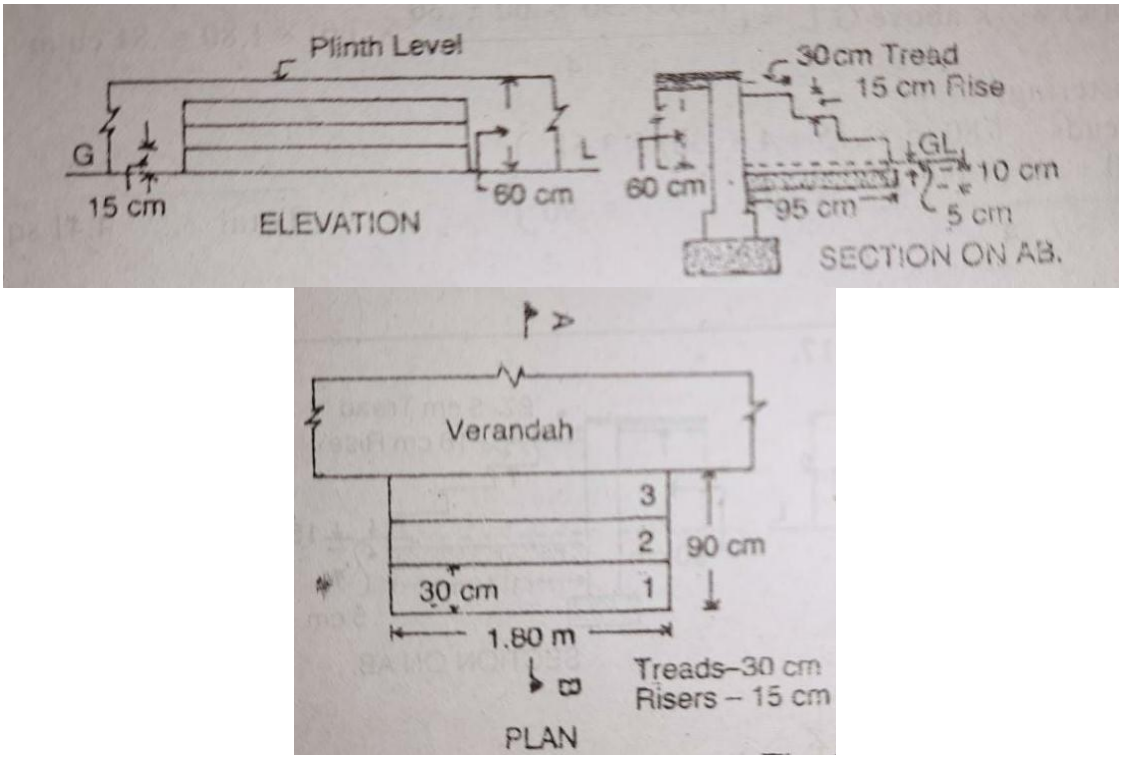
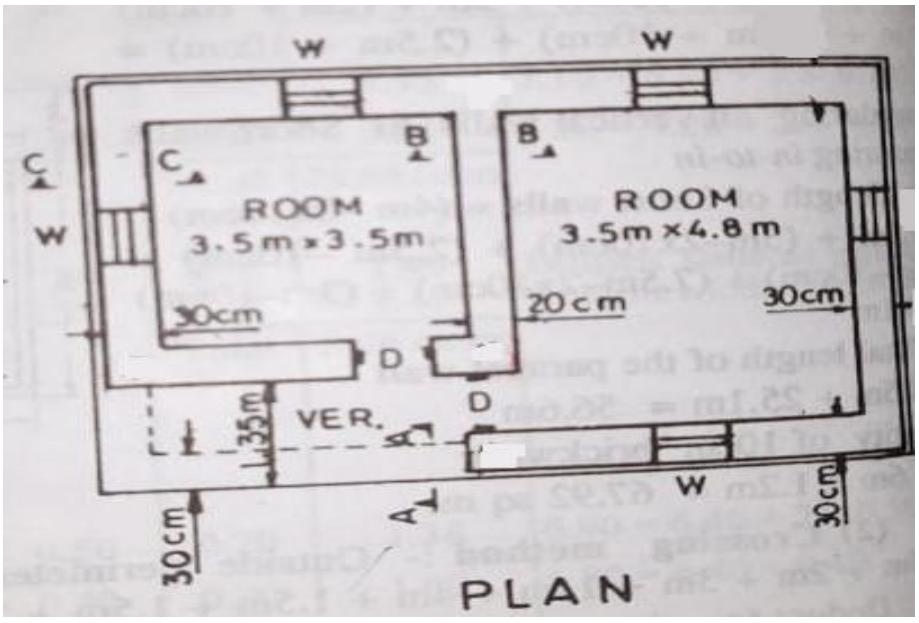


PLAN



SECTION A-A

Fig.2

	in foundation and plinth (d) 2.5 cm cement concrete damp proof course, and (e) 1st class brickwork in lime mortar in super structure. Adopt Centre Line method. (Ref. Fig.2)		
8	Estimate the quantities of earthwork, concrete, brickwork and finishing work of different types of steps from given drawings.  ***Fig.3***	[L3][CO1]	**[10M]**
9	Estimate the quantities of the following items of a two roomed building from the given plan and sections as shown in Fig.4. (1) Earthwork in exaction in foundation (2) Lime concrete in foundation (3) 1st class brick in 1:6 cement mortar in foundation and plinth (4) 2.5 cm thick damp proof course and (5) 1st class brickwork in 1:6 cement mortar in superstructure. 	[L3][CO1]	**[10M]**

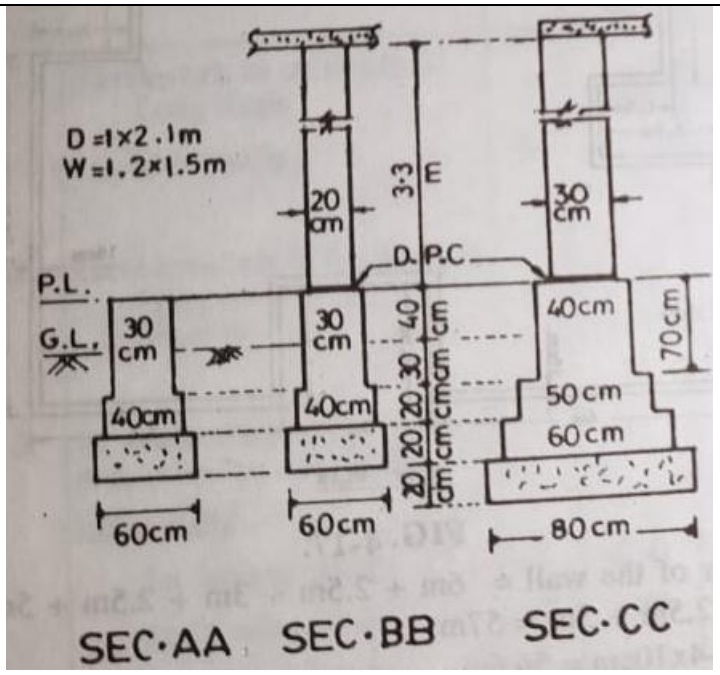
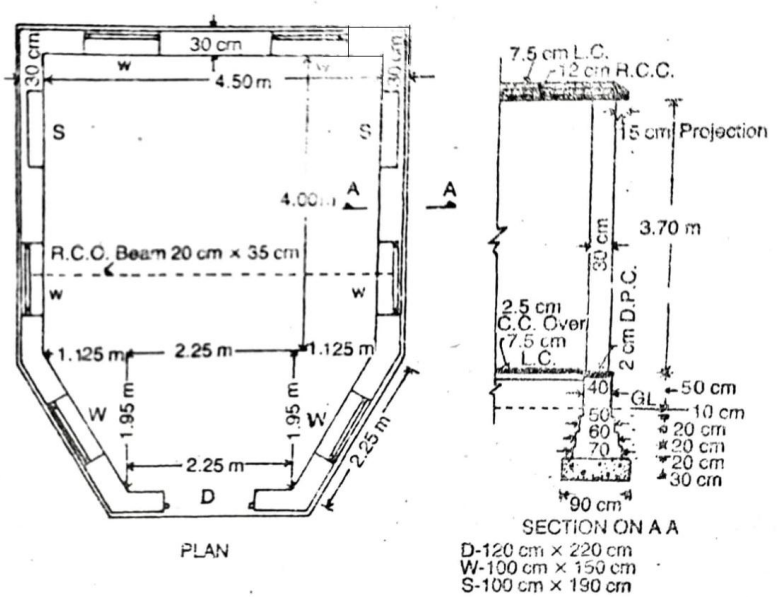
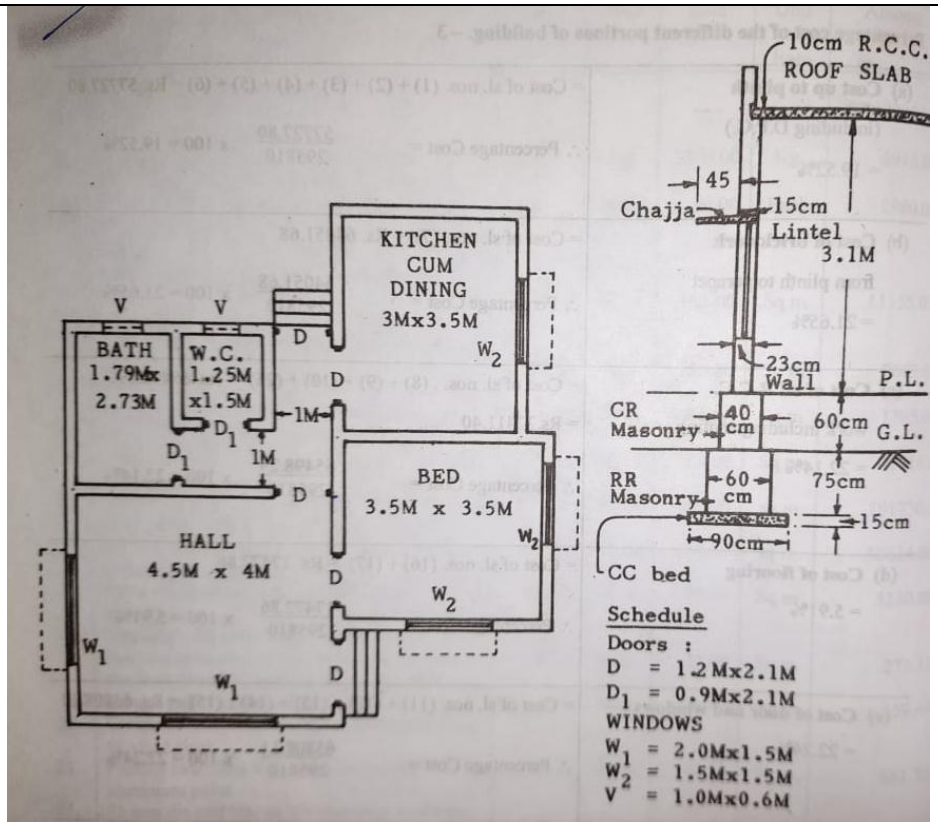


Fig.4

10	For the plan shown estimate the quantities of – (a) Earthwork in foundation (b) Concrete in foundation (c) Brickwork in foundation and plinth in 1:6 cement mortar (d) Brickwork in superstructure in cement mortar (e) 2.5 cm cement concrete over 7.5 cm cement concrete floor  	[L3][CO1]	**[10M]**
11	For the residential building shown in Fig.5, estimate the following: (a) Earthwork in exaction (b) C.R. masonry in C.M (1:6) in the basement (c) Laterite stone masonry in C.M. (1:5) in the superstructure (d) R.C.C (1:2:4) in chajja, lintel and roof slab (e) Plastering wall surface in C.M (1:3) 12 mm thick	[L3][CO1]	**[10M]**



PLAN & SECTIONAL VIEW

Fig.5

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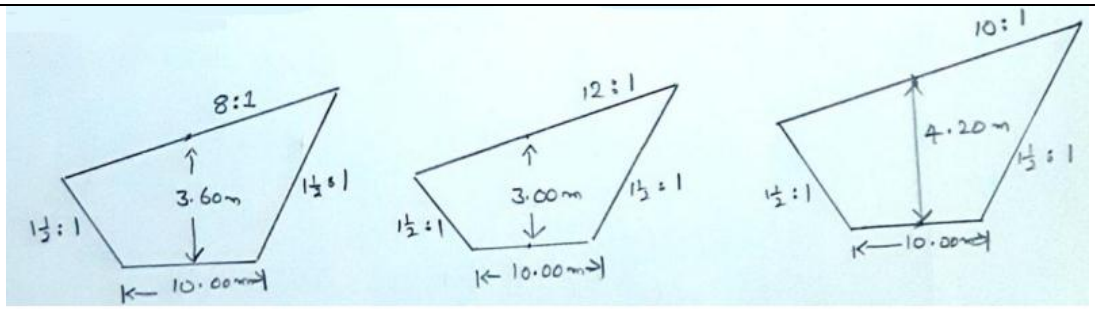
UNIT –II
ROAD ESTIMATING AND EARTH WORK FOR CANALS

1	**a**	Define *Lead* and *Lift.*	[L1][CO2]	**[2M]**
	b	Define turfing. Give the equation for calculating turfing area for a road in banking having formation width 'B', formation depth 'd', side slopes S:1 (H:1) and length 'L'.	[L2][CO2]	**[2M]**
	c	Write Prismoidal formula for calculating quantity of earth, for two sections A_1 and A_2 which are separated by a distance or length L.	[L2][CO2]	**[2M]**
	d	List different items of estimation in metalled road construction.	[L1][CO2]	**[2M]**
	e	Draw the canal section having *Partly in Excavation and Partly in Embankment* with a neat sketch and mention the dimension.	[L2][CO2]	**[2M]**
2		Write a detailed note on different methods of estimating earthwork in construction.	[L1][CO2]	**[10M]**
3		A road portion of 200 m length is having heights 1.00 m and 1.60 m in banking at the two ends. The road portion in an uniform ground with a formation width 10 m and side slopes being 2:1 (horizontal: vertical). Assume that there is no transverse slope. (i) Calculate the quantity of earthwork using *Mid Sectional Area Method, Mean Sectional Area Method and Prismoidal Formula Method. (iii)* Compare the two methods with *Prismoidal Formula Method* and report the difference of quantities in percentage. (iii) If the side slopes are to be provided with a stone pitching of 15 cm thick, calculate the cost of pitching at the rate of Rs.220/- per cu.m	[L3][CO2]	**[10M]**
4		Reduced level (R.L.) of ground along the centre line of a proposed road from chainage 10 to chainage 20 are given below. The formation level at the 10^{th} chainage is 107 and road is in downward gradient of 1 in 150 up to the chainage 14 and then the gradient changes to 1 in 100 downward. Formation width of road is 10 m and side slopes of banking are 2:1 (H:V). Length of the chain is 30 m. Prepare an estimate of earth at the rate of Rs.275% cu.m.	[L3][CO2]	**[10M]**

Chainage	**RL of ground (m)**
10	105.00
11	105.60
12	105.44
13	105.90
14	105.42
15	104.30
16	105.00
17	104.10
18	104.62
19	104.00
20	103.30

5	Reduced level (R.L.) of ground along the centre line of a proposed road from chainage 10 to chainage 20 are given below. The formation level at the 10th chainage is 107 and road is in downward gradient of 1 in 150 up to the chainage 14 and then the gradient changes to 1 in 100 downward. Formation width of road is 10 m and side slopes of banking are 2:1 (H:V). Length of the chain is 30 m. Find the area of the side slopes and the cost of turfing the side slopes at the rate of Rs.60% sq,m. **Chainage** | **RL of ground (m)** 10 | 105.00 11 | 105.60 12 | 105.44 13 | 105.90 14 | 105.42 15 | 104.30 16 | 105.00 17 | 104.10 18 | 104.62 19 | 104.00 20 | 103.30	[L3][CO2]	**[10M]**
6	Estimate the cost of earthwork for a portion of road for 400 m length from the following data:- Formation width of the road is 10 m. Side slopes are 2:1 in banking 1.5:1 in cutting. **Station** | **Distance in m** | **RL of ground in m** | **RL of formation** 25 | 1000 | 51.00 | RL of formation is 52.00. Downward gradient of 1in 200 26 | 1040 | 50.90 27 | 1080 | 50.50 28 | 1120 | 50.80 29 | 1160 | 50.60 30 | 1200 | 50.70 31 | 1240 | 51.20 32 | 1280 | 51.40 33 | 1320 | 51.30 34 | 1360 | 51.00 35 | 1400 | 50.60	[L3][CO2]	**[10M]**
7	A hill road is to be constructed in side-long ground in cutting. Calculate the quantity of earthwork for two chain length in between 10th to 12th chainage, the length of chain being 30 m. The depth of cutting at the chainage 10 is 3.60 m at the centre and cross slope of ground is 8:1 (H:V). The depth of cutting at the chainage 11 is 3.00 m at the centre and cross slope of ground is 12:1 (H:V). The depth of cutting at the chainage 12 is 4.20 m. The depth of cutting at the chainage 12 is 4.20 m at the centre and cross slope of ground is 10:1 (H:V). Formation width is 10 m and side slopes of cutting 1.5:1 (H:V). Estimate cost of earthwork using *Mid-Sectional Area, Mean Sectional Area* and *Prismoidal Method* if the rate of earthwork in exaction is Rs.275% cu.m.	[L3][CO2]	**[10M]**

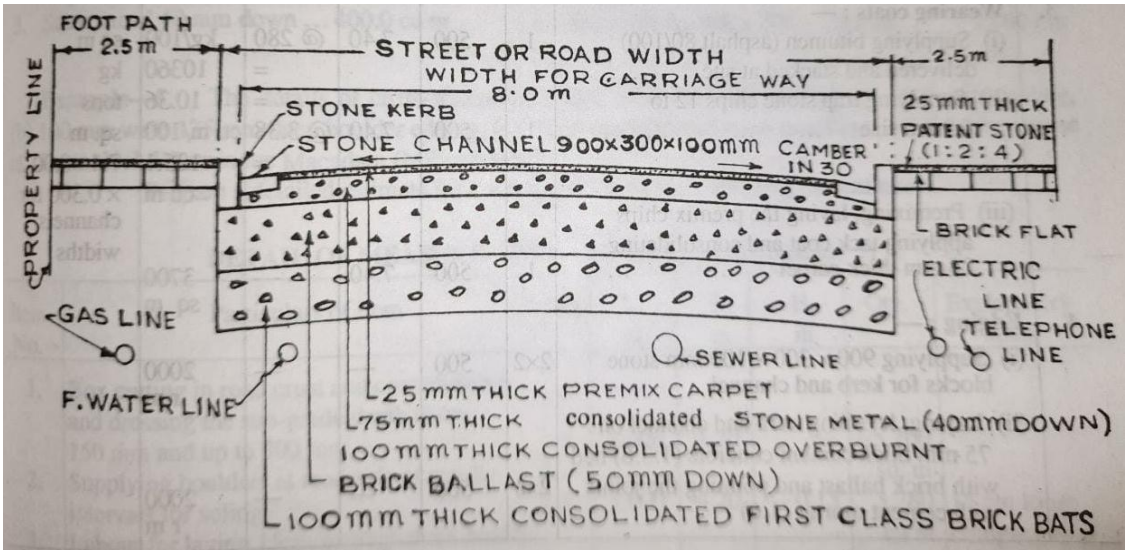


Section at 10th Chainage Section at 11th Chainage Section at 12th Chainage

8 Calculate the quantity of earthwork of a hill road in side-long ground, for a length of 200 m from 5 to 10 chainage, tangent of the angle of transverse slop of ground (tanΘ) is equal to 0.2 althrough as measured by Ghat Tracer. The length of chain is 20 m. The formation width of the road is 7 m and slope bank is 2:1. R.L. of ground and formation level at the centre of the road are as follows:- [L3][CO2] **[10M]**

Chainage	Distance (m)	RL of ground at centre (m)	RL of formation at centre (m)
5	100	200.00	201.20
6	120	199.75	201.80
7	140	200.50	202.40
8	160	201.70	203.00
9	180	202.40	203.60
10	200	201.50	204.20

9 Detailed dimensioned sketch cross-section of a city street having mettled portion of 8 m for the carriageway is shown in figure. Prepare a estimate for constructing 500 m length of this street. Indicate also quantities of materials. [L3][CO2] **[10M]**



10 With neat sketches explain the irrigation canal section which may be generally encountered in estimate. [L2][CO2] **[10M]**

11	Calculate the quantity of earthwork of a portion of a channel with the following data:- Bed width = 3 m; Free board = 44 cm; Slope of digging is 1:1; Side slope of banking 1.5:1; Full supply depth = 1m; Top width of both the bank = 1.5 m.	[L3][CO2]	**[10M]**

Rd. (m)	**Ground level (m)**	**Proposed bed level (m)**
0	225.24	224.00
30	224.80	223.94
60	224.43	223.88
90	224.12	223.82
120	224.50	223.76
150	224.98	223.70

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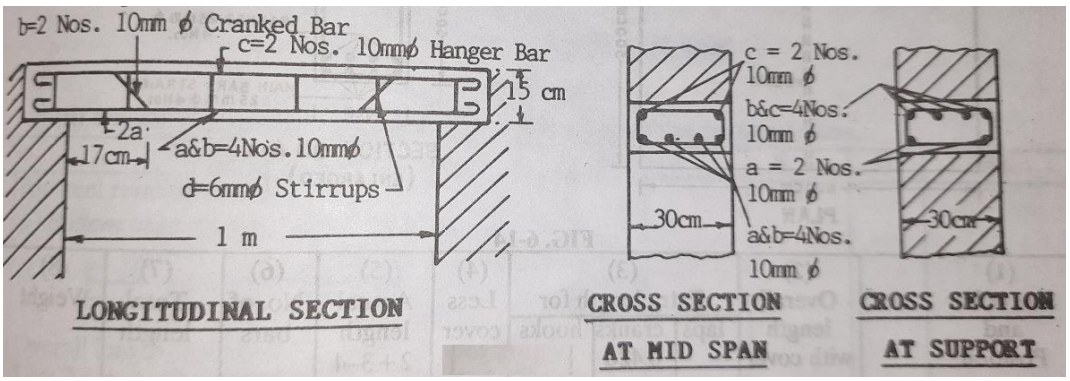
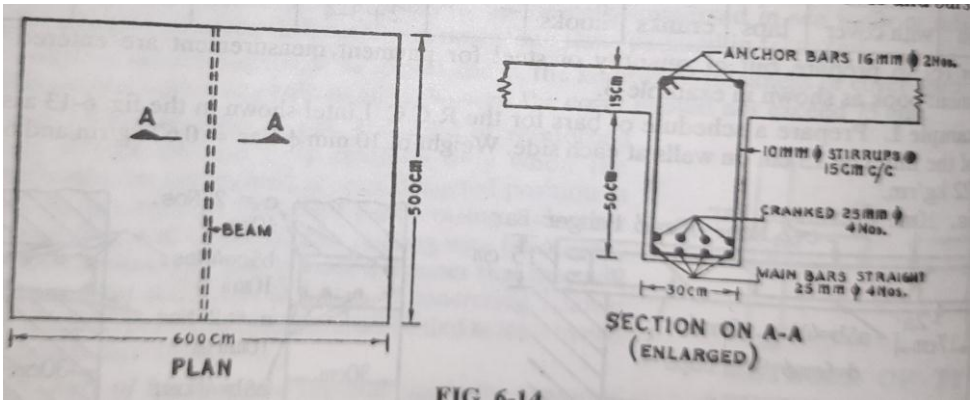
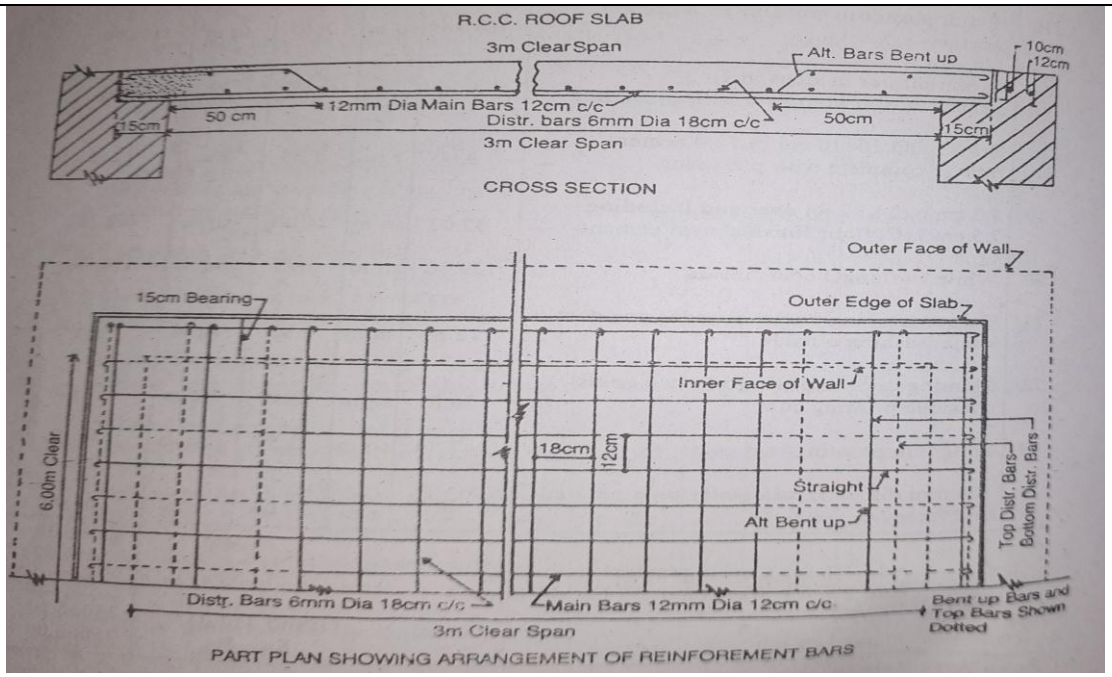
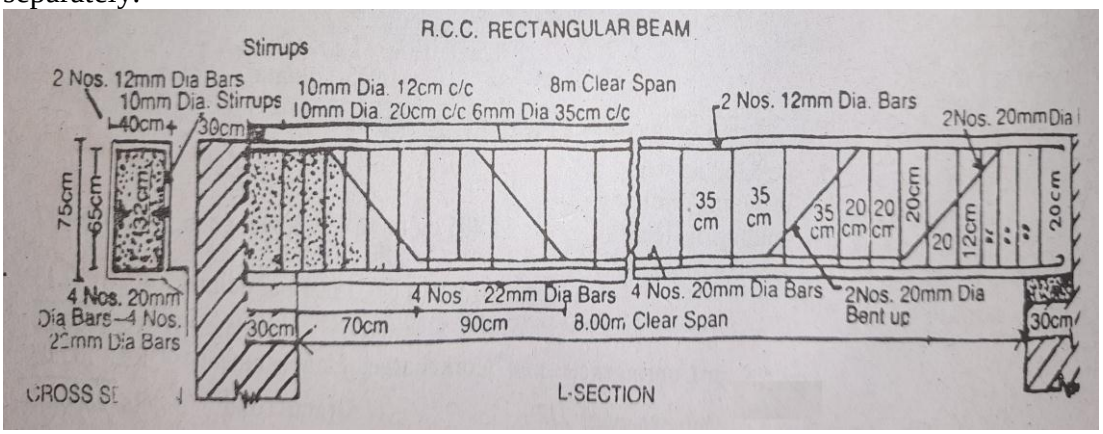
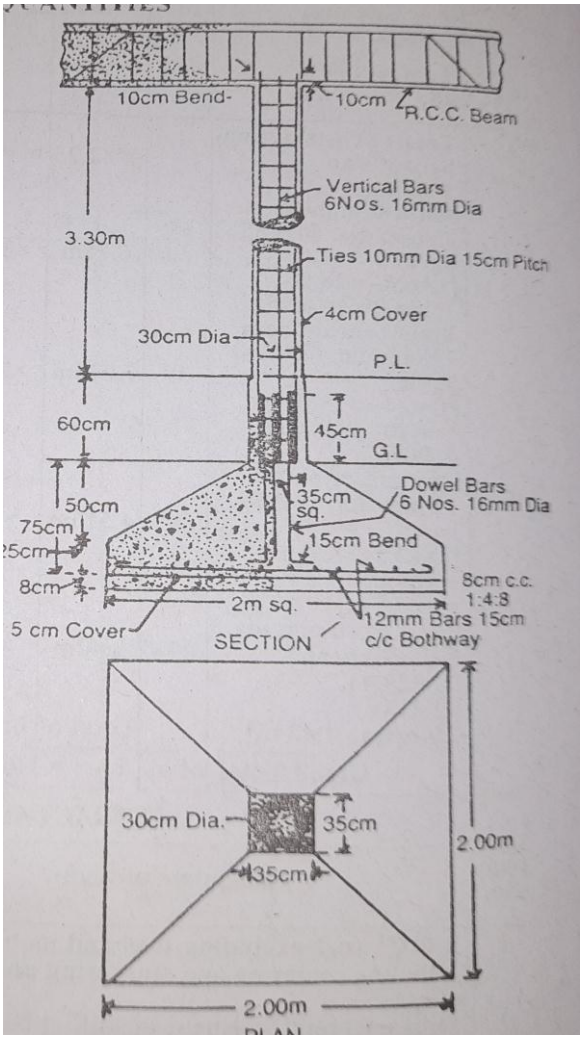
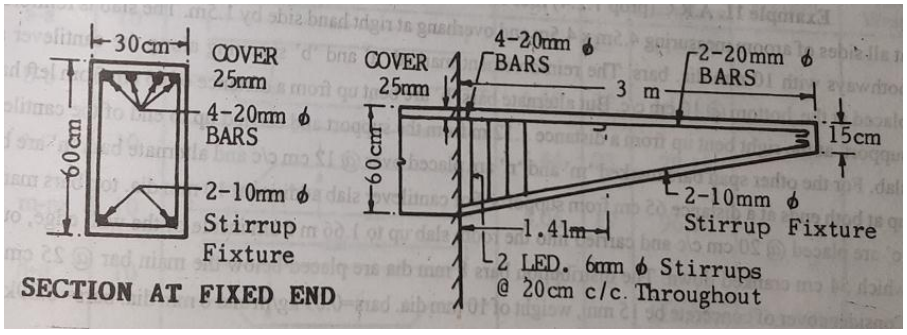
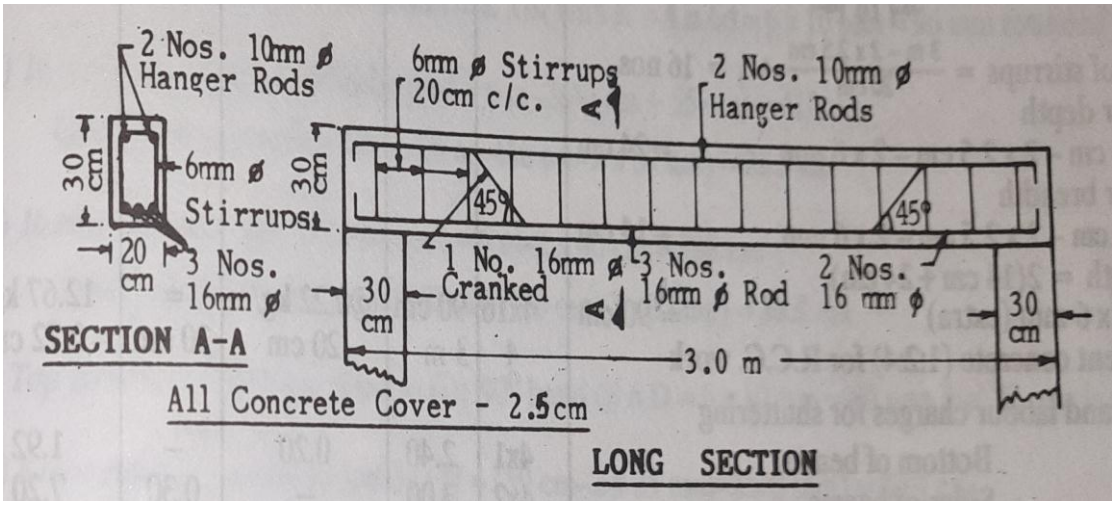
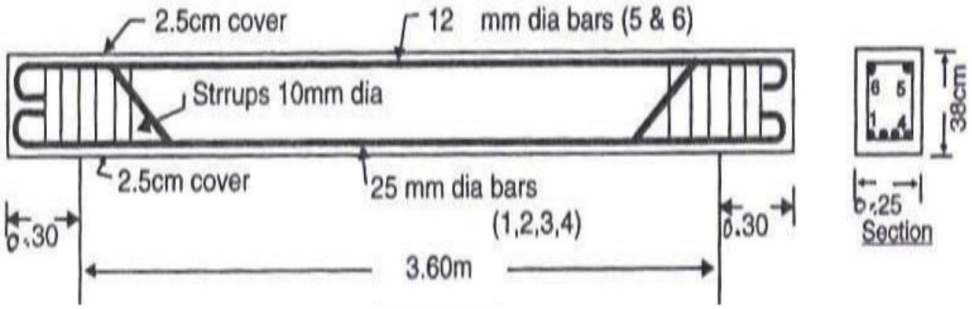
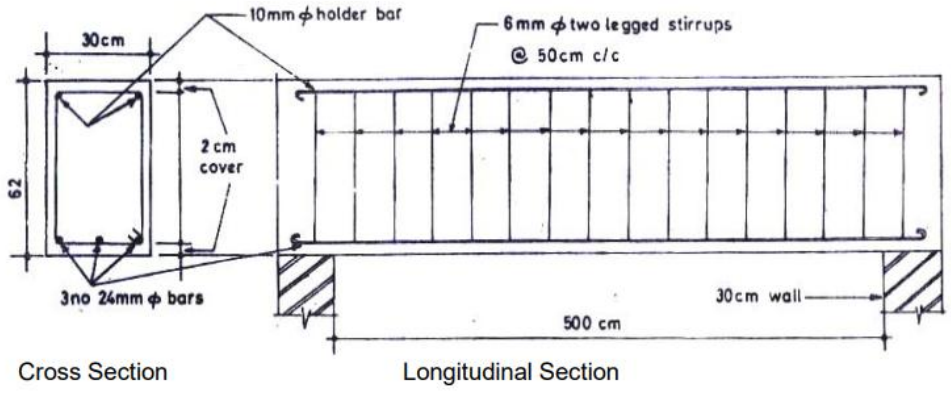
UNIT –III
R.C.C WORKS

1	**a**	Draw a semi-circular hook and right angle bend at end anchorage of reinforcement.	[L2][CO3]	**[2M]**
	b	What are different types of reinforcement bars used in RCC members?	[L2][CO3]	**[2M]**
	c	What are percentage of steel of concrete in general in different types of RCC members?	[L1][CO3]	**[2M]**
	d	What is schedule of bars?	[L1][CO3]	**[2M]**
	e	What are different items of work estimated in reinforced cement concrete work?	[L1][CO3]	**[2M]**
2	**a**	Explain the purpose of preparing schedule of bars.	[L2][CO3]	**[3M]**
	b	With a neat sketches explain how the measurement of bending dimension of bars for reinforced concrete is estimated.	[L2][CO3]	**[7M]**
3		Prepare a schedule of bars for the RCC lintel shown in figure assuming bearing of the lintel be 15 cm on walls at each side. Weight of 100 mm dia bar = 0.62 kg/rm and 6 mm dia bar = 0.22 kg/rm. 	[L3][CO3]	**[10M]**
4		A room 600 cm long x 500 cm wide has a flat roof. There is one T-beam in the centre (cross section below the slab 30 cm x 50 cm) and the slab is 15 cm thick. Estimate the quantity of iron bars required for reinforcement (for the T-beam only) from the data given below :- Main bars – 8 nos. 25 mm dia. in 2 rows of each (all 4 in the bottom being straight an others bent) Strirrups – 10 mm dia. and 15 cm centre to centre throughout Anchor bar – 2 nos. 16 mm dia  FIG. 6.14	[L3][CO3]	**[10M]**
5		Prepare a detailed estimate of a RCC roof slab of 3 metres clear span and 6 metres long from the given drawings. RCC work including centering and shuttering and steel reinforcement in detail shall be taken separately.	[L3][CO3]	**[10M]**

			
6	Prepare a detailed estimate of a RCC beam of 8 m clear span and 75 cm x 40 cm in section from the given drawings. Steel in detail and RCC work shall be calculated separately. 	[L3][CO3]	**[10M]**

7	Prepare a detailed estimate of a RCC column with foundation footing from the given drawings.  **PLAN & SECTION**	[L3][CO3]	**[10M]**
8	A cantilever RC beam projects beyond the fixed end by 3 m and is 30 cm x 60 cm at fixed end and reduced to 30 cm x 15 cm at the free end. At the fixed end the beam is reinforced with 4 bars 20 mm dia at the top and 2 bars are curtailed at a distance of 1.41 m from the fixed end, but the remaining 2 bars continued up to the free end. The beam is provided with 6 mm dia two legged stirrups 20 cm centre to centre for the entire length. At the bottom there are 2 bars 10 mm dia as stirrup fixture. Weight of bars are 20 mm = 2.47 kg/m, 10 mm = 0.62 kg/m, 6 mm =-.22 kg/m. assume 25 mm clear cover and the main bars are suitably anchored, but is not needed in the estimate. Estimate the quantity of reinforcement.  	[L3][CO3]	**[10M]**
9	A RCC rectangular beam 20 cm wide x 30 cm deep x 3.0 m overall length is reinforced with Tor steel bars 3 nos. 16 mm dia (wt.1.58 kg/m) two outer bars straight and top, two outer hanger bars are 10 mm in dia (wt.0.62 kg/m) straight and L-hooked at ends. Stirrups are 6 mm in dia MS bar (wt. 0.22 kg/m) and spaced at 20 cm centers. All concrete cover = 2.5 cm. Estimate the quantity of reinforcement.	[L3][CO3]	**[10M]**

			
10	Workout the quantity of reinforcement by preparing bar requirement schedule of a beam as per the drawing given below. Side covers 50 mm. 	[L3][CO3]	**[10M]**
11	The following figure shows the longitudinal section & cross section of a simple beam of clear span 5.0 m. The thickness of support wall is 300 mm. Workout the total quantity of the reinforcement in the beam. Also prepare the bar bending schedule. 	[L3][CO3]	**[10M]**

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UNIT –IV
ANALYSIS OF RATES

1	**a**	Define rate analysis. What is the purpose of rate analysis?	[L1][CO4]	**[2M]**
	b	What are the factors on which rate of particular item of work depends?	[L1][CO4]	**[2M]**
	c	List various expenses that comes under overhead costs.	[L1][CO4]	**[2M]**
	d	What are different quantities required for brickwork in 1:6 cement sand mortar for 10 cu.m?	[L3][CO4]	**[2M]**
	e	Mention volume of ballast, sand and cement for 10 cu,m of 1:2:4 cement concrete.	[L3][CO4]	**[2M]**
2	Mention the labour requirements for the following works as recommended by National Building Organization: (a) Earthwork per 28.3 cu.m (b) Cement concrete work per 2.83 cu.m (c) R.C.C work (d) Brickwork per 2.83 cu.m (e) Flooring		[L1][CO4]	**[10M]**
3	(a) Prepare the rate per cu.m for 1:2:4 cement concrete. (b) Arrive the rate for I-class brickwork in superstructure with 20 x 10 x 10 cm brick with 1:6 cement sand mortar.		[L3][CO4] [L3][CO4]	**[5M]** **[5M]**
4	Work out rate per cu.m for RCC work in beams and slabs with 1:1½:3 cement concrete.		[L3][CO4]	**[10M]**
5	(a) Prepare the reate per cu.m for random rubble stone masonry in superstructure in 1:6 cement sand mortar. (b) What is the rate per sq.m for constructing 12 mm thick cement plastering in ceiling with 1:3 cement sand mortar?		[L3][CO4] [L3][CO4]	**[5M]** **[5M]**
6	Calculate the rate per cu.m for providing and laying plain cement concrete (M10) nominal mix in foundation trenches including compacting and curing.		[L3][CO4]	**[10M]**
7	(a) Prepare rate per cu.m for exaction over are for a basement in hard soil, depth 1.5 m and removing the material through a distance of 50 m. (b) Prepare rate per sq.m for laying Mosic or Terrazo title floor.		[L3][CO4] [L3][C04]	**[5M]** **[5M]**
8	(a) Perform rate analysis for arrive rate per sq.m for 1:2 cement mortar in pointing. (b) What is the rate per sq.m for providing white washing one coat?		[L3][CO4] [L3][CO4]	**[5M]** **[5M]**
9	(a) Prepare rate per cu.m for constructing rubble stone masonry in superstructure 1:6 cement sand mortar. (b) Prepare rate per sq.m for painting one coat over a coat of priming.		[L3][CO4] [L3][C04]	**[5M]** **[5M]**
10	(a) Prepare rate for ashlar masonry in superstructure in 1:6 cement sand mortar. (b) Calculate rate per sq.m for laying 2 cm thick damp proof course with 1:2 cement mortar.		[L3][CO4] [L3][C04]	**[5M]** **[5M]**
11	(a) Prepare earthwork in banking or in exaction in road or canal work in layer of 20 cm including ramming, dressing etc., up to 30 m load and 1.5 m lift. (b)arrive rate per sq.m for laying 2.5 cm thick 1:1.5:3 cement concrete as damp proof course.		[L3][CO4] [L3][CO4]	**[5M]** **[5M]**

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UNIT –V
SPECIFICATIONS & VALUATION

1	**a**	Write brief note on types of specifications.	[L1][CO5]	**[2M]**
	b	What are principles adopted while writing specifications?	[L1][CO5]	**[2M]**
	c	What is the purpose of valuation?	[L1][CO6]	**[2M]**
	d	What is the difference between scrap value and salvage value?	[L2][CO6]	**[2M]**
	e	What is the difference between obsolescence and depreciation?	[L2][CO6]	**[2M]**
2	List and explain general specifications of a first class building.		[L2][CO5]	**[10M]**
3	Write detailed specification for earthwork exaction.		[L2][CO5]	**[10M]**
4	Give detailed account on specifications of 1:2:4 cement concrete.		[L2][CO5]	**[10M]**
5	What are different specifications for first class brick work.		[L2][CO5]	**[10M]**
6	(a) Write detailed specifications for white washing and colour washing. (b) Mention detail specifications for doors and windows.		[L2][CO5] [L2][CO5]	**[5M]** **[5M]**
7	List and explain various methods of calculating depreciation.		[L2][CO6]	**[10M]**
8	Give detailed account on different methods of valuation.		[L2][CO6]	**[10M]**
9	A three-storied building is standing on a plot of land measuring 800 sq.m. The plinth area of each storey is 400 sq.m. The building is of RCC framed structure and the future life may be taken as 70 years. The building fetches a gross rent of Rs.1500.00 per month. Work out the capitalized value of the property on the basis of 6% net yield. For sinking fund 3% compound interest may be assumed. Cost of land may be taken Rs.40.00 per sq m. Other data as required may be assumed suitably.		[L3][CO6]	**[10M]**
10	In a plot of land costing Rs.20,000.00 a building has been newly constructed at the total cost of Rs.80,000.00 including sanitary and water supply works, electrical installation, etc. The building consists of four flats for four tenants. The owner expects 8% return on the cost of construction and 5% return on the cost of land. Calculate the standard rent for each flat of the building assuming:- (i) The life of the building as 60 years and sinking fund will be created on 4% interest basis. (ii) Annual repairs cost at 1% of the cost of construction (iii) Other outgoings including taxes at 30% of the net return on the building.		[L3][CO6]	**[10M]**
11	Calculate the standard rent of a Government residential building newly constructed from the following data – (i) Cost of land – Rs.10,000.00 (ii) Cost of construction of the building – Rs.40,000.00 (iii) Cost of roads within the compound, and fencing – Rs.20,00.00 (iv) Cost of sanitary and water supply works – 8% of the cost of building (v) Cost of electric installation including fans – 10% of the cost of building (vi) Municipal House tax – Rs.400.00 per annum (vii) Water tax – Rs.250.00 per annum (viii) Property tax – Rs.140.00 per annum		[L3][CO6]	**[10M]**

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