INSTITUTE OF AERONAUTICAL ENGINEERING

(Autonomous)
Dundigal, Hyderabad - 500 043

CIVIL ENGINEERING

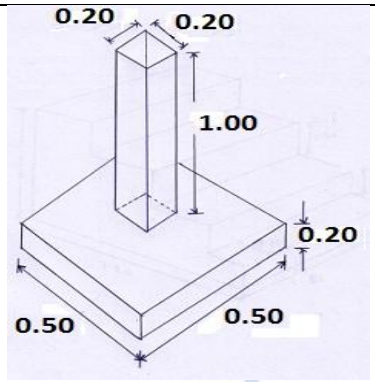
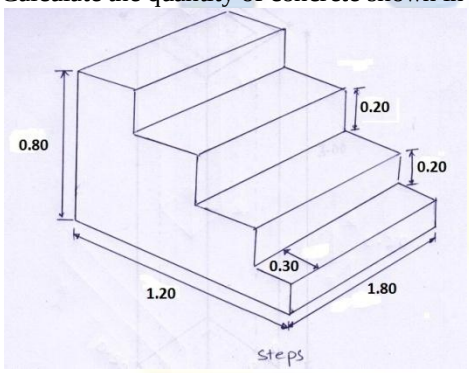
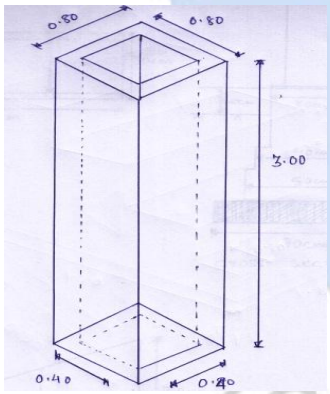
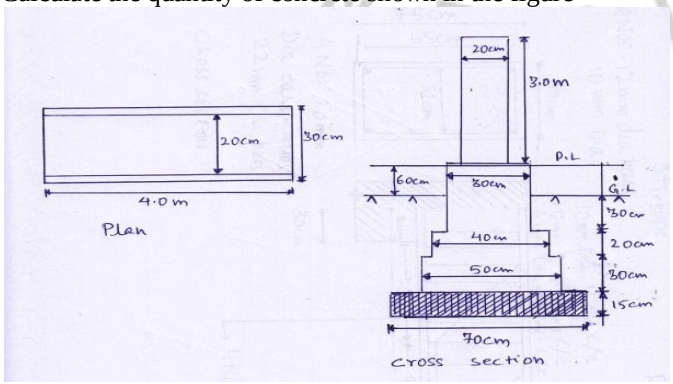
Assignment Questions

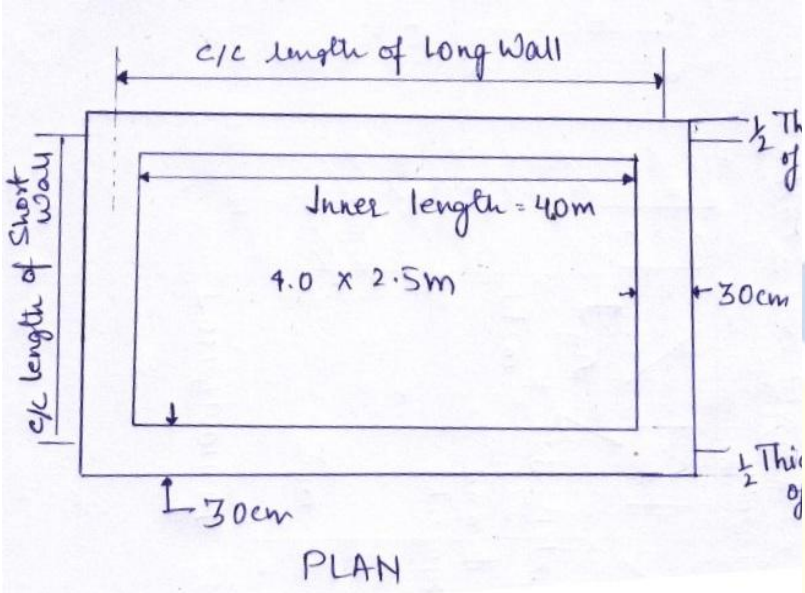
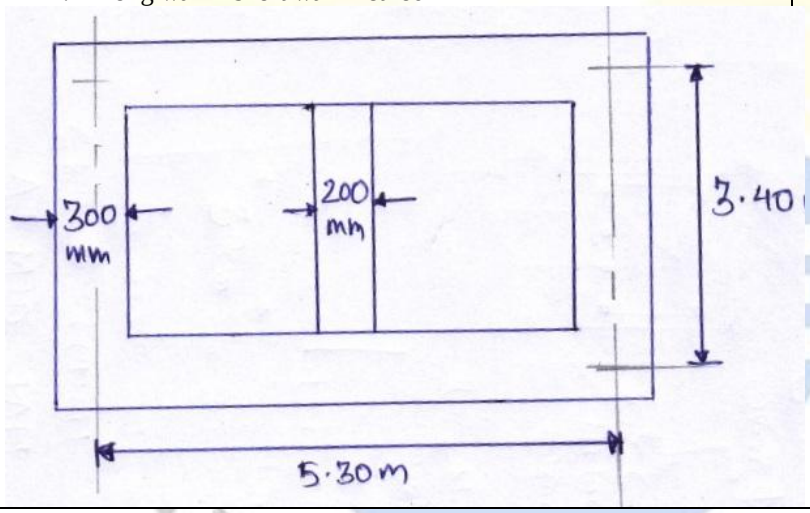
Course Name	**:**	**ESTIMATION AND COSTING**
Course Code	:	**A70138 – R16**
Class	:	**IV B. Tech I Semester**
Branch	:	**CIVIL ENGINEERING**
Year	:	**2018– 2019**
Course Faculty	:	**Mr. Gude Ramakrishna, Associate Professor, Department of Civil Engineering.**

COURSE OVERVIEW:

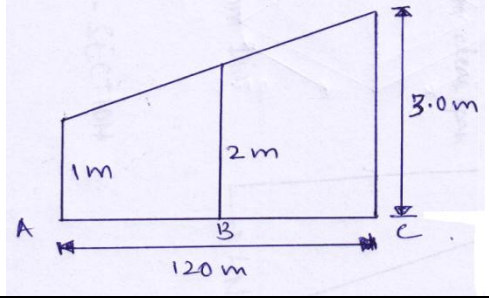
Estimation is the technique of calculating or computing the carious quantities and the expected expenditure to be incurred on a particular work or project. Before sanction or approval of any project or work, its estimated cost worked out and necessary funds are sanctioned by the competent authority. Accuracy in estimate is very important, if estimate is exceeded it becomes a very difficult problem for engineers to explain, to account for and arrange for the additional money. Inaccuracy in preparing estimate, omission of items, changes in the designs, improper rates, etc. are the reasons for exceeding the estimate through increase in the rates is one of the main reasons. In framing a correct estimate, care should be taken to find out the dimensions of all the items correctly, and to avoid omissions of any kind of work or part thereof. The rate of each item should also be reasonable and workable. The rates in the estimate provide for the complete work, which consist of the cost of materials, cost of transport , cost of scaffolding, cost of tools and plants , cost of water , taxes, establishment and supervision cost, reasonable cost, reasonable profit of contractor, etc.

S. No.	Question	Blooms Taxonomy Level	Program Outcomes
	UNIT-I **GENERAL ITEMS OF WORK IN BUILDING, DETAILED ESTIMATES OF BUILDINGS**		
1	(a) Explain principle units for various items of work. (b)List out limits of measurement and degrees of accuracy in estimating.	Understand	1
2	a. What is approximate estimate and explain the importance of approximate estimate. b. Enumerate purpose of an approximate estimate.	Remember	1
3	List out general items of work for building estimates in detail.	Understand	1
4	Explain the following general items of work involved in the estimation for a building and its process calculation. (a) Centering and shuttering (b) Steel work (c) Lime concrete in roof (d) Wood work for doors and windows.	Remember	2
5	Calculate the quantity of brickwork shown in the figure.	Understand	2

	 .		
6	Calculate the quantity of concrete shown in the figure  .	Understand	2
7	Calculate the quantity of woodwork shown in the figure Total height = 3.00 m External width = 0.80m Internal width = 0.40m 	Understand	2
8	Calculate the quantity of concrete shown in the figure  .	Understand	2

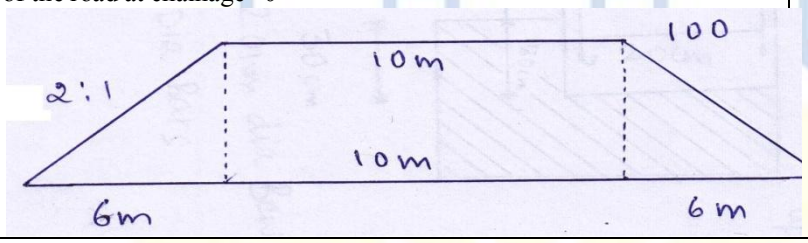
9	Calculate the quantity of brickwork shown in the figure by 1. Center line method 2. Long wall – short wall method  	Understand	2
10	Calculate the quantity of brickwork shown in the figure by 1. Center line method 2. Long wall – short wall method  	Understand	2
	UNIT-II **EARTHWORK FOR ROADS AND CANALS**		
1	Draw the tabular form for the calculation of earthwork with the following methods. (a) Mid – ordinate method and (b) Mean – sectional area method.	Understand	2
2	(a)Explain the terms lead and lift. (b) List out the general methods for computation of earth work.	Understand	2
3	How do you calculate: a) Earth work with vertical fall of the ground surface for fully in banking, fully in cutting and partly in banking cutting? b) Earth work on curvature of a road without transverse slope.	Understand	2
4	How do you calculate: a) Earth work with vertical fall of the ground surface for fully in banking, fully in cutting and partly in banking cutting? b) Earth work on curvature of a road without transverse slope.	Understand	2
5	Calculate the volume of earthwork for 100.00m length of road in a uniform ground. Height of the bank at one end is 0.75m and at the other	Understand	3

<table>
<tr><td></td><td>end 1.20m. Formation width is 10.00m and side slopes of embankment are 2:1. Ground does not have any cross slope. Calculate the volume of earthwork by
Mid sectional area method
Mean sectional area method
Trapezoidal method and
Prismoidal method.</td><td></td><td></td></tr>
<tr><td>6</td><td>Prepare a detailed estimate for earthwork for a portion of a road from the following data.

<table><tr><th>Distance in m</th><th>RL of ground</th><th>RL of the formation</th></tr><tr><td>0</td><td>114.50</td><td>115</td></tr><tr><td>100</td><td>114.75</td><td rowspan="4">Upward gradient 1 in 200 up to 600 m</td></tr><tr><td>200</td><td>115.25</td></tr><tr><td>300</td><td>115.20</td></tr><tr><td>400</td><td>116.10</td></tr><tr><td>500</td><td>116.85</td><td rowspan="8">Downward gradient 1 in 400</td></tr><tr><td>600</td><td>118.00</td></tr><tr><td>700</td><td>118.25</td></tr><tr><td>800</td><td>118.10</td></tr><tr><td>900</td><td>117.80</td></tr><tr><td>1000</td><td>117.75</td></tr><tr><td>1100</td><td>117.90</td></tr><tr><td>1200</td><td>117.50</td></tr></table>
Formation width of road is 8m, side slopes are 2:1 in banking and 1½:1 in cutting. Draw L-section and cross sections.</td><td>Remember</td><td>3</td></tr>
<tr><td>7</td><td>The formation width of a road embankment is 9.0m. The side slopes are 2.5:1. The depths along the center line of road at 50.0m intervals are 1.2, 1.1, 1.4, 1.2, 0.9, 1.5 and 1.0.m. It is required to calculate the quantity of earthwork by
(a) Prismoidal rule.
(b) Trapezoidal rule.</td><td>Remember</td><td>3</td></tr>
<tr><td>8</td><td>Calculate the quantity of each work for 200m length for a portion of a road in an uniform ground the heights of banks at the two ends being 1.00m and 1.60m. The formation width is 10 m and side slopes 2:1 (H : V). Assume that there is no transverse slope. Use the following methods and justify which method is good.
(a) Mid – sectional area method and
(b) Prismoidal formula.</td><td>Understand</td><td>3</td></tr>
<tr><td>9</td><td>A canal is proposed to be excavated between two points A and B, 120m apart. If the bed width is 10.00m. side slopes 1.5:1 and depth of cutting 1.00m, 2.00m and 3.00m at A,B and C. Calculate the quantity of earthwork excavation by
Mid sectional area method
Mean sectional area method
The longitudinal section of the position A – B and cross section at A, B, C and Mid-point section is shown in the figure
  </td><td>Remember</td><td>3</td></tr>
<tr><td>10</td><td>The ground levels along the center line of the road are given below</td><td>Remember</td><td>4</td></tr>
</table>

Chainage in meters:	0	50	100	150	200
R.L. of ground	97.00	96.50	96.00	97.50	98.00

The road is to be formed in embankment with the formation level at 100.00m throughout the length. If the width of the road is 10.00m and side slopes 2:1. Calculate the quantity of earthwork required by
Trapezoidal rule
Prismoidal rule.
Assuming the transverse slope as level. The figure below shows the c/s of the road at chainage "0"



UNIT-III
RATE ANALYSIS

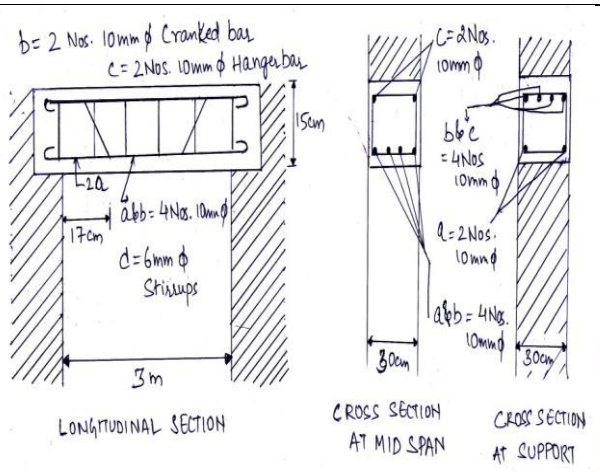
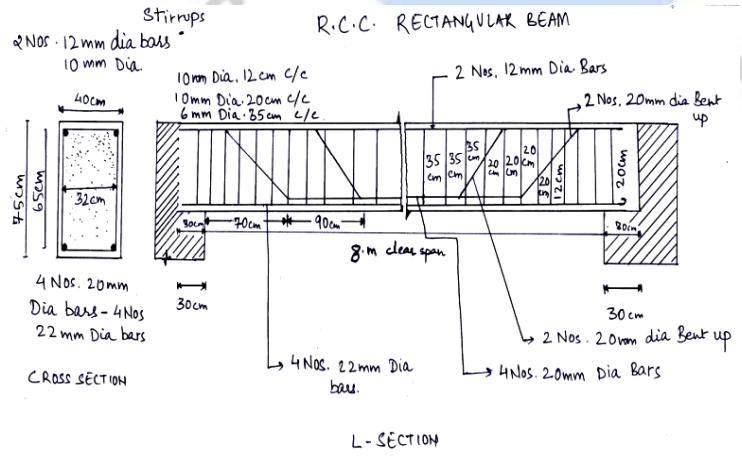
1	Explain the following (a) Market rate. (b) Work-charged establishment. (c) Lump-sum.	Remember	5
2	(a)What is an Estimate? Draw and explain Flow Chart of Estimation. (b)Write about Analysis of Rates? What is the Purpose of Rate analysis?	Understand	5
3	Calculate the quantity of materials and analyze the rate required for lime concrete in foundation with 40mm size brick ballast with 1 lime and 2 surkhi mortar. Proportions 1:2:6 for 1 cu.m	Understand	5
4	Calculate the quantity of materials and analyze the rate required for lime concrete in foundation with 25mm size stone ballast, lime and sand. Proportions 1:2:4 for 1 cu.m	Understand	5
5	Prepare the lead statement for the following materials	Remember	5

S.No	**Material**	**Rate at source**	**Lead in Km**			**Conveyance charges per Km**
			MT	**CT**	**ST**	
1	40mm HBG metal	Rs. 1200 / cu.m	-	8	9	Rs. 50 per cu.m
2	River sand	Rs. 1500 / cu.m	6	8	12	Rs. 35 per cu.m
3	Cement	Rs. 275 / bag	5	-	7	Rs. 5 per bag

6	a. Calculate the rate for cement concrete (1:2:4) with graded stone chips from 20 mm down to 6 mm for RCC works excluding shuttering and reinforcement. b. Analysis the rate for cement concrete (1:2:4) pouring into moulds completely.	Remember	6
7	Prepare the data sheet and calculate the cost of the items given below: Brick masonry in C.M(1:6) with country bricks – 1 cu.m 1. 600 no's country bricks 2. 0.38cu.m C.M (1:6) 3. 1.40 no's mason 4. 0.7 no's man mazdoor 5. 2.10 no's woman mazdoor 6. L.S. Sundries	Remember	6

<table>
<tr><td>8</td><td>Prepare the data sheet and calculate the cost of the items given below:
Cement concrete(1:5:10) with 40mm size HBG metal – 1 cu.m
1. 0.92 cu.m – 40mm size HBG metal
2. 0.46 cu.m – sand
3. 0.092 cu.m – cement
4. 0.20 no’s – mason
5. 1.80 no’s – man mazdoor
6. 1.40 no’s – woman mazdoor
7. L.S. Sundries</td><td>Remember</td><td>6</td></tr>
<tr><td>9</td><td>Prepare the data sheet and calculate the cost of the items given below:

Lead statement of materials:
<table><tr><th>S. No</th><th>Material</th><th>Rate at source</th><th>Lead in Km</th><th>Conveyance charges per Km</th></tr><tr><td>1</td><td>40mm HBG metal</td><td>Rs. 1200 / cu.m</td><td>25</td><td>Rs. 50 per cu.m</td></tr><tr><td>2</td><td>River sand</td><td>Rs. 1500 / cu.m</td><td>38</td><td>Rs. 35 per cu.m</td></tr><tr><td>3</td><td>Cement</td><td>Rs. 275 / 50 kg bag</td><td>15</td><td>Rs. 5 per bag</td></tr><tr><td>4</td><td>Country bricks</td><td>Rs. 850 / 100 Nos</td><td>18</td><td>Rs. 100 / 100nos</td></tr></table>.</td><td>Remember</td><td>6</td></tr>
<tr><td>10</td><td>Prepare the unit rates for finished items of works for cement concrete in foundation (1:5:10)</td><td>Remember</td><td>6</td></tr>
<tr><td colspan="4">UNIT-IV
REINFORCEMENT BAR BENDING , CONTRACTS</td></tr>
<tr><td>1</td><td>a. Differentiate between development length in tension and compression.
b. What do you mean by development length of reinforcement?</td><td>Understand</td><td>7</td></tr>
<tr><td>2</td><td>(a) What are development lengths for plain and deformed bars.
(b) Compare development length in tension and in compression.</td><td>Remember</td><td>7</td></tr>
<tr><td>3</td><td>(a) What do you mean by end anchorage, explain types of end anchorages
(b) What do you mean by development length of reinforcement?</td><td>Understand</td><td>7</td></tr>
<tr><td>4</td><td>Explain the following engineering contracts along with their advantages and disadvantages.
(a) Item rate contract
(b) Percentage rate contract.</td><td>Understand</td><td>7</td></tr>
<tr><td>5</td><td>Write a short note on the following:
(a) Time limits for tender notice
(b) Sale of tender papers.
(c) Global tender.</td><td>Remember</td><td>7</td></tr>
<tr><td>6</td><td>Prepare a schedule of bars for the RCC lintel shown in the figure 1 assuming bearing of the lintel be 15 cm on walls at each side. Weight of 10mm diameter bar is 0.62 kg/rm and 6 mm diameter bar is 0.22 kg/rm.</td><td>Understand</td><td>8</td></tr>
</table>

	 Figure 1		
7	Calculate the quantity of steel reinforcement required for a roof slab of 3 m x 6 m and fully resting over a wall of 300 mm thick on all sides. i. 10 mm dia main bars are provided in shorter span direction at 150 mm c/c. Alternative bars are bent up near the support and all bars are hooked at both ends. Details of reinforcement: ii. 8 mm dia distribution bars are provided in longer span direction at 200 mm c/c. To hold the bent up bars in position 3 no's distribution bars are provided on each side at top. iii. Cover: Bottom and top cover to reinforcement taken as 15 mm and end cover of 25 mm is provided.	Understand	8
8	Prepare bar bending schedule and calculate the quantity of reinforcement in a R.C.C (1:2:4) lintel as per data given below: Total Length of the lintel including bearing=1.50 m; Thickness of wall = 400 mm; Thickness of lintel = 150 mm; Main reinforcement 5 bars of 12 mm ø (out of which 2 bars are bent up near support). Top reinforcement 2 bars of 10 mm ø; 6 mm ø, 2 legged stirrups are provided @175 mm c/c uniformly.	Understand	8
9	Prepare a detailed estimate if a R.C.C beams of 8 meters clear span and 75cm x 40cm in section from the given drawing. Steel in detail and RCC work shall be calculated separately. Also prepare the schedule of bars.  .	Remember	7
10	Explain the process of acceptance of tenders and general tender conditions	Understand	8

UNIT-V VALUATION OF BUILDINGS, STANDARD SPECIFICATIONS			
1	Find the plinth area required for the residential accommodation for an assistant engineer in the pay scale of rupees 400 to 1000 per month.	Understand	9
2	Explain the following method of valuation of a building along with an example. (a) Valuation based on cost (b) Direct method of valuation.	Understand	9
3	(a)Define valuation and explain the purpose of valuation. (b)Explain capitalized value with a simple example.	Understand	9
4	Give the detailed specifications of the following items of works. (a) Color washing (b) Lime concrete in foundation.	Remember	9
5	Give the detailed specifications of the following items of works. (a) Galvanized corrugated sheet roofing. (b) Lime concrete in foundation.	Remember	9
6	A building is situated by the side of a main road of Hyderabad city on a land of 800 sqm. The built up portion in 25m X 20m. The building is first class type and provided with water supply, sanitary and electric fittings, and the age of the building is 30 years. Workout the valuation of the property. Assume plinth area rate is Rs.200.00 and cost of land as Rs.6000 per sqm.	Understand	10
7	A three storey building is standing on a plot of land measuring 800sq.m. The plinth area of each storey is 400sq.m. The building is of RCC frame structure & the future life may be taken as 70years. The building fetches a gross rent of rupees 1500 per month. Workout 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 as Rs.40 per sq.m. Other data required may be assumed suitably.	Understand	10
8	A colonizer intends to purchase a land of 100,000 sq.m area located suburb of a big city to develop it into plots of 700sq.m each after providing necessary roads and parks and other amenities. The current sale price of small plots in the neighborhood is Rs. 30 per sq.m. The colonizer wants a net profit of 20%. Workout the maximum price of the land at which the colonizer may purchase the land.	Understand	10
9	In a plot of land costing rupees 20,000. A building has been newly constructed at a total cost of 80,000. Including sanitary and water supply works, electrical installations etc. the building consists of 4 flats for 4 tenants. The owner expects 8% returns on the cost of construction and 5% return on cost of land. Calculate the standard rent for each flat of the building assuming 1. The life of the building as 60 years and sinking fund will be created on 4 % interest basis 2. Annual repairs cost at 1% cost of construction 3. Other outgoings including taxes at 30% of the net return of the building	Understand	10
10	i.Explain the term leasehold property. ii.Calculate the standard rent of a government residential building newly constructed from the following data: Cost of land = Rs. 1,00,000/- Cost of construction of the building = Rs. 4,00,000/- Cost of roads within the compound and fencing= Rs. 20,000/- Cost of sanitary and water supply works = 8% of the cost of the building.Cost of electrical installation including fans = 10% of the cost of the building.Municipal house tax = Rs. 4,000/-per Annum. Water tax = Rs. 1,200/-per Annum. Property tax = Rs. 1,000/-per Annum.	Understand	11

Prepared by:
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