



Summer– 19 EXAMINATION

Subject Name: Estimating & Costing

Model Answer

Subject Code:

17501

Important Instructions to examiners:

- 1) The answers should be examined by key words and not as word-to-word as given in the model answer scheme.
- 2) The model answer and the answer written by candidate may vary but the examiner may try to assess the understanding level of the candidate.
- 3) The language errors such as grammatical, spelling errors should not be given more Importance (Not applicable for subject English and Communication Skills).
- 4) While assessing figures, examiner may give credit for principal components indicated in the figure. The figures drawn by candidate and model answer may vary. The examiner may give credit for any equivalent figure drawn.
- 5) Credits may be given step wise for numerical problems. In some cases, the assumed constant values may vary and there may be some difference in the candidate's answers and model answer.
- 6) In case of some questions credit may be given by judgement on part of examiner of relevant answer based on candidate's understanding.
- 7) For programming language papers, credit may be given to any other program based on equivalent concept.

Q. No.	Sub Q.N.	Answer	Marking Scheme
1.	(a)	Attempt any <u>Three</u> of the following:	12 Marks
	(i)	<p>Explain in brief revised estimate and supplementary estimate.</p> <p>Ans :1) Revised estimate: Revised estimate is a detailed estimate and is required to be prepared under any one of the following circumstances.</p> <ol style="list-style-type: none">When the original sanctioned estimate is likely to exceed by more than 5%.When the expenditure on a work exceeds or likely to exceeds the amount of administrative sanctioned by more than 10%.If there is change of rate or quantity of materials.Major additions or alterations are introduced in original work. <p>2) Supplementary estimate. It is detailed estimate of additional work and is prepared when additional works or changes are required to supplement the original works, during the execution of work. Then a fresh detailed estimate of additional works is prepared in addition to the original works. The abstract should show the amount of the original estimate and the total amount including the Supplementary amount, for which sanctioned is required.</p>	2 Marks each
1.	(ii)	<p>State purpose of estimating and costing.</p> <p>Ans : i) To know the approximate cost of proposed work. ii) To obtain administrative approval and technical sanction. iii) To know the requirements of tools, plants and equipment. iv) To fix up the completion period. v) To draw up a construction schedule and programme. vi) To invite tenders. vii) To keep control over expenditure during construction Valuation to know value of property.</p>	4 Marks



1.	(iii)	<p>State service unit for</p> <p>Ans:</p> <p>1)reservoir-----sq. meter of catchment area</p> <p>2)hotel----per room</p> <p>3)stadium-----per seat</p> <p>4)school----per class room</p>	1Mark For each																												
1.	(iv)	<p>State modes of measurement.</p> <p>Ans:-</p> <p>1)formwork---- sq. m</p> <p>2)U.C.R.masonry ---cu.m.</p> <p>3) Brick wall (10 cm thick) : sq. m</p> <p>4)railing -----RMT</p>	1Mark For each																												
1.	(b)	Attempt any one of the following:	06 M																												
1.	(i)	<p>Draw standard format of measurement sheet abstract sheet and face sheet.</p> <p>Ans:-Measurement sheet</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 10%;">Item No.</th> <th style="width: 35%;">Description of item</th> <th style="width: 10%;">No.</th> <th style="width: 10%;">Length L</th> <th style="width: 10%;">Breadth B</th> <th style="width: 10%;">Height D/H</th> <th style="width: 15%;">Quantity</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Abstract sheet</p> <table border="1" style="width: 100%; border-collapse: collapse; margin-bottom: 10px;"> <thead> <tr> <th style="width: 10%;">Item No.</th> <th style="width: 35%;">Description of item</th> <th style="width: 10%;">Quantity</th> <th style="width: 10%;">Unit</th> <th style="width: 10%;">Rate</th> <th style="width: 10%;">Unit of rate</th> <th style="width: 15%;">Amount</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table> <p>Face sheet:</p> <p>Division: _____</p> <p>Sanction estimate No.: _____</p> <p>Fund head: _____</p> <p>Major head: _____</p> <p>Minor head: _____</p> <p>Service head: _____</p> <p>Departmental head: _____</p> <p>Estimate framed in the office of Executive Engineer, P.W.D., the probable expenses that will occur in Name of Work: _____</p> <p>Administrative approval under No. _____ Dated _____</p>	Item No.	Description of item	No.	Length L	Breadth B	Height D/H	Quantity								Item No.	Description of item	Quantity	Unit	Rate	Unit of rate	Amount								01 M 01 M 01 M
Item No.	Description of item	No.	Length L	Breadth B	Height D/H	Quantity																									
Item No.	Description of item	Quantity	Unit	Rate	Unit of rate	Amount																									



Technical sanctioned under No. _____ Dated _____
 Estimate prepared by: _____
 And checked by: _____ Call
 of authority: _____

02 M

General abstract

Sr. No.	Particulars	Amount
1	Estimated cost (as per abstract)	Rs. _____
2	Water supply and Sanitary charges @ _____ %	Rs. _____
3	Electrification charges @ _____ %	Rs. _____
4	Contingencies @ 3 to 5%	Rs. _____
5	Work charged establishment @ 1 to 2%	Rs. _____
	Total estimated cost	Rs. _____

1. (ii) Prepare approximate estimate of bridge having span 5 spans of 45 m each using following data:

1) Cost of existing bridge rs.1.25 cr.
 2) Existing bridge having 4 spans of 50m each.

Ans :- No of bays =5
 Each span =45m
 Cost of existing bridge is Rs1.25 cr. /- per meter
 Total length of bridge= **5 x 45 = 225m.**
Total length of existing bridge =4x50=200m
Rate of construction per meter length (existing bridge)= $1.25 \times 10^7 / 200 = 62500$
 Approximate cost of new bridge =225 x 62500 = **14062500** Rs.
 Approximate estimate of bridge is Rs. **1.4062** Cr.

06M

2. Attempt any two of the following :

16 M

2. (a) Calculate quantity of earthwork of road using following data.

Formation width 12 m
 Slope in cutting 1.5:1
 Slope in banking 2:1
 Use mean area method

Chainage in m	0	50	100	150	200
Ground level	500.00	499.20	498.42	494.80	494.00



Formation level	496.10	496.00	496.50	495.00	494.60
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Ans:- Formation width 'B' = 12 m

Slope in cutting = 1.5:1 Slope in banking = 2:1

slope in	S	B	Chainage	F.L.	G.L.	d (m)	Bd (m ²)	Sd2 (m ²)	A= Bd + Sd2	Am	Lm	Quantity	
			(m)									cutting	Banking
cutting	1.5	12	0	496.1	500	3.9	46.8	22.815	69.615	61.6875	50	3084.4	
cutting	1.5	12	50	496	499.2	3.2	38.4	15.36	53.76				
cutting	1.5	12	100	496.5	498.42	1.92	23.04	5.5296	28.57	41.1648	50	2058.2	
		12				0	0	0	0	14.2848	45.28	646.82	
banking	2	12	150	495	494.8	-0.2	2.4	0.08	2.48	1.24	4.72		5.8528
banking	2	12	200	494.6	494	-0.6	7.2	0.72	7.92	5.2	50		260
												5789.43	265.8528

06 M

By similarity of triangle

$$[x/1.92] = [(50-x)/0.2]$$

$$X = 45.2830$$

Therefore, chainage at zero depth = 100 + 45.28 = 145.28m

Total quantity of earthwork in cutting = 5789.43 cu.m

Total quantity of earthwork in Banking = 265.85 cu.m.

02 M

2. (b) Describe in brief preparation of approximate estimate for water supply project.

Ans :- i) Basis of preparing approximate estimate of Water supply project may be population to be served by project. In this case knowing cost of recently constructed similar water supply project, cost per capita can be found out, and then approximate cost of new project can be calculated.

ii) Otherwise water supply project is divided in to following units and approximate cost of each unit is found out and then total approximate cost of project is calculated.

Sr. No.	Unit	Service unit
1	Intake or head work	Per MLD OR Per m ³ capacity
2	Pumping machinery	Per H.P. OR KW
3	Rising main	Per running mater

02 M

02 M



				4	Treatment unit like aerator, flash mixer, clarifloculator, rapid sand filter, disinfection.	Per MLD OR Per m ³ capacity		04 M
				5	Ground storage reservoir and ESR	Per liter capacity		
				6	Distribution system	Per running meter		
				7	Staff quarter	Per Sq. m.		
				8	Land acquisition	Per Acre		

2. (c) A RCC beam 230 mm X 300 mm and length 4000mm is reinforced with 3 nos. Of 12 mm diam. Main bar placed in one row, out of 3, two bars are straight and one bar is bent up. In addition to this 2 anchor bars to 10 mm diam. are provided at top 6 mm diam. And stirrups are provided at 150 mm c/c. The overall cover provided to beam is 30 mm. Calculate total quantity of steel and prepare bar bending schedule.

Ans:- overall cover provided to beam is **30 mm**

Member	Main bar	Anchor bar	Stirrups
A RCC Beam	Straight bar 2 Nos. 12mm diam.	2 Nos. 10mm diam.	6 mm diam. at 150 mm c/c
(230mm x 300mm) Length = 4000 mm	Bent up bar 1 Nos. 12mm diam.		

Ans- Assume overall cover 30mm

Length of Main Straight Bar = $(4000 - 2 \times 30) + 2 \times 9 \times (12) = 4156 \text{ mm} = 4.156 \text{ m}$

Length of Bent up bar = $(4000 - 60) + 18 \times (12) + 2 \times 0.42 \times (230 - 60) = 4298.8 \text{ mm} = 4.298 \text{ m}$

Length of Anchor bar = $(4000 - 60) + 18 \times (10) = 4120 \text{ mm} = 4.120 \text{ m}$

$a = 230 - 60 = 170 \text{ mm}$, $b = 300 - 60 = 240 \text{ mm}$

Length of Stirrups = $2(a + b) + 24(\text{dia}) = 2 \times (170 + 240) + 24 \times (6) = 964 \text{ mm} = 0.964 \text{ m}$

No of stirrups = $(4000 - 60) / 150 + 1 = 28 \text{ Nos}$

Bar Bending Schedule:-

Description	Shape of bar	Dia (φ)	No.	L	Total Length	Wt Kg/m	Total Wt (kg)
Bottom Main straight bar		12	2	4.156	8.312	0.889	7.389
Bent up bar		12	1	4.298	4.298	0.889	3.829
Top anchor bar		10	2	4.120	8.24	0.617	5.084
Stirrups		6	28	0.964	26.992	0.222	5.992
22.294 kg							



3.	Attempt any four of the following :	16 M
a)	State the rules for deduction of opening as per IS1200 for brickwork. Ans:- Masonry work in superstructure - No deduction is made for the following i) Openings up to 0.1 sq.m ii) End of beams, posts, rafters, purlin etc. up to 0.05 sq.m in section iii) Bed plates, wall plates, bearing of chajjas where thickness does not exceed 10 cm. iv) Bearing of floor and roof slab are not deducted from masonry in superstructure.	04 M
b)	Define rate analysis and state the factors affecting rate analysis. Ans:-Rate Analysis: The method of determining the rate of a particular item of work by Considering the quantities and cost of material and labour is called as rate analysis. Factors affecting Rate Analysis:- 1. Major Factors :- a) Material b) Labour 2. Minor Factors: -a) Special Equipment b) Place of work c) Nature of work d) Conditions of Contract e) Profit of the contractor f) Specification g) Site Condition h) Miscellaneous Major Factor:- a) Materials:- The material can be calculated by knowing the specification of the items. The price of various materials depends upon market conditions. The cost of material is taken as delivered at site inclusive of transport, local taxes, and other charges. For tools and plants and miscellaneous petty item which cannot be accounted in details lump sum provision is made. It is also necessary to include a certain percentage of waste of all materials to cover breakage, losses, cutting waste etc. b) Labour: - The labour force will be necessary to arrange the materials in proper way so that the items can be completed. The amount of labour force required to carry out a unit of a particular item is decided from past experience or in case of Complicated items it is decided by carrying out a sample of that item. The labour force required depends upon the efficiency of labourer hence this force will vary From place to place and also there prices. By knowing the amount of labour force and wages of laborer the cost of labour can be calculated	01 M 01 M 02 M
c)	Define 'task work 'enlist the factors affecting task work. Ans:- Task work:- : The capacity of a skilled labour to do the quantity of work per day called task work. Task work is depends on the nature, size, height, situation, location, climate condition, techniques adopted, wages paid. Factors Affecting Task Work:- 1. Out turn of skilled labour depends on the nature, size, height, situation, location, Climatic condition, technique adopted, wages paid etc. 2. Availability of skilled labour. 3. A well-organized work increases the out turn of labour. 4. Job satisfaction and working condition may increase the out turn work. If the work is allotted on piece work basis then the daily wages output of labour increases.	01 M 03 M
d)	Fig. no.1 shows underground water tank .calculate quantity of	

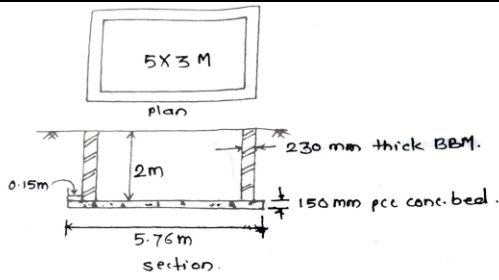


Fig. No. 1

- i) earthwork
ii) brickwork

Sr.no.	Description of items and details of work	No.	length	Width	Depth	Quantity	Remark
1	Earthwork in excavation	1	5.76	3.76	2.15	46.56 Cu.m	Width =3+0.23+0.23+0.15 =3.76 Depth =2+0.15=2.15m
2	Brickwork						
	Long wall	2	5.46	0.23	2	5.023	Length of long wall =c/c dist.of long wall +width of item =5.00+0.23+0.23=5.46m
	Short wall	2	3	0.23	2	2.76 7.78 Cu.m	Length of short wall =c/c dist.of short wall +width of item

02 M

02 M

e) Explain in brief lead and lift

Ans:- i) **Lead:** The horizontal distance between the trench pit and the place where excavated earth is placed is called as **lead**. The unit of lead is 50 m for a distance upto 500 m, 500 m for a distance exceeding 500 m upto 5 km and 1 km for distance exceeds 5 km.

ii) **Lift:** It is the depth of excavation or the vertical movement of material. Generally lift is taken as 1.5 m below ground level. Extra lift shall be measured in unit of 1.5 m or part thereof.

02M

02M

f) Describe D.S.R. state its use.

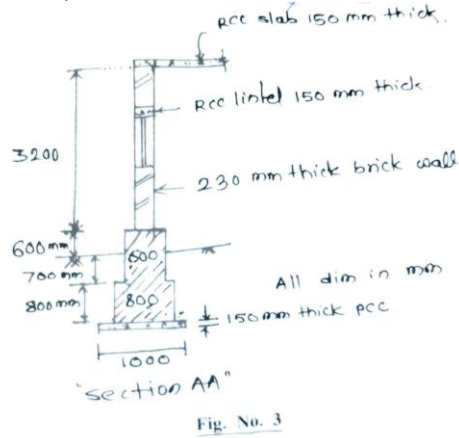
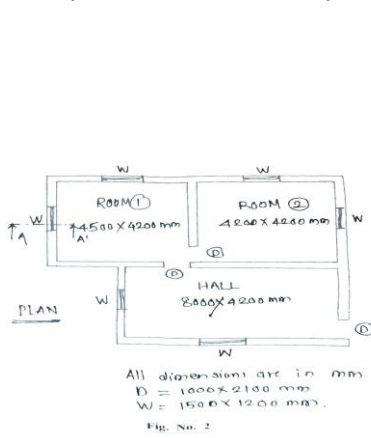
Ans:-A booklet containing rates of various engineering items for the preparation of detailed estimates such as buildings, roads, bridges, canal etc, called as schedule of rates. It also gives the rate of materials, daily wages of labour, carriage expenditure. It is also given with table for quantities of various material required in construction. Schedule of rates vary with region
Schedule of rates increases every year by certain percentage of previous year rates.
Schedule rates periodically revised

04 M

4. a) Workout quantities of any three items of work for fig. no.2

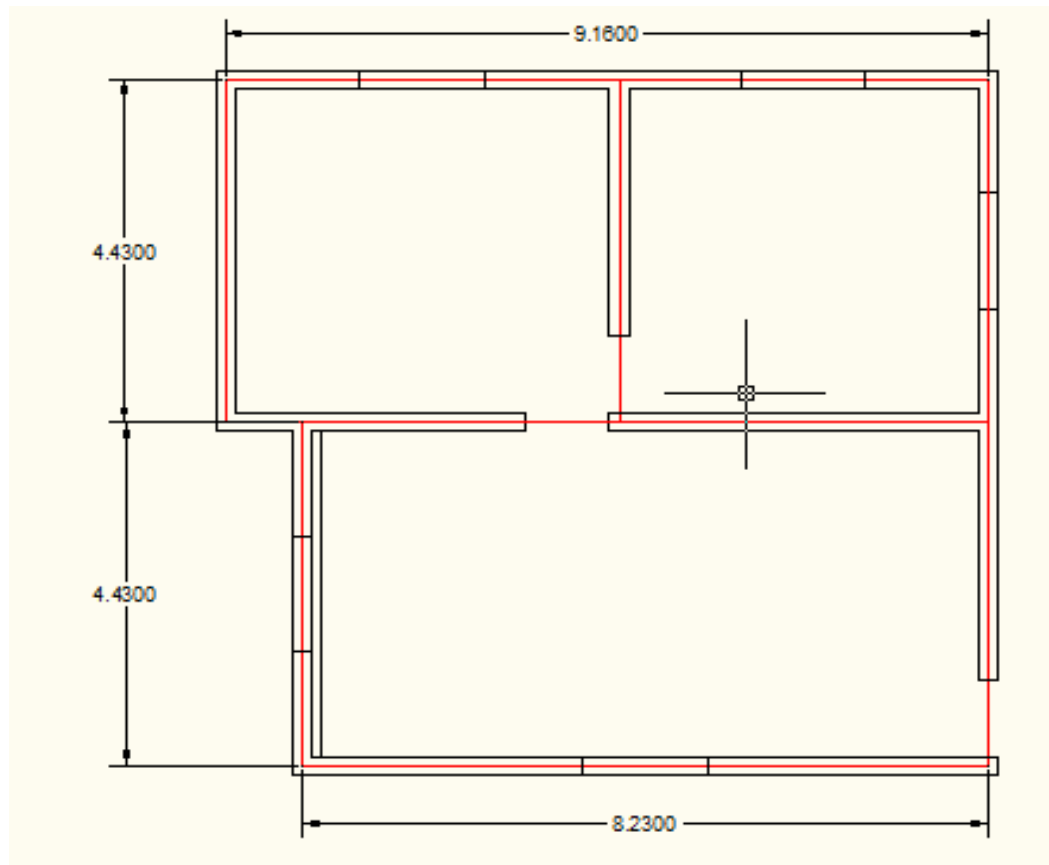
12 M

- i) Earthwork in excavation.
- ii) UCR masonry in CM 1:6 in foundation and plinth.
- iii) Brickwork in CM 1:5 in superstructure
- iv) RCC slab for roof (M_{20} concrete).



ANS:-Assume horizontal wall as L/W and vertical wall as S/W

L1= 9.16 m,L2= 8.23m,S1=4.43m



4 M



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Sr. No.	Description of item of work	No.	Length (L)	Breadth (B)	Depth (D)	Quantity	Total		
1.	Earthwork in excavation. FOR LONG WALL L1 = 9.16 +1.0=10.16	2	10.16	1.00	1.65	33.528	77.05 Cu.m	4 M	
	L2 = 8.23+1.0 =9.23	1	9.23	1.00	1.65	15.22			
	FOR SHORT WALL S1 = 4.43 -1.0 =3.43	5	3.43	1.00	1.65	28.29			
2.	UCR masonry in CM 1:6 in foundation and plinth. For first footing						67.18 Cu.m	4 M	
	FOR LONG WALL L1 = 9.16 +0.8=9.96	2	9.96	0.800	0.8	12.74			
	L2 = 8.23+0.8 =9.03	1	9.03	0.800	0.8	5.7792			
	FOR SHORT WALL S1 = 4.43 -0.8 =3.63	5	3.63	0.800	0.8	11.616			
	For second footing FOR LONG WALL L1 = 9.16 +0.6=9.76	2	9.76	0.600	1.3	15.2256			
	L2 = 8.23+0.6=8.83	1	8.83	0.600	1.3	6.8874			
	FOR SHORT WALL S1 = 4.43 -0.6 =3.83	5	3.83	0.600	1.3	14.937			



		3.	Brickwork in CM 1:5 in superstructure FOR LONG WALL $L1 = 9.16 + 0.23 = 9.39$ $L2 = 8.23 + 0.23 = 8.46$ FOR SHORT WALL $S1 = 4.43 - 0.23 = 4.2$	2	9.39	0.23	3.2	13.8		4 M
				1	8.46	0.23	3.2	6.22	35.476	
				5	4.2	0.23	3.2	15.456	Cu.m	
			Deduction for opening							
			Door (D)	3	1.0	0.23	2.1	1.44		
			WINDOW(W)	6	1.5	0.23	1.2	2.484	4.43	
			LINTEL OVER DOOR window	3 6	1.3 1.8	0.23 0.23	0.15 0.15	0.134 0.372		
			NET QUANTITY						31.046	Cu.m
		4.	RCC slab for roof (M₂₀ concrete).	Area =81.23 Sq.m		0.15		12.18	12.18	
			$L=9.16+0.23=9.39$							
			$B=8.86+0.23=9.09$							
			$L2=9.16-0.83=0.93$							
			$B=4.43$							
			$A=(9.39 \times 9.09) - (0.93 \times 4.43) = 81.23$							
4.	b)	Attempt any ONE of the following :								6 M
	i)	Workout quantities of concrete and steel in footing for RCC column shown in fig.no. 3 <u>NOTE:</u> If students assumed the data/figure and attempted to solve the Question, give appropriate marks.								6 M



Particulars	Quantity	Rate		Per Unit	Amount	
		Rs.	Ps.		Rs.	Ps.
1. Materials:						
Cement	18 Bags	300	00	Bag	5400	00
Sand	3.6 m ³	800	00	Cu.m	2880	00
Stone	12.5 m ³	700	00	Cu.m	8750	00
Through stone	20 Nos.	38	00	Nos.	760	00
2. Labours:						
Head Mason	½ Nos.	325	00	Day	162	50
Mason	13 Nos.	314	00	Day	4082	00
Male Mazdoor	10 Nos.	273	00	Day	2730	00
Female Mazdoor	08 Nos.	269	00	Day	2152	00
Bhisti	1½ Nos.	273	00	Day	409	50
Sundries, T & P etc	L.S	L.S	L.S	---	200	00
				Total	27325	00

02M

C) Add water charges @ 1 % of total = 273.25

D) Add contractor's profit @ 10 % of total = 2732.5

Grant total = 30330.75

Rate per cu.m = Grant total / Volume of masonry = Rs 3033.075/-

02M

b) Prepare rate analysis for plastering 12 mm thick in CM 1:3

Ans:- Assume Quantity (Area) of
plaster = 100 m² Wet Volume = Area
xThickness

$$= 100 \times 0.012$$

$$= 1.20 \text{ m}^3$$

Add 30% to fill-up the joints

$$= 1.20 \times 1.30$$

$$= 1.56 \text{ m}^3$$

Material Calculation

Dry Volume = 25% more of wet volume

$$= 25/100 \times (1.56) = 1.95 \text{ m}^3$$

02M



a) Volume of Cement = $\frac{\text{Dry Volume}}{\text{Sum of Mix Proportion}} \times \text{Content of cement in proportion}$

Volume of Cement = $\frac{1.95 \times 1}{1+3} = 0.4875 \text{ cu.m}$

No. of Cement Bags = $\frac{0.4875}{0.035} = 13.92 \text{ bags} = \text{approximately} = 14 \text{ bags}$

b) Volume of Sand = $\frac{\text{Dry Volume}}{\text{Sum of Mix Proportion}} \times \text{Content of Sand in proportion}$

Volume of Sand = $\frac{1.95}{1+3} \times 3 = 1.4625 \text{ cu.m}$

Sr. No	Particular	Quantity	Rate	Per	Amount
A Material					
1	Cement	14	300	Bag	4200
2	Sand	1.46	1950	Cum	2847
Total (A)					7047.00
B Labour					
1	Head Mason	0.5	600	Day	300
2	Mason	10	500	Day	5000
3	Male Mazdoor	8	350	Day	2800
4	Female Mazdoor	4	250	Day	1000
5	Bhisti	1	350	Day	350
6	Scaffolding Sundries T.&P.	L.S.	L.S.	L.S.	700
Total (B)					10150
Total Cost of Material & Labour (C) = Total (A+B)					17197
Add Water Charges @ 1.5% of Total Cost of Material & Labour =					257.955
Overall Cost= Total Cost + Water Charges =					17454.95
Add Contractors Profit @ 10% of Overall Cost (E) =					1745
Grand Total= Overall Cost + Contractors Profit =					19199.49

02M

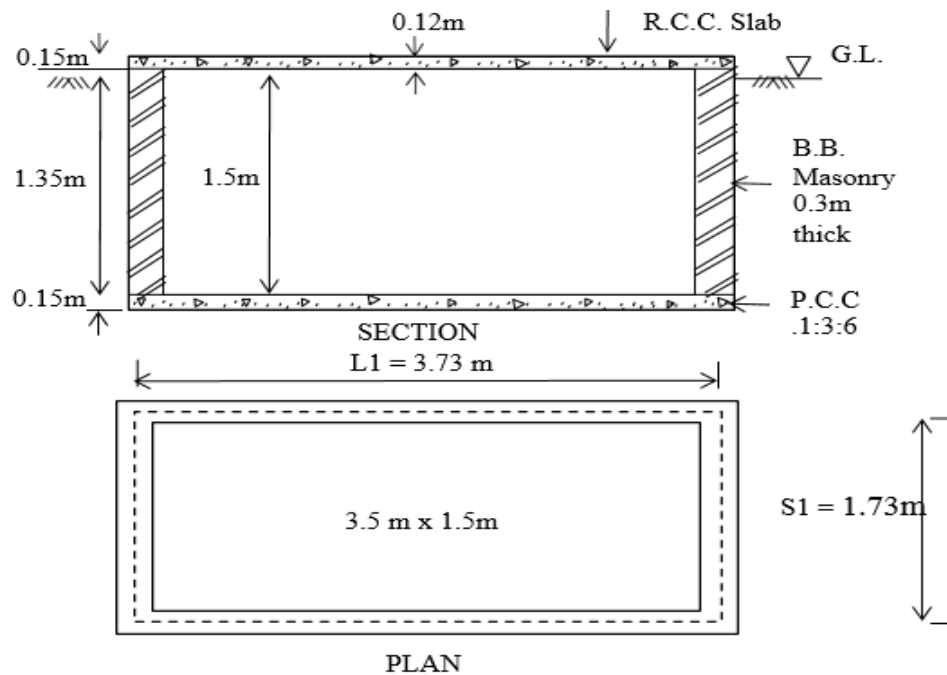
02M

02M

Rate per Sqm = Grant total / Assumed Volume of Masonry = **191.99 per Sqm**

- c) Workout quantities of following items for septic tank having internal dimension 1.5 x 3.5 m and height 1.5 m
- Earthwork in excavation.
 - P.C.C.(1:3:6) 15 CM THICK
 - B.B. masonry in CM (1:6 (230 mm thick)
 - M15 slab on septic tank 12 cm thick .the top of slab of septic tank is 15 cm above ground level.

Ans:-



Assume wall spanning in horizontal direction as long wall & wall spanning in vertical direction as short wall in plan

Length of long wall;

$$L_1 = (0.23/2) + 3.5 + (0.23/2)$$

$$L_1 = 3.73 \text{ m} \dots\dots\dots 2 \text{ nos.}$$

Length of short wall;

$$S_1 = (0.23/2) + 1.5 + (0.23/2)$$

$$S_1 = 1.73 \text{ m} \dots\dots\dots 2 \text{ nos.}$$

projection for P.C.C. as 0.15 m all over



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Sr. No.	Description of item of work	No.	Length L (m)	Breadth B (m)	Depth D (m)	Quantity	Total Quantity		
1	Excavation $L=3.5+2 \times 0.230 = 3.96\text{m}$ $+0.15+0.15=4.26\text{m}$ $B=1.50 + 2 \times 0.230 =$ $1.96\text{m}+0.15+.015=2.26\text{ m}$	1	4.26	2.26	1.65	15.88	15.88	02M	
							15.88 cu.m	02M	
2	P.C.C. (0.15 m thick)	1	4.26	2.26	0.15	1.44	1.44 cu.m		
3	Brickwork 0.230m thick								
	Long wall $L_1 = 3.73+0.230 = 3.95\text{m}$	2	3.95	0.230	1.50	2.7255	3.760 cu.m	02M	
	Short wall $S_1 = 1.73 - 0.230 = 1.50\text{m}$	2	1.50	0.230	1.50	1.035		02M	
4	R.C.C. Slab (1:2:4) $L=3.5+2 \times 0.230 =$ 3.96m $B=1.50$ $+2 \times 0.230 = 1.96\text{m}$	1	3.96	1.96	0.12	0.931	0.931 cu.m		
6.	Attempt any FOUR of the following :							16 M	
a)	State the rules for deduction of plaster works as per IS 1200. Ans:- i) No deduction is made for ends of beams, posts, rafters, purlins etc. ii) No deduction is made for opening up to 0.5 sq. m. and no addition is made for jambs, soffits, and sills of these openings. iii) For opening more than 0.5 sq. m. and up to 3 sq. m. deduction is made for one face only. No addition for jambs, soffits, and sills of these openings. iv) For opening above 3 sq. m. deduction is made for both faces of openings and the jambs, soffits, and sills shall be added.							04 M	
b)	Explain mid sectional area method for earthwork of road. Ans:-(1) Mid-sectional area method: In this method, the mid-section area is calculated by dividing the trapezoidal cross-section of Road/Canal into rectangle and two triangles and then							04 M	



this mid-section area is multiplied by the length of the section to get quantity of earthwork as given below:

Area of mid section = Area of rectangular portion + area of two triangular portion
 $= Bd_m + \frac{1}{2}sd_m^2 + \frac{1}{2}sd_m^2 = Bd_m + sd_m^2$

\therefore Quantity of earthwork = $(Bd_m + sd_m^2) \times L$

General, $Q = (Bd + sd^2) \times L$, where d stands for mean height or depth.

The quantities of earthwork may be calculated in a tabular form as below :-

Stations or Chain-age	Depth or Height	Mean Depth or Height "d"	Area of central portion Bd	Area of sides Sd^2	Total Sectional Area $Bd+sd^2$	Length between stations L	Quantity $(Bd + sd^2) \times L$	
							Embankment	Cutting

Fig. 7-4

c) Calculate the quantity of excavation and enter in standard measurement sheet of item of earthwork for community well shown in fig no. 4.

NOTE: If students assumed the data/figure and attempted to solve the Question, Give appropriate marks.

04 M

d) Calculate the quantity of brickwork and entire in standard measurement sheet of item of work for community well shown in fig.no.5

Ans:-

Item no.	Particulars of item	No.	Length (m)	Breadth (m)	Height (m)	Quantity
1	I-Class Brickwork in 1:6 C.M.	1	(^ X6.6)	0.6	3.5	43.54
		1	(^ X6.5)	0.5	2.9	29.60
		1	(^ X6.4)	0.4	3.5	28.14
		TOTAL				
						Cu.m

04 M

OR

Item no.	Particulars of item	No.	Length (m)	Breadth (m)	Height (m)	Quantity

04 M



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		1	I-Class Brickwork in 1:6 C.M.	1	$\sqrt[4]{(7.2^2-6^2)}$		3.5	43.54		
				1	$\sqrt[4]{(7^2-6^2)}$		2.9	29.60		
				1	$\sqrt[4]{(6.8^2-6^2)}$		3.5	28.14		
								TOTAL	101.28	
									Cu.m	
	e)	State any four advantages of using softwares /programmes for estimating and costing. Ans:- Following are the advantages of QE-Pro: 1) Fort of accurate quantity computation. 2) Calculates quantities from building plans. 3) Generation of measurement sheet in LBD format. 4) Cost break up for material, labour and machine. 5) Project planning and Gantt chart. Interface with MS project.							04 M	
	f)	Enlist any eight softwares names used in estimating and costing. Ans:- 1. QE-Pro 2.2002 CD Estimator. 3.Chief Estimator 4. ICE 2000. 5. TECS. 6.Estimator 2.0 7.Estimate Master 5.13 8.Build Soft 9.Plan Swift Software 10.EXTRAXION Estimating Software etc.							04 M Any eight (½ marks each)	