VIII Sem. CV

CBCS SCHEME

USN | | | | | | | | | | |

15CV81

Eighth Semester B.E. Degree Examination, June/July 2019
Quantity Surveying and Contracts Management

Time: 3 hrs. Max. Marks: 80

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

1 The details of the two room building are shown in the Fig.Q 1. Estimate the quantities and cost of the following items of works:

i) Earth work excavation for foundation in ordinary soil at Rs.300/m^3.

ii) Cement concrete bed 1:4:8 for wall foundations at Rs.2500/m^3

iii) SSM (Size Stone Masonry) in CM 1:8 for footings and basement foundation at Rs.1800/m^3

iv) First class BBM (Burst Brick Masonry) work for super structure in CM 1:6 at Rs.2000/m^3

v) RCC $1:1\frac{1}{2}:3$ roof slab at Rs.3000/m^3. **(16 Marks)**

Fig.Q 1

OR

2 What are the different types of estimates? Explain any three different types of estimation. **(16 Marks)**

Module-2

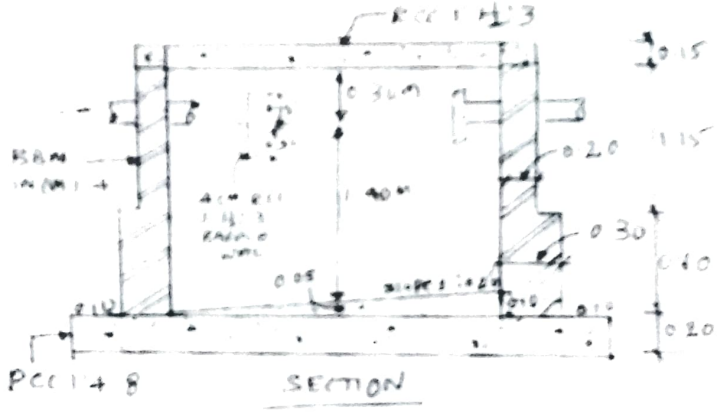
3 The details of septic tank are shown in the Fig.Q.3. Estimate the quantities for the following items of work and cost of abstract

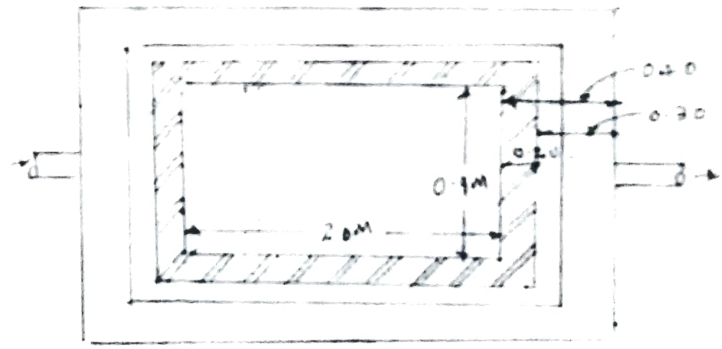
i) Earthwork in excavation for foundation hard soil at Rs 400 m^3

ii) PCC 1:4:8 for bed concrete at Rs 2500 m^3

iii) BRM in CM 1:4 for side walls at Rs 2200 m^3

iv) RCC $1:1\frac{1}{2}:3$ for cover slab at Rs 3000 m^3 **(16 Marks)**





PLAN

Fig Q.3

OR

4 Estimate the quantities and cost of earth work for a portion of the road form the following data. Formation width of the road is 10m side slopes are 2:1 in filling and 1.5:1 in cutting. The cost of filing is Rs.180 m^3 and cutting Rs.120 m^3.

Ch. (m)	0	40	80	120	160	200	240	280
RL of GL (m)	100.60	100.20	99.80	100.20	100.80	101.90	102.40	102.50
RL of FL (m)	101.00	← Raising Gradient 1 in 400 →						

(16 Marks)

Module-3

5 Write the detailed technical specifications for the following:
i) Earth work excavation for foundation
ii) Burnt Brick Masonary in CM 1:6
iii) Plastering in CM 1:6 to interior surface
iv) RCC work proportion 1:2:4 (16 Marks)

OR

6 Carryout the rate analysis for the following:
i) Earth work excavation for foundation in ordinary soil.
ii) P C C 1:4:8 for foundation using 40mm and down size aggregate
iii) Coursed rubble masonry in C M 1:6
iv) RCC $1:1\frac{1}{2}:3$ for roof slab (16 Marks)

Module-4

7 Explain the procedure of tendering and award of works in civil engineering projects (16 Marks)

OR

8 What are the different types of contracts? Explain any three types of contracts (16 Marks)

Module-5

9 Write short notes about any four of the following:
i) Performance security
ii) Liquidated damages
iii) Contract management
iv) Breach of contract
v) Mobilization and equipment advances. (16 Marks)

OR

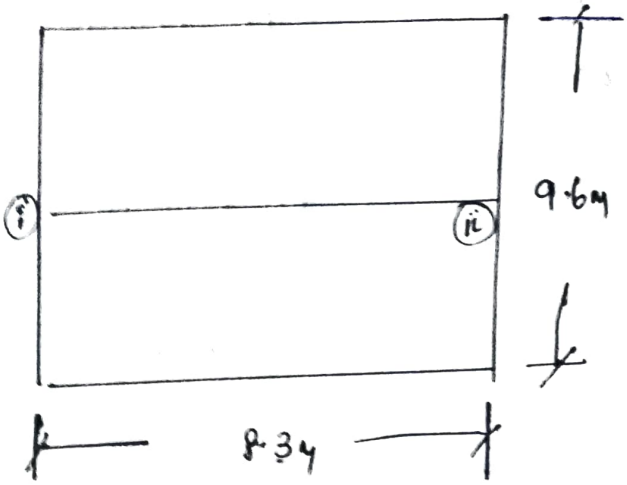
10 a. What is the difference between the cost, estimate and value? (06 Marks)
b Explain the methods of valuation (10 Marks)

* * * * *

Scheme of Valuation

Sub: Quantity Surveying and Contracts Management (17CV81)

Q1



Total length of wall =
$2 \times 9.6 + 3 \times 8.3 = 44.10$.

No of overlaps = 2 Nos.

Sl No	Particulars	No	L	B	D	Qty	Unit	Formula
(1)	Excavation	1	43.10	1.0	1.2	51.72		$44.1 - 2\times 1.0/2$
(2)	PCC	1	43.10	1.0	0.20	8.62	cum	
						60.34		
(3)	SSM							$44.10 - 2\times 0.7/2$
	1st footing	1	43.4	0.7	0.6	18.23		
	2nd footing	1	43.60	0.5	0.4	8.72		$44.0 - 2\times 0.5/2$
	3rd footing	1	43.7	0.6	0.5	8.76		
						35.69	Cum	
(4)	RBM							
	main	1	43.81	0.3	3.0	39.42		$44.1 - 2\times 0.3/2$
	parapet	1	35.81	0.2	0.9	6.45		$(9.6+8.3)\times 2$
	deduct					45.87		
	Door D	1	1.2	0.3	2.1	0.756		
	D_1	1	1.0	0.3	2.1	0.63		
	window W_1	2.0	1.0	0.3	1.5	0.90		
						2.286		
						43.58	Cum	
(5)	RCC							
	1:1½:3 slab	1	9.9	8.6	0.15	12.77	cum	

Detail of Abstract Estimation.

Sl No	Particulars	Unit	Qty	Rate	Amount
1	Excavation	Cum	51.72	300	15,516.00
2	PCC 1:6:8	Cum	8.62	2500	21,550.00
3	RRM in CM 1:8	Cum	35.69	1800	64,242.00
4	BBM	Cum	43.58	2000	87,160.00
5	Slab 1:1½:3	Cum	12.77	3000	38,310.00
					2,26,778.00

(3) Different types of Estimations.

(a) Preliminary estimate / Abstract
(b) Plinth area estimate
(c) Cube rate estimate
(d) Detailed estimate
(e) Revised estimate
(f) Supplementary estimate
(g) Supplementary / Revised estimate
(h) Annual repair / maintenance estimate

(a) Preliminary / Abstract Estimate

To arrive the cost within short time this method is applied which enable the responsible authority concerned to consider the financial aspects of scheme. This is prepared from practical knowledge and cost of similar works.

(b) Plinth Area estimate :

Plinth area should be calculated by taking the external dimensions of the building at the plinth. Open area & others should not be included in the plinth area. The area can also be found out by wall area of the building + floor area of the room

(c) Detailed Estimate or Item Rate Estimate

It is a accurate estimate and consist of working out the quantities of each item of works and working the cost. Usually detailed estimate is prepared in two stages.

(i) Details of measurements and calculation of quantities.

Item No particulars No Length B Depth Qty.

(ii) Abstract Estimate

Item No particulars unit Qty Rate Amount.

This type of estimate is prepared for technical sanction, administrative approval and also for execution of a contract.

Q3.

Q3

Sl No	Particulars	No	L	B	D	Qty	Remark
(1)	Excavation	1	2.80	1.70	1.95	9.28	Cum
(2)	PCC 1:4:8	1	2.8	1.70	0.20	0.95	
	Sloping	1	2.0	0.90	0.05	0.09	
						1.04	Cum
(3)	BBM						
	long wall 1st step -	2	2.6	0.3	0.60	0.94	
	2nd step -	2	2.4	0.2	1.15	1.08	
	Short wall 1st step -	2	0.9	0.3	0.60	0.32	
	2nd step -	2	0.9	0.2	1.15	0.41	
						2.77	Cum
(4)	RCC 1:1½:3						
	Coping slab	1	2.4	1.3	0.15	0.468	Cum

Abstract estimate

SC No	Particulars	unit	Qty	Rate	Amount
1	Excavation	Cum	9.28	400	3712.00
2	PCC 1:4:8	Cum	1.04	2500	2600.00
3.	BBM CM 1:6	Cum	2.77	2200	6094.00
4.	RCC 1:1½:3.	Cum	0.468	3500	1404.00
				Total amount =	13810.00

Sl No	Distance	Ground RL	formation RL	Depth	Area (BD)	Side area SD^2	Total area	Mean Area	Length	Quantity filling	Quantity cutting
0	0	100.60	101.0	0.4	4.0	0.32	4.32	-			
40	40	100.20	101.1	0.9	9.0	1.62	10.62	7.47	40	298.80	
80	80	99.80	101.2	1.4	14.0	3.92	17.92	14.27	40	570.80	
120	120	100.20	101.3	1.10	11.0	2.42	13.42	15.67	40	626.80	
160	160	100.80	101.4	0.60	6.0	0.72	6.72	10.07	40	402.80	
200	200	101.46	101.46	0.00	0.0	0.00	0.00	3.36	24	80.64	
240	240	101.90	101.50	-0.4	-4.0	0.24	4.24	2.12	16		33.92
280	280.	102.40	101.60	-0.8	-8.0	0.96	8.96	6.60	40		264.00
		102.50.	101.70	-0.8	-8.0	0.96	8.96	8.960	40.		358.4
										1979.84	656.32

Given Data : formation exceeding B = 10m side slope 2:1 filling & 1.5:1 cutting

Cost of filling = Qty × Rate = 1979.84 × 180 = 3,56,371.20.

Cost of cutting = 656.32 × 120 = 78,758.40

total Cost = 435,129.60 ..

(5) Detailed technical specifications :

(i) Earthwork excavation for foundation.

* Foundation trenches shall be carried out as per plan approved @ site.
* Sides of trenches shall be truly vertical and bottom shall be uniformly levelled
* Any valuable things / material found during excavation shall be property of the government.
* The excavated material shall be stacked away from sides of trench by at least 1m.
* Water if any accumulates in the trench, shall be pumped out without any extra payment
* Excavation shall be measured as per exact length, width and depth which is measured vertically.

(ii) Brickwork in CM 1:6 :

Materials: Bricks - should be IS Specification, Table moulded well burnt, copper red coloured, free from cracks, sharp edges, should have uniform size, standard in well soaked before use of any use.

Cement - IS Specification, OPC

Sand - Shall be natural sand obtained from river, clean, durable, free from organic matter.

Proportion : to prepare mortar one part of cement and six part of sand by volume.

iii) Cement plastering in CM 1:6 :

Material : Cement - IS Specification, fresh OPC
Sand - River sand free from Organic matter
water - portable water.

preparation of Surface : The plastering shall be carried out after masonry joints are racked out & well watered. To ensure uniform thickness, narrow strips of about 10 cm wide plaster shall be applied first then gaps between such strips shall immediately filled up with mortar.

Material / Proportion : the proportion of mortar shall be maintained by 1 part cement & six part Sand. first dry ingredients shall be mixed & required amount of water shall be added

Application of plaster : First coat of plaster shall be uniformly applied after applying water. thickness of first coat shall be not less than 12mm & cured for 7 Days.

finish : Second coat shall be started at least 7 Days and should be 8mm thk.

Measurement, Measurement is taken in Sq mts.

iv) RCC 1:2:4

Material : cement - IS Specification. OPC.
Sand - clean, free from Organic matter
Coarse Agg - Round shape, clean & free from Organic Material, 40mm & Downsize

Mixing : Only the quantity of mortar which can be used within 30 min shall be prepared @ time. Mixing is done on water tight platform, drinking water should be used

Bond and laying : Usually bricks are laid in English bond unless mentioned.

joints : Each brick shall be set with bed and vertical joint completely filled with mortar, All the horizontal joints shall be parallel & truly level. All corners shall be truly in plumb.

Soaking of bricks : Brick shall be soaked in water before use.

fixtures : All ebdy fixtures such as pipes, outlet of water hold fast etc shal be embedded in brick work in rich cement mortar during progress of work.

Scaffolding : Single/double scaffolding shall be provided holes left in masonry work for scaffolding shall be filled & made good before plastering

Curing : Brickwork shall be constantly kept moist on all faces for a minimum period of seven days.

Measurement : Usually taken in cubic meters for partition walls measured in square meters.

(5)
(iv) Reinforcement : Should be Mild steel / HYSD / TMT bars. Shall be bound, hooked & bent accurately, avoid joints. If done sufficient lapping should be done.

Centering and Shuttering : Should be done with timber / steel plates and to prevent leakage of mortar, proper props bracing and wedges are placed. to prevent concrete stick proper oiling / greasing is done on shutters.

Proportion : 1 part cement, 2 part sand and 4 part aggregate are mixed dry. they required amount of water added later on.

Mixing : Mixing of concrete is done in a Mechanical / manual Mixer the concrete from drum shall be placed in a water tight platform.

Curing : Concrete surface kept damp by covering jute bags and covered for 21 days.

Measurement : Concrete in cubic mtrs & steel in quintals.

(6) Rate Analysis.

(i) Earthwork excavation in Ordinary Soil

	Qty	Rate	Amount.
(i) labours (Mazdoor)	3 1/4	290/ day	942.50
(ii) add water charges			9.42
			951.92
profit and Overhead 10% of total			95.19
Grand total			1047.11

Rate / cum = 101.00

6

(ii) Ref 11.4.18.

Sl No	Particulars	Qty	Rate	Amount
1.	Material			
	Cement -	36.00	330/bag	- 11880.00
	Sand -	4.8	1300/cum	- 6240.00
	C. Aggyate -	9.6	700/cum	- 6720.00
2	Labour			
	H. Masoy. -	1/4	400/day	- 100.00
	Masoy. -	2.0.	390/Day	- 780.00
	Mazdoor -	20.0	290/Day	- 5800.00
3.	Contengencies (lump sump)			- 300.00
				31820.00
	add 1% water charges			- 318.20.
				32180.00.
	Contractor profit (10%.)			- 3218.00
	Grand total			- 35351.02

Rate/cum = $\frac{35352}{10}$ = Rs 3535.20

(iii) Coursed rubble Masonry in CM 1:6,

Sl No	Particulars	Qty	Rate	Amount
1	Material			
	Stone →	4.5	550	- 6875.00
	Sand —	3.4	1300	- 4420.00
	Cement -	11.	330	- 5610.00
	Scaffolding -	LS		200.00
2	Labour			
	Head mason	1/2	400/Day	- 200.00
	Mason	15	390	- 5850.00
	Mazdoor	24	290	- 6960.00

Total = 3006.00.

water charges 1% = 30.06.

Total = 3036.65.

Profit 10% = 303.66

Grand total = 3340.21.

Rate/cum = 3340.2

(iv) RCC M 15 (1:1½:3) including steel & curing.

Sl No	Particulars	Qty	Rate	Amount
(1)	Materials			
	Coarse aggregate	8.4	900	7560.00
	Sand	4.2	1300/cum	5460.00
	Cement	80.7 bags	330/bag	26631.00
(2)	Labour.			
	Head mason	½	400	200.00
	Mason	3.0	390	1170.00
	Mazdoor	23.0	290	6670.00
(3)	Hire Charges.			
	Mixer	0.7/Day	800	560.00
	Vibrator	0.7	325	227.50
	Scaffolding	LS	—	200.00
				48718.50
	water charges (1%)			487.30
				49215.78
	Contractor's Profit 10%			4921.58
			G. Total	54137.36

Rate/cum = 5413.7

(7)

Invitation of tender

↓

Collect tender doc and study.

↓

Prepare tender summary.

↓

Decision to bid → No → stop

↓

Site visit and investigation

↓

Consultation queries

↓

Preparation of bid doc

material collection	labour organization	Equipment organization	working capital

↓

Submission of bids

↓

Project awarded → No → stop

↓

Appoint team & commence the project.

(8) Different types of contracts

(a) Piece work contract.
(b) Lump sum contract
(c) Item rate / unit price.
(d) Percentage rate.
(e) Cost plus percentage
(f) Labour contract.
(g) target contract.

(a) Item rate / unit price Contract:

In this contract, contractor takes execution of work at unit rates agreed at the time of tender. Payment made to contractor by detailed measurement taken by actual executed by contractor.

(b) Cost plus percentage contract:

In this contract, contractor is paid the actual cost of building plus a fixed percentage for his over head expenses, service and profit.
Contractor makes his own agreement of material and labours. Usually 10% is kept as profit.

(c) Labour Contract:

In this contract, contractor takes only the labours portion of work. All the necessarily material are supplied to site by department / owners. Contractor arranges his own labours & get work done as per specification. Contractor is paid for the labours only on the actual quantities of work done measured under the item rate basis.

advantages:

Since materials supplied by dept, better progress and standard quality can be maintained

Since material procured by dept. they save the money as well as quality material is procured

Disadvantages:

Delay in material supply may delay the work

(i) performance security :

performance security it includes performance bond provided by a bank or insurance company retention funds and performance guarantee by a surety (a person who makes itself responsible for the performance of contractor obligation). It is to provide security to respect of a contractors performance during contract period. Usually protect the client from the risk of a contractor failing to fulfil its contractual obligation to the client. in other words its a guarantee to the contractor that the project will be satisfactorily completed.

when the contractor unable to complete the schedule work, his performance amount will be use to compensate the work.

(ii) Liquidated Damage :

It is a amount of compensation payable by a contractor to the owners or the govt one to delayed construction having no reason with real damage. If the contractor fail to complete the work meeting the time ~~noted~~ mentioned in tender they the contractor shall pay to the owners or to the govt the sum stated in the tender as liquidated damage for such default and not as penalty for every day for the exact period taken to complete the project compared with tender agreement date.

(ii) Contract management :

LOA against Quotation

↓

Contract is awarded

↓

Initiation of work

↓

If change in work, request → for change order] Execution as per terms & condition

↓

Executes as per change order →] Monitor, Testing & Inspection of works [not approved → Rework.

↓

Running bill payments

↓

Generation of Daily progress report

↓

Legal payments as per actual Contractor work

↓

Contract closer → Handing Over.

It can be defined as multi stage process that goes on through the entire duration of the Contract & ensure that parties meet their Contractual obligations in order to deliver the specific objectives provided in Contract.

(iv) Breach of Contract :

The Contract binds the owner / dept and contractor legally. The contractor should follow the rules & regulations of the dept & complete the work within the specific period in agreement as per drawing & specifications. at the same time dept / owner is also responsible to see that the work is done in time as per drawings and specifications and quality is also maintained. If all the above specifications are not done by both the parties they it will lead to breach of Contract.

If the contractor is not able to fulfil the terms of Contract. then there is a provision for penalising a contractor whenever there is a breach in the terms of agreement.

(v) Mobilization and Equipment Advances :

Mobilization advance payments are payments of funds to a supplier / contractor in anticipation of and for the purpose of performance under Contract. these payment are not measured by contract performance.

this is a kind of payment to the supplier or contractor. primarily extended as financial assistance neither lease of contract to mobilize the man & material resource for timely and smooth start of the project.

10 (a) Estimate : It's a probable cost of work usually prepared before the construction is taken up.

Cost : This can be amount known after completion of work (exact expenditure made for construction)

Value : It is a fair price or value of a property such as building, factory other civil structures, land etc after completion & used for same period. Usually value varies from time to time & depends largely on supply.

Methods of Valuation :

(i) Land and building method.

As the name indicates in this method the value of land is added to the value of structure to arrive at the fair Market value of property.

* In case self occupied property.
* In case when it is not possible to obtain fair & maintainable rent.
* In case where there is no direct evidence of rent such as school & hospitals etc.

Market value of land is added with structure value after depreciated gives final value of property.

(ii) Rent Capitalisation Method :

In this method the rental income is calculated after deducting all outgoings from the gross rent and year's purchase is calculated after adopting the current bank interest.

first calculate gross income per annum.
deduct the outgoings for maintenance.
final amount — income — outgoing = Net income.

(iii) Composite rate method :

this method represent rate per unit area of building along with its proportionable share of land. usually this method adopted for apartments and commercial complexes. main contains land & building value.

land value — depend, on location, amenities provided by developer.

Building value — after depreciation value is calculated.

(iv) Profit Method :

In case of Hotels, motels, Cinemas, public houses which falls under the category of the licensed premises, usually depends primarily on the earning capacity of the property.

(iv) Development method :

This method used for the properties which are in the undeveloped stage or partly developed and partly undeveloped stage. usually in this case depend on initial investment, development cost and expected profit.

(a) Ascert demand of small plots in the area

(b) Determine the area of land required for development work as per bye laws.

(c) Determine the cost of development work such as construction of road, light (street), sewerage, water supply, gardens, electric lines, sewerage lines, earth filling / cutting, CD works etc.

(d) Ascertain total sale price of all small plots