

Part - A

I  
1. Quantity Survey: It is defined as a technique or the process of calculating the quantities and cost of various items involved in a construction project, by any standard method before commencing the work.

2

2. Lead and lift

The horizontal distance between the vertical lines to the centre of pit and the centre of the bank, which is formed with excavated earth is called Lead.

The vertical distance between centre of depth of cutting and centre of height of depression is called lift.

2

3. Floor area :-

It is defined as clear covered area i.e., plinth area excluding the area of the walls. It consists of floor of all rooms, verandahs, passages, corridors, staircase, entrance rooms, kitchens, stores, bathrooms etc. Sills of doors and openings are not included in the floor area.

Carpet area :- It is the useful area or livable area. This is the total floor area minus circulation area.

2

4. Centre line method  
Long wall short wall method.

5. \*
- \* quantity of materials and cost
  - \* Labour cost
  - \* cost of equipment, tools and plants
  - \* Overhead and establishment charges.

2

2x5  
10

### Part-B

II

#### 1. Requirements

- \* knowledge of detailed drawing
- \* Specification regarding the mode of construction
- \* Various items of work involved and the different materials to be used
- \* Ability to write the description of different work.
- \* The rate of various items of work the rate of various materials to be used in the construction and also the cost of construction should be known.

3

#### Purpose

- \* To ascertain the necessary amount of money required by the owner to complete the required work.
- \* To ascertain the quantities of the material required
- \* To calculate the number of different categories of workers that are to be employed to complete the work within the scheduled time

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- \* TO assess the requirements of tools, plants and equipments required to complete the work according to the program.
- \* TO fix up the completion period from the volume of works.
- \* To draw up a construction schedule.

2. Plinth area estimate (square metre)

Plinth area estimate is calculated by finding the plinth area of the building and multiplied it with the plinth area rate. plinth area is the built up covered area of the building measured at the floor level. plinth area is calculated by taking external dimensions of the building at the floor level excluding plinth offset, courtyard, open area, balconies and cantilever projections.

CUBE RATE ESTIMATE (cube rate)

In this method the overall volume (cubical content) of the building is taken as the basis for estimating the cost. This is calculated by finding the cubical content of the building ( $l \times b \times h$ ) and multiplying it by the cube rate. The length and breadth should be taken as the external dimensions of the building at the floor level i.e., plinth area. The height should be taken from floor level to the top of roof slab.

Service unit method

In this method the approximate cost of a project arrived at based upon its service unit. The unit cost or unit rate is

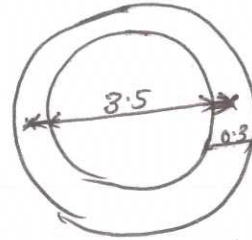
from the actual expenditure incurred for a similar work.

3.

$$\begin{aligned} \text{perimeter length} &= \pi D \\ &= 3.14 \times 3.8 \end{aligned}$$

$$\begin{aligned} D &= 3.5 + 0.3 \\ &= \underline{\underline{3.8 \text{ m}}} \end{aligned}$$

$$\text{Centerline length} = \underline{\underline{11.93 \text{ m}}}$$

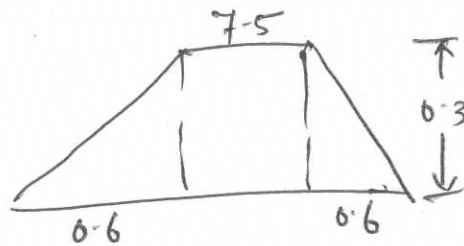
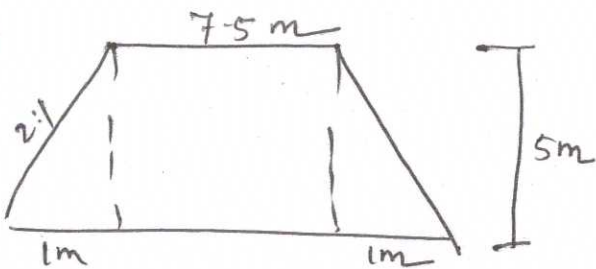


$$\begin{aligned} \text{Quantity} &= l \times b \times h \\ &= 11.93 \times 0.3 \times 2.5 \\ &= \underline{\underline{8.95 \text{ m}^3}} \end{aligned}$$

4.

$$\begin{aligned} \text{Area of cross section at } 0 \text{ m} &= A_0 = \frac{7.5 + 9.5}{2} \times 0.5 \\ &= \underline{\underline{4.25 \text{ m}^2}} \end{aligned}$$

$$\begin{aligned} \text{Area at } 500 \text{ m} &= A_{500} = \frac{7.5 + 8.5}{2} \times 0.3 \\ &= \underline{\underline{2.43 \text{ m}^2}} \end{aligned}$$



$$\text{Quantity} = 500 \times \left( \frac{4.25 + 2.43}{2} \right)$$

$$= 1670.00 \text{ m}^3$$

$$\text{L.S} = 130.00$$

$$\text{Qty.} = \underline{\underline{1800 \text{ m}^3}}$$

5.

$$EWE = l \times b \times h$$

$$\text{Horizontal, H} = 2.3 \times 1.35 \times 0.15$$

$$= \underline{0.465 \text{ m}^3}$$

$$\text{Vertical} = 0.95 \times 1.35 \times 0.15$$

$$= 0.192 \text{ m}^3$$

$$\text{Total qty} = \underline{0.657 \text{ m}^3}$$

### Bridgework

$$1^{\text{st}} \text{ step horizontal} = 2 \times 1.2 \times 0.15 = 0.36 \text{ m}^3$$

$$1^{\text{st}} \text{ step vertical} = 0.8 \times 1.2 \times 0.15 = 0.144 \text{ m}^3$$

$$2^{\text{nd}} \text{ step horizontal} = 1.7 \times 0.90 \times 0.15 = 0.2325 \text{ m}^3$$

$$2^{\text{nd}} \text{ step vertical} = 0.8 \times 0.90 \times 0.15 = 0.108 \text{ m}^3$$

$$3^{\text{rd}} \text{ step horizontal} = 1.4 \times 0.6 \times 0.15 = 0.126 \text{ m}^3$$

$$3^{\text{rd}} \text{ step vertical} = 0.8 \times 0.6 \times 0.15 = 0.072 \text{ m}^3$$

$$4^{\text{th}} \text{ step horizontal} = 1.10 \times 0.3 \times 0.15 = 0.0495 \text{ m}^3$$

$$4^{\text{th}} \text{ step vertical} = 0.80 \times 0.3 \times 0.15 = 0.036 \text{ m}^3$$

$$\text{Total qty} = \underline{14.15 \text{ m}^3}$$

6.

Water Supply It includes pipe lines which supply designed water to the premises or locality with required storage structures like tanks required valves for the proper utility. The pipeline is connected to main pipe of Gram panchayat.

5.

Sanitation :- this include drainage and sanitation requirements of the building like design construction and maintenance

Electrical installations

electrical installations like wiring accessories fittings erections of transformers, control protective devices. etc.

Elevators and lift These are provided to transport the people from one floor to other they are either hydraulic or electrical

Escalators ; it is the latest type of device to transport people. it is a conveyor transport device for transporting people.

Gas supply

gas supply is like electricity and water in building for using as fuel or lighting purpose.

Fire protection

the purpose of fire of human beings goods etc. from the occurrence fire in the building or group buildings.

UNIT - 1III  
a.

$$\text{Crimo Carpet area} = 2200 \text{ m}^2$$

Assume built up area or plinth area

$$= x$$

$$x = 2200 + x \times \frac{35}{100} + x \times \frac{10}{100}$$

$$= 2200 + 0.35x + 0.1x$$

$$x - 0.45x = 2200$$

$$x = 2200 / 0.55$$

$$= \underline{\underline{4000 \text{ m}^2}}$$

$$\text{Plinth area rate} = 1500 / \text{m}^2$$

$$\text{Cost} = 4000 \times 1500$$

$$= 60,00,000 / -$$

7% water supply & sanitary

$$= 60,00,000 \times 7/100$$

$$= \underline{\underline{4,20,000 / -}}$$

for electrical installation = 8%

$$= 60,00,000 \times 8/100$$

$$= 4,80,000 / -$$

Contingencies & other items = 10% of total

$$\text{Total cost} = 60,00,000 + 4,20,000$$

$$+ 4,80,000$$

$$= \underline{\underline{69,00,000 / -}}$$

$$10\% = 69,00000 \times 10/100$$

$$= 69,0000/-$$

$$\text{Total cost} = 69,00000 + 6,90000$$

$$= \underline{\underline{75,90000/-}}$$

### B. Trapezoidal Formula.

The trapezoidal rule is an extension of the mean sectional area method and is applicable to a series of sections taken at equal intervals apart. If  $A_1, A_2, A_3, A_4, \dots, A_n$  are the cross sectional areas along longitudinal section and  $L$  is the equal interval,

$$V = L \left( \frac{A_1 + A_n}{2} + A_2 + A_3 + \dots + A_{n-1} \right)$$

### Prismoidal Formula

This method assumes that the shape of the solid b/w two  $\parallel$  cross sections is the shape of prismoid.

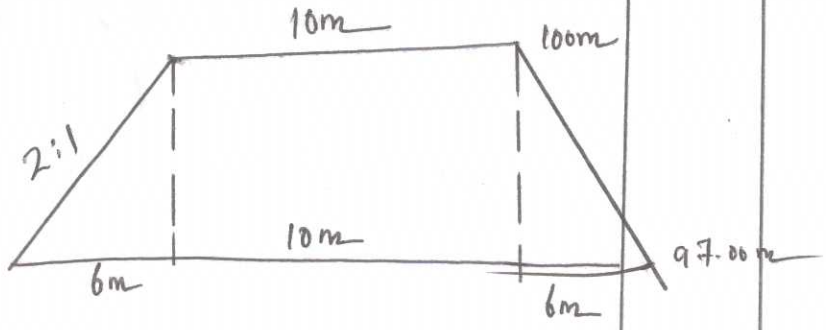
$$V = \frac{L}{6} (A_1 + 4A_m + A_2) \quad \text{2 cross sectn.}$$

Extending to more sections;

$$V = \frac{L}{3} \left( \text{first area} + \text{last area} + 4 \sum \text{even areas} + 2 \sum \text{odd areas} \right)$$

OR

IV  
a.



Chainage m	0	50	100	150	200
Height m	3	3.5	4	2.5	2

Area of C.S  $A_1$  at chainage 0 =  $(b+md)d$   
 $= (10 + 2 \times 3)3$   
 $= \underline{\underline{48.00 \text{ m}^2}}$

$A_2$  at 50m =  $(10 + 2 \times 3.5)3.5$   
 $= \underline{\underline{59.50 \text{ m}^2}}$

$A_3$  at 100m =  $(10 + 2 \times 4)4$   
 $= \underline{\underline{72 \text{ m}^2}}$

$A_4$  at 150m =  $(10 + 2 \times 2.5)2.5$   
 $= \underline{\underline{37.50 \text{ m}^2}}$

$A_5$  at 200m =  $(10 + 2 \times 2)2$   
 $= \underline{\underline{28 \text{ m}^2}}$

By Trapezoidal formula

$$V = L \left( \frac{A_1 + A_2 + A_3 + A_4 + A_5}{5} \right)$$

$$= 50 \left( \frac{48}{2} + 59.50 + 72 + 37.5 + \frac{28}{2} \right)$$

$$= \underline{\underline{10350 \text{ m}^3}}$$

by prismoidal formula;

$$\begin{aligned} V &= \frac{L}{3} (A_1 + A_5 + 4(A_2 + A_4) + 2A_3) \\ &= \frac{50}{3} (48 + 28) + 4(59.5 + 37.5) + 2(72) \\ &= \underline{\underline{10134 \text{ m}^3}} \end{aligned}$$

B. Approximate Estimate :- It is also called as rough cost estimate but it is not the accurate estimate. Sometimes it is called preliminary estimate. It is useful for preliminary study of various aspects of work.

Detailed estimate :- It is an accurate estimate in which each item of work is worked out separately. The dimensions such as length, width, depth/height are accurately taken from the concerned drawings of the proposed structure.

Item No.	Description	NO	Measurement			Quantity	Total Qty
			L	B	H/D		

Abstract estimate

It gives the accurate cost of the project. The cost of each item of work is calculated in the prescribed format, taking the quantities arrived from the detailed estimate & the rates arrived with reference to standard schedule of rates.

## Unit - 2

V

a.

$$\text{centerline length} = 58.90 \text{ m}$$

$$\text{no. of } \gamma = \underline{\underline{8 \text{ No. s}}}$$

$$L = 58.90 - (\gamma_2 \times 8 \times 0.80)$$

$$= \underline{\underline{55.7 \text{ m}}}$$

$$B = 0.80 \text{ m}$$

$$H = 0.15 \text{ m}$$

$$\text{Qty} = 55.7 \times 0.80 \times 0.15$$

$$= \underline{\underline{6.68 \text{ m}^3}}$$

b.

1. kitchen & BED (400 x 300)

$$L = (4 - 2 \times 0.05) = 3.9 \text{ m}$$

$$B = (3 - 2 \times 0.05) = 2.9 \text{ m}$$

$$h = 0.37 \cdot (0.4.5 - 0.8)$$

$$\text{Qty} = (3.9 \times 2.9 \times 0.37) \times 2 = \frac{2 \times 11.68 \text{ m}^3}{\cancel{11.68 \text{ m}^3}}$$

$$= 23.36 \text{ m}^3$$

$$\ast \text{ Dining Qty} = 3.4 \times 3.4 \times 0.37 = 4.28 \text{ m}^3$$

$$\ast \text{ BED (400 x 320)} = 3.9 \times 3.1 \times 0.37 = 4.47 \text{ m}^3$$

$$\ast \text{ Hall (350 x 600)} = 3.4 \times 5.9 \times 0.37 = 7.42 \text{ m}^3$$

$$\text{Total Qty} = \underline{\underline{39.53 \text{ m}^3}}$$

VI

a

Item No.	Description	No.	L	B	H/D	Qty	Total	Remarks
1.	Brick masonry.	1	57.7	0.30	3	51.93		$L = 58.9 - (\frac{1}{2} \times 8 \times 0.3)$ $= \underline{\underline{57.7 m}}$
	<u>Deductions</u>							
	Door	6	1	0.30	2.10	3.78		
	Window	10	1.2	0.30	1.50	5.40		
						-9.18		
	<u>total brick less deduction</u>					42.75	<del>42.15 m<sup>3</sup></del>	
	lintel	1	57.7	0.3	0.15	2.60		
	over	6						
	<u>total less deduction</u>					40.15 m <sup>3</sup>		

b.

Item	Description	No.	L	B	H/D	Qty	total qty	Remarks
1.	Kitchen	1	3.9	2.9	0.8	9.05		
2	Bed	1	3.9	2.9	0.8	9.05		
3	Dining	1	3.4	3.4	0.8	9.25		
4	Bed	1	3.9	3.1	0.8	9.68		
5.	Hall	1	3.4	5.9	0.8	16.05		
							<u>53.078 m<sup>3</sup></u>	

VII

a. Item	Description	NO.	L	B	H/D	Qty	Total Qty	Remark.
1.	R.C.C FOR ROOF Slab.	1	8.80	10.80	0.10	9.504		
	lintel	1	57.7	0.30	0.15	2.60		
							12.10 m <sup>3</sup>	

b.

Item	Description	NO	L	B	H/D	Qty	Total Qty
1.	Painting 1 coat.						
	door	1 x 1/4 x 6	1.00		2.10	3.15	
	window	10 x 3/4	1.20		1.50	13.5	
							16.65 m <sup>2</sup>

OR

VIII

a. Item	Description	NO.	L	B	H/D	Qty	Total Qty	Remark.
1.	Plastering.							
	External	1	37.60		3.7	139.12		$L = 2(8.4 + 10.4)$ $= 37.60$
	<del>over parapet</del>							H = 3 + 0.10 + 0.6
	Internal							
	* kitchen/BED	2	14		3	84		L = 2(4 + 3)
	* Dining	1	14		3	42		L = 2(3.5 + 3.5)
	* BED	1	14.4		3	43.2		L = 2(4 + 3.2)
	* Hall	1	19.0		3	57		L = 2(3.5 + 6)
							365.32 m <sup>3</sup>	

b.

brickwork for parapet

Inside L = 10.40 - 0.2 - 0.2  
 = 10m

Inside B = 8.40 - 0.4 = 8m

C.L = 2(10 + 0.2 + 8 + 0.2)  
 = 36.8m

Qty = 36.8 x 0.2 x 0.6  
 = 4.416 m<sup>3</sup>

Unit - IV

IX

Sl. No.	Description	Qty	Unit	Rate	Rate per	Qty Amount	Remarks
	Rec 1:2:4 using 20mm broken stone.						
	<u>Materials</u>						
	Broken Stone	0.009	m <sup>3</sup>	1000	m <sup>3</sup>	9.00	
	Sand	0.0045	m <sup>3</sup>	2000	m <sup>3</sup>	9.00	
	Cement	3.3	kg	8000	t	26.40	
	<u>labour</u>						
	mason	0.002	No. 3	800	each	1.60	
	man	0.004	No. 3	500	each	5.00	
	women	0.05	No. 3	400	each	20.00	

<u>Conveyance</u>							
Broken stone	0.009	m <sup>3</sup>	25	km/m <sup>3</sup>	5.625	25 km	
Sand	0.0045	m <sup>3</sup>	20	km/m <sup>3</sup>	2.07	23 km	
Cement	3.3	kg	60	km/t	1.98	10 km	
					<u>80.675</u>		

contractor profit = 10%

$$= 80.675 \times 10/100$$

$$= \underline{\underline{8.068/-}}$$

$$\text{Rate per unit of RCC} = 80.675 + 8.068$$

$$= \underline{\underline{88.7425/-}}$$

OR

Item	Description	Qty	Unit	Rate	Per	Amount		Per meter
						Rs	Ps	
	<u>Brickwork</u>							
	<u>material</u>							
	Brick	500	No-s	6000	1000ms	3000	00	
	Sand	0.24	m <sup>3</sup>	2000	m <sup>3</sup>	480	00	
	Cement	69	kg	8000	t	552	00	
	<u>Labour</u>							
	B. mason	0.7	No-s	800	each	560	00	
	man	0.35	No-s	500	each	175	00	
	women	0.7	No-s	400	each	280	00	

Conveyance

Brick	500	no 8	25	km/1000	225	00	18 km
Sand	0.24	m <sup>3</sup>	20	km/m <sup>3</sup>	168	00	35 km
Cement	69	kg	60	km/lt	41	40	10 km

5481 40

CP = 10 %

=  $5481.40 \times \frac{10}{100}$

= 548.14 /-

Rate per unit of brick masonry =  $5481.40 + 548.14$

= 6029.54 /-