TED (15)-4013
(Revision- 2015)

A20-04289

Reg.No.....
Signature. .....

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/MANAGEMENT/
COMMERCIAL PRACTICE – APRIL -2020.

QUANTITY SURVEYING-I

(Maximum Marks : 75) [Time : 2.15 hours]

Note:1. Missing data may be suitably assumed.
2. Question should be worked out in standard form.
3. Sketches on 5th and 6th page.

PART–A

Marks

I. Answer **any three** questions in one or two sentences. Each question carries 2 marks.

1. Define Contigencies.
2. List out painting coefficients of flush door and fully panelled door.
3. What percentage is provided in estimate for water supply and sanitary installations.
4. Define Lumpsum.
5. Define Standard Schedule of Rate. (3x2=6)

PART - B

II Answer **any four** of the following questions . Each question carries 6 marks.

1. Discuss any four types of estimate of a building.
2. List out four duties of a quantity surveyor.
3. Describe different methods of taking estimate.
4. Calculate the quantity of brick work and plastering required for a compound wall of 10m long, 0.2m thick and 1.5m height. Also find the total cost, if the rate of brick work is Rs.300/m^3 and rate of plastering is Rs.9/m^2.
5. Discuss the rules for deduction of opening in internal and external plastering.
6. Compute quantity of brick work required for an underground water tank of circular cross section having internal diameter 3m, thickness of 0.25m and 4m height.
7. What is rate analysis and how rate analysis is being carried out. [4x6 =24]

PART - C

(Answer **any of the three units** from the following. Each full question carries 15 marks)

UNIT I

III (a) A building consist of 120 sqm plinth area in each floor. It consist of ground and first floor whose height are 4m and 3.6m respectively. Calculate the cost of the building from the given data. The rates given below are same for both floors.

i. Cubic content rate=2000/m^3

ii. Additional for Architectural appearance @3% of Building cost.

iii. Additional for water supply @5% of building cost.

iv. Additional for sanitary work@ 5% of building cost.

v. Additional for electrical work @6% of building cost.

vi. Unforeseen items 5% of building estimate.

vii. Supervision charge @ 2.5%

viii. contengencies @ 4%. (9)

(b) The areas with contours at the site of a proposed reservoir are given below. Find the reservoir capacity using trapezoidal rule.

Contour in m	101	102	103	104	105	106	107
Area in m^2	528	910	1500	1750	2100	2800	3100

(6)

OR

IV (a) Estimate the quantity of earth work for a portion of road from the following data. Road width at the formation surface is 8m. side slope 2:1 in banking and 1.5:1 in cutting. Length of the chain is 30m.

Chainage	20	21	22	23	24	25	26	27	28	29	30
GL	71.20	71.25	70.90	71.25	70.80	70.45	70.20	70.35	69.10	69.45	69.70
Formation LVL	70	← Upward gradient 1 in 200→									

(15)

UNIT- II

V Estimate the quantities of the following items of a residential building from the plan and section as shown in Fig.1.

General Specification- Foundation-PCC using cement concrete 1:5:10, RR masonry in CM 1:6 in foundation and plinth. Super structure – Brick masonry in CM 1:5 Plastering -12mm thick in CM 1:3 RCC work in CC 1:2:4

(a) Earth work excavation in foundation. (4)

(b) Plinth in foundation. (4)

(c) 1st class brick work in Cement mortar. (7)

OR

VI Estimate the quantities of the following items of a residential building from the plan and Section as shown in Fig.2

General Specification- Foundation-PCC using cement concrete 1:5:10, Masonry-1st class brick work in CM 1:6 in foundation and plinth. Super structure-Brick masonry in CM 1:6. Plastering-12mm thick in CM 1:3:RCC work in CC 1:2:4.

(a) Earthwork excavation in foundation. (6)

(b) 1st class brick work in superstructure. (5)

(c) Lintel and roof slab. (4)

UNIT- III

VII Estimate the quantities of following items in Fig.2.

(a)12mm thick cement plastering for inside and outside wall. (9)

(b) Calculate the quantity of 20mm thick cement plastering required for inside and top wall of a ground level RCC water tank(Fig.3). (6)

OR

VIII (a) Calculate the quantities of earthwork excavation for foundation in ordinary soil and cement concrete (1:2:4), 30cm thickness at the bottom slab and 20cm thickness at side walls for a ground level RCC water tank (Fig.3). (8)

(b) Calculate the quantity of painting required for inside wall of building in Fig.1. (7)

UNIT – IV

IX Workout the unit rate of Random rubble masonry in superstructure in 1:6 cement sand mortar.

Material for 10 m^3	**Rate**
12.5m^3 of stone	Rs.1200/cum
0.7 m^3 of cement	Rs.7650/cum
4.2 m^3 of sand	Rs.700/cum

Labours

12 Nos mason	Rs.300/head/day
10 Nos Mazdoor	Rs.220/head/day
10 men coolie	Rs.200/head/day
Sundries T and P etc.	Rs.300/-

Add 1.5% water charge and 10% Contractors profit. (15)

OR

X Assess the rate of brick masonry for super structure in 1:6 Cement sand mortar Unit 1m^3.

Material	**Labour**
Country Brick -500 Nos.	1.4 Nos Mason @ Rs.850/head/day
Cement-105 kg @ Rs.8000/ton	0.7 Nos Men mazdoor@Rs.750/head/day
Sand-0.42 m^3 @Rs.1200/m3	2.1 Women Coolie @ Rs.700/head/day

Conveyance

SL.No.	Material	Cost @ source	Per	Lead in Km	Conveyance Charge per Km
1	Brick	9000	1000	18	12

Add 10% contractors profit. (15)

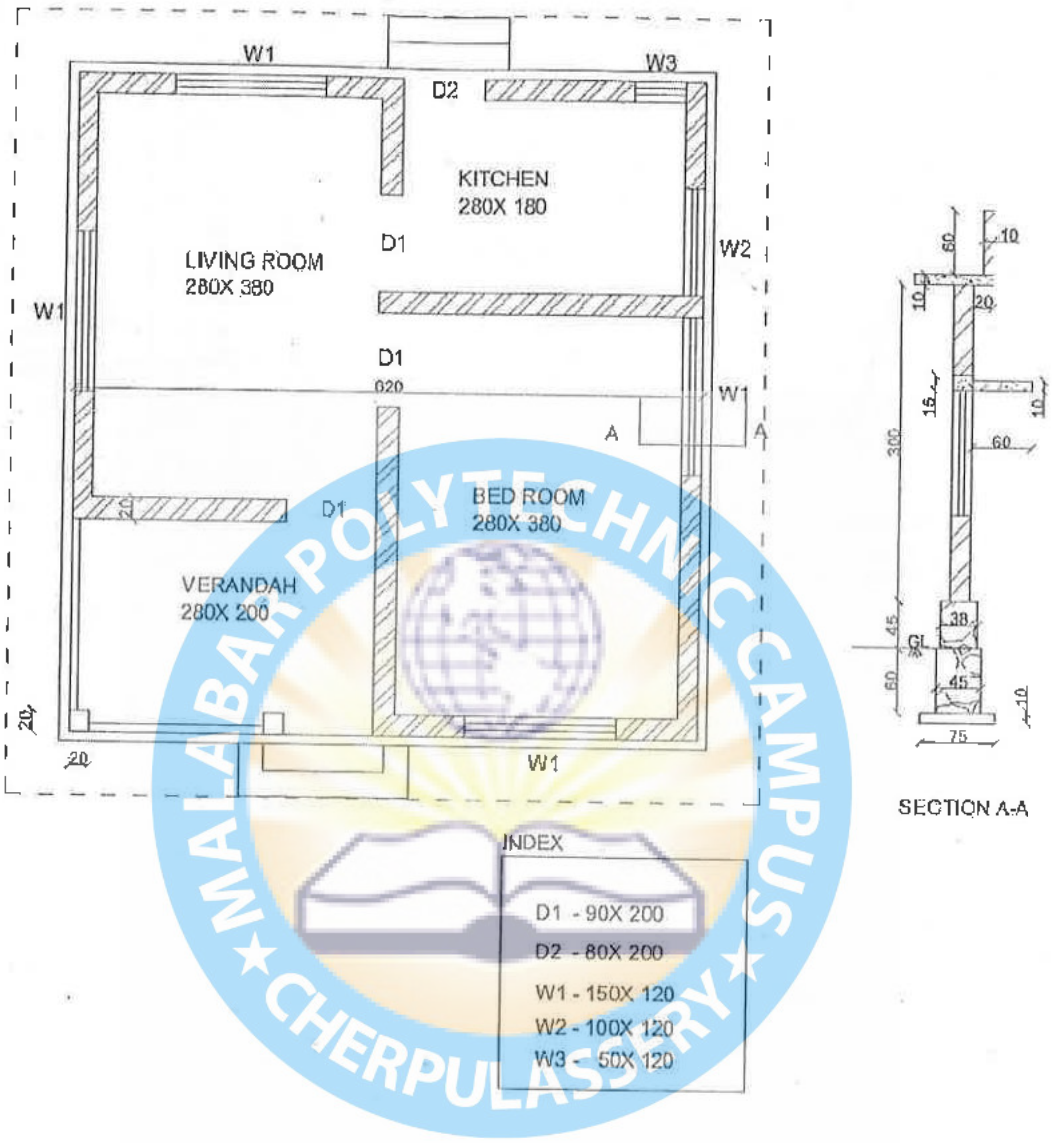
W1
W3
D2
KITCHEN
280X 180
LIVING ROOM
280X 380
D1
W2
W1
D1
020
W1
A
A
D1
BED ROOM
280X 380
VERANDAH
280X 200
20
20
W1
INDEX
D1 - 90X 200
D2 - 80X 200
W1 - 150X 120
W2 - 100X 120
W3 - 50X 120
SECTION A-A

Fig.1

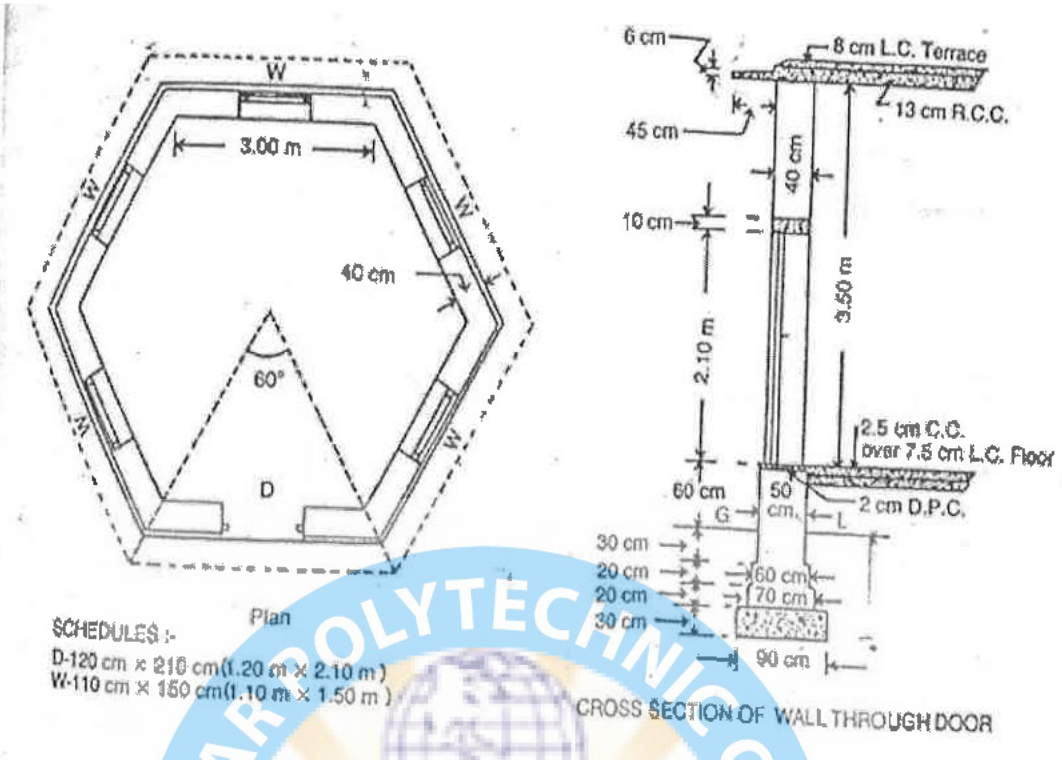

Fig.2

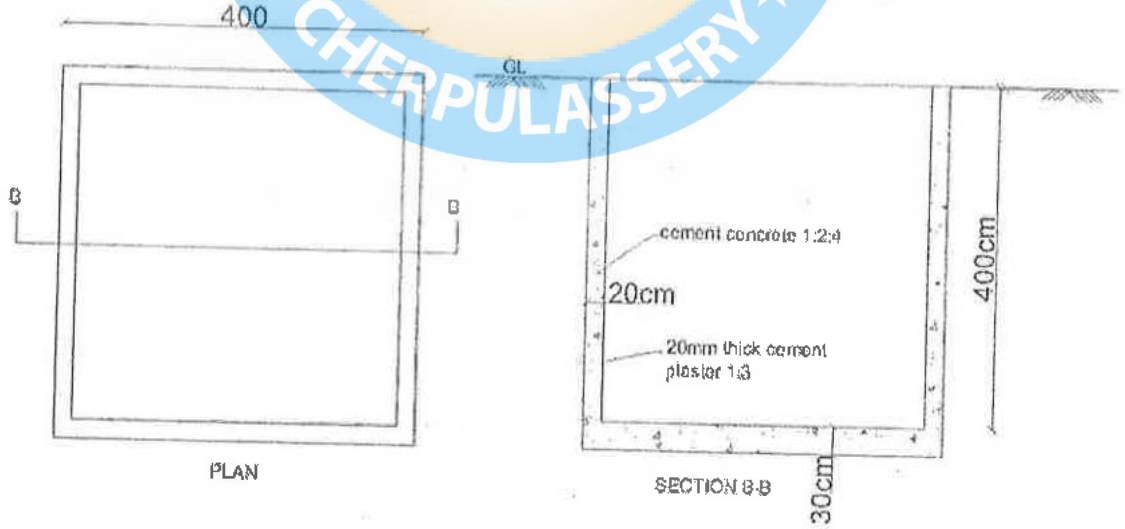

Fig.3

Revision (15) 4013	APRIL 2020
Course title : QUANTITY SURVEYING I	**COURSE CODE : 4013**

Ques. No	Scoring indicators	Split up	Sub total	TOTAL
	PART A			
1	**It is** an amount added to an estimate to allow for items, conditions, or events for which the state, occurrence, or effect is uncertain and that experience shows will likely result, in aggregate, in additional costs".			**2**
2	**Flush door 1.30 for each side** **Fully paneled door 1.20 for each side**			**2**
3	**5 % of building cost for both sanitary and water supply**			**2**
4	While preparing an estimate, it is not possible to workout in detail in case of petty items. Items other than civil engineering such items are called lumpsum items or simply L.S.Items. The following are some of L.S. Items in the estimate. 1. Water supply and sanitary arrangements. 2. Electrical installations like meter, motor, etc.,			**2**
5	means any schedule included in the Contract which, in respect of any section or item of work to be carried out, shows the respective unit rate of payment for execution of that work and which may also include lump sums, provisional sums other sums, quantities and prices.			**2**
	PART B			
1	Based on these criterias, there are mainly 8 cost estimates followed in construction: 1. Preliminary Cost Estimate 2. Plinth Area Cost Estimate 3. Cube Rate Cost Estimate 4. Approximate Quantity Method Cost Estimate 5. Detailed Cost Estimate 6. Revised Cost Estimate 7. Supplementary Cost Estimate	**Any 4**		

Remarks:

	Preliminary Cost Estimate The preliminary cost estimate is also called an **abstract cost estimate or approximate cost estimate or budget estimate.** This estimate is generally prepared in initial stages to know the approximate cost of the project. By this estimate, the competent sanctioning authority can decide the financial position and policy for the administration section. Preliminary estimates are prepared with reference to the cost of similar type projects in a practical manner. In this estimate, the approximate cost of each important item of work is displayed individually to know the necessity and utility of each item of work. The items of work include the cost of lands, cost of roads, electrification, water supply costs, cost of each building, etc. **Revised Cost Estimate** Revised cost estimate is a detailed estimate and it is prepared when the original sanctioned estimate value is exceeded by 5% or more The increase may be due to sudden increase in cost of materials, cost of transportation etc. The reason behind the revision of estimate should be mentioned on the last page of revised estimate. **Supplementary Cost Estimate** Supplementary cost estimate is a detailed estimate and it is prepared freshly when there is a requirement of additional works during the progress of original work. The estimate sheet should consists of cost of original estimate as well as the total cost of work including supplementary cost of work for which sanction is required. **Annual Repair Cost Estimate** The annual repair cost estimate is also called as **annual maintenance estimate** which is prepared to know the maintenance costs of the building which will keep the structure in safe condition. Whitewashing, painting, minor repairs, etc. are taken into consideration while preparing annual repair estimate for a building.		**3** **6**	

Remarks:

2	• Review architectural plans and prepare quantity needs • Estimate the quantity and costs of materials • Prepare contracts and documents • Set budgets for payments, inventory needs, and materials • Analyze costs for maintenance and additional building needs • Track changes in plans or constructions; update budgets • Negotiate with contractors and subcontractors • Hire and document contractors and subcontractors • Act as a liaison between clients and site managers/engineers	**Any 8**	**6**	**6**
3	**METHODS OF TAKING OUT QUANTITIES** The quantities like earth work, foundation concrete, brickwork in plinthand super structure etc., can be workout by any of following two methods: a) Long wall - short wall method b)Centre line method. **.LONG WALL-SHORT WALL METHOD** In this method, the wall along the length of room is considered to be longwall while the wall perpendicular to long wall is said to be short wall. To get thelength of long wall or short wall, calculate first the centre line lengths of individual walls. Then the length of long wall, (out to out) may be calculated after adding half breadth at each end to its centre line length. Thus the length of short wall Measured into in and may be found by deducting half breadth from its centre linelength at each end. The length of long wall usually decreases from earth work tobrick work in super structure while the short wall increases. These lengths aremultiplied by breadth and depth to getquantities. **2.CENTRE LINE METHOD** This method is suitable for walls of similar cross sections. Here the totalcentre line length is multiplied by breadth and depth of respective item to get thetotal quantity at a time. When cross walls or partitions or verandah walls joinwith main all, the centre line length gets reduced by half of breadth for eachjunction. Such junction or joints are studied carefully while calculating total centreline length. The estimates prepared by this method are most accurate and quick.		**1** **2.5** **2.5**	**6**

Remarks:

<table>
<tr>
<td>4</td>
<td>
<table>
<tr><th>Item</th><th>Sl No</th><th>Length</th><th>Width</th><th>Height</th><th>Quantity</th><th>Remarks</th></tr>
<tr><td>Brick work</td><td>1</td><td>10</td><td>0.2</td><td>1.5</td><td>3 M^3</td><td></td></tr>
<tr><td>Plastering in cement mortar</td><td></td><td></td><td></td><td></td><td></td><td></td></tr>
<tr><td>Inside and outside</td><td>2</td><td>10</td><td></td><td>1.5</td><td>15 m^2</td><td></td></tr>
<tr><td>Top</td><td>1</td><td>10</td><td>0.2</td><td></td><td>2 m^2</td><td></td></tr>
</table>
Total cost

For brickwork = 3x300 = 900 rs

For plastering 17x 9 = 153 rs
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<td>4

2</td>
<td>6</td>
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<tr>
<td>5</td>
<td>Deductions:- For jambs, soffits, sills etc.; for openings not exceeding 0.5 sqm each In area, for ends of joists, beams, posts, girders, steps, etc., not exceeding 0.5 sqm In area; and for openings exceeding 0.5 sqm and not exceeding 3 sqm each, deductions and additions shall be made In the following manner:-

(a) No deduction shall be made for ends of joists, beams, posts etc.and openings not exceeding 0.5 sqm each and neither additions shall be made for reveals , jambs , soffits, sills etc. of these openings nor for finish (finish to plaster) around ends of joists , beams, posts etc.

(b)Deductions for openings exceeding 0.5 sq m but not exceeding 3 sq m each shall be made as follows and no addition shall be made for reveals, jambs, soffits, sills etc. of these openings.</td>
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Remarks:

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<tr><th>item</th><th>Sl no</th><th>length</th><th>breadth</th><th>height</th><th>quantity</th><th>remarks</th></tr>
<tr><td>Brick work</td><td>1</td><td>19.63</td><td>.25</td><td>4</td><td>19.634m^3</td><td>L = 2x3.14x(3+.25/2)</td></tr>
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<td>
Rate Analysis can be defined as the analytical study (qualitative and quantitative) that leads to the definition of a new unit rate referring to a given job or work type, by identifying its basic elements

Following are the two main purposes of carrying out the rate analysis an item: To determine the actual cost per unit of items. To examine the item for economic processes and economic uses of materials involve in making the item.

In order to determine the rate of a particular item, the factors affecting the rate of that item are studied carefully and then finally a rate is decided for that item. This process of determining the rates of an item is termed as analysis of rates or rate analysis. The rate of particular item of work depends on the following: 1. Specifications of works and material about their quality, proportion and constructional operation method. 2. Quantity of materials and their costs. 3. Cost of labours and their wages. 4. Location of site of work and the distances from source and conveyance charges. 5. Overhead and establishment charges 6. Profit Cost of materials at source and at site of construction: The costs of materials are taken as delivered at site inclusive of the transport local taxes and other charges.
</td>
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3</td>
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Remarks:

Ans: Plinth area of Ground floor $= 120 m^2$

Height of Ground floor $= 4 m$

$\therefore$ Cubic content of Ground floor $= 120 \times 4 = \underline{480 m^3}$

Plinth area of first floor $= 120 m^2$

Height of First floor $= 3.6 m$

$\therefore$ Cubic content of First floor $= 120 \times 3.6 = \underline{432 m^3}$

Total cubic content of the building $= 480 + 432$

$= \underline{912 m^3}$

Cubic content rate $= 2000/m^3$

Cost of the building $= 912 \times 2000$

$= \underline{18,24,000/-}$

3

III.

Cost of architectural appearance at 3%

$= 18,24,000 \times \frac{3}{100}$

$= \underline{54,720/-}$

Cost of water supply at 5% $= 18,24,000 \times \frac{5}{100}$

$= \underline{91,200/-}$

Cost of Sanitary work at 5% $= 18,24,000 \times \frac{5}{100}$

$= \underline{91,200/-}$

3

Cost of electrical work at 6% $= 18,24,000 \times \frac{6}{100}$

$= \underline{1,09,440/-}$

Cost of unforeseen items at 5% $= 18,24,000 \times \frac{5}{100}$

$= \underline{91,200/-}$

Cost of contegencies at 4% $= 18,24,000 \times \frac{4}{100}$

$= \underline{72,960/-}$

3

Overall cost of building $= 1824000 + 54720 + 91200 + 91200 + 109440 + 91200 + 72960$

$= \underline{23,34,720/-}$

Remarks:

	Cost for supervision charges = $2334720 \times \frac{2.5}{100}$ = 58,368/- Grand total = 2334720 + 58368 = 23,93,088/-		6	15
IV	200 × Formation level in each stations At chainage 20 = 70 At chainage 21 = 70 + 0.15 = 70.15 m At chainage 22 = 70.15 + 0.15 = 70.3 m At chainage 23 = 70.3 + 0.15 = 70.45m At chainage 24 = 70.45 + 0.15 = 70.6m At chainage 25 = 70.6 + 0.15 = 70.75m At chainage 26 = 70.75 + 0.15 = 70.9 m At chainage 27 = 70.9 + 0.15 = 71.05 m At chainage 28 = 71.05 + 0.15 = 71.2 m At chainage 29 = 71.2 + 0.15 = 71.35 m At chainage 30 = 71.35 + 0.15 = 71.5 m Depth of formation At chainage 20 = 71.20 − 70 = 1.2m At chainage 21 = 71.25 − 70.15 = 1.1m		4	

Remarks:

At chainage 22 = 70.90 − 70.3 = 0.6 m

At chainage 23 = 71.25 − 70.45 = 0.8 m

At chainage 24 = 70.80 − 70.6 = 0.2 m

At chainage 25 = 70.75 − 70.45 = 0.3 m

At chainage 26 = 70.9 − 70.20 = 0.7 m

At chainage 27 = 71.05 − 70.35 = 1.3 m

At chainage 28 = 71.2 − 69.10 = 2.1 m

At chainage 29 = 71.35 − 69.45 = 1.9 m

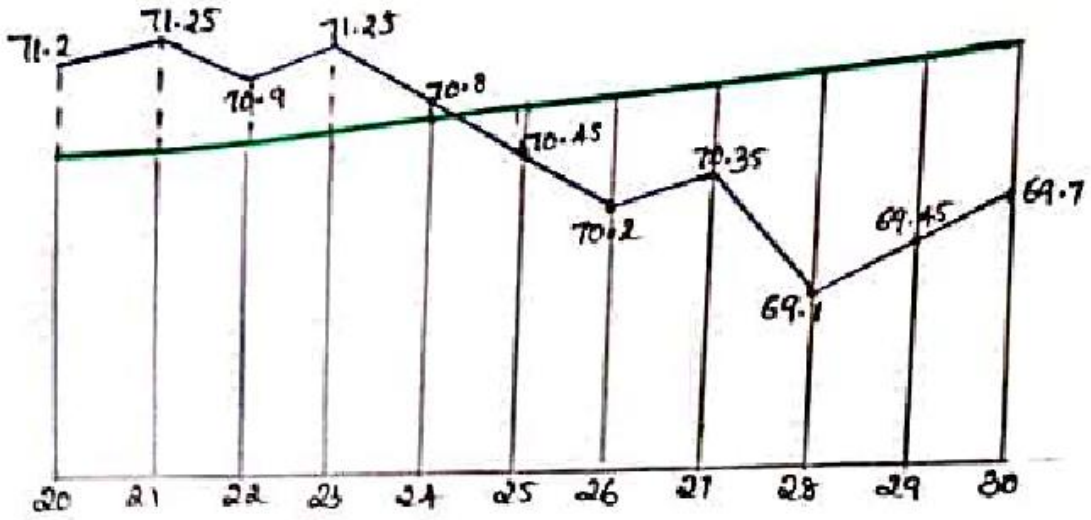
At chainage 30 = 71.5 − 69.70 = 1.8 m

4

4

Ground Level	71.20	71.25	70.90	71.25	70.80	70.45	70.20	70.35	69.10	69.45	69.70
Depth	1.2	1.1	0.6	0.8	0.2	0.3	0.7	1.3	2.1	1.9	1.8
Formation Level	70	70.15	70.3	70.45	70.6	70.75	70.9	71.05	71.2	71.35	71.5

15



3

Remarks:

Volume of cutting upto A_5

Applying prismodial formula

$$V = \frac{L}{3}\left(A_1 + A_5 + 4(A_2 + A_4) + 2(A_3)\right)$$

$A_1 = bd_1 + nd_1^2 = (8 \times 1.2) + (1.5 \times 1.2^2) = \underline{11.76 m^2}$

$A_2 = bd_2 + nd_2^2 = (8 \times 1.1) + (1.5 \times 1.1^2) = \underline{10.615 m^2}$

$A_3 = bd_3 + nd_3^2 = (8 \times 0.6) + (1.5 \times 0.6^2) = \underline{5.34 m^2}$

$A_4 = bd_4 + nd_4^2 = (8 \times 0.8) + (1.5 \times 0.8^2) = \underline{7.36 m^2}$

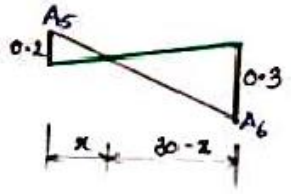
$A_5 = bd_5 + nd_5^2 = (8 \times 0.2) + (1.5 \times 0.2^2) = \underline{1.66 m^2}$

$$\therefore V = \frac{30}{3}\left(11.76 + 1.66 + \{4 \times (10.615 + 7.36)\} + 2(5.34)\right)$$

$$= \frac{30}{3}(13.42 + 71.9 + 10.68)$$

$$= 10 \times 96 = \underline{960 m^3}$$

Section 5-6



$$\frac{x}{0.2} = \frac{30-x}{0.3}$$

$0.3x = (30-x)0.2$

$0.3x = 6 - 0.2x$

$0.3x + 0.2x = 6 \Rightarrow 0.5x = 6$

$\therefore x = \frac{6}{0.5} = \underline{12 m}$, $30 - x = 30 - 12 = \underline{18 m}$

$A_6 = bd_6 + nd_6^2 = 8 \times 0.3 + (2 \times 0.3^2)$ (filling)

$= \underline{2.58 m^2}$

Remarks:

Volume of filling from 6 to 11

$V = \frac{L}{3}(A_6 + A_{11} + (4(A_8 + A_{10})) + (2 \times A_7))$

$A_7 = bd_7 + nd_7^2 = (8 \times 0.7) + (2 \times 0.7^2) = 6.58\ m^2$

$A_8 = bd_8 + nd_8^2 = (8 \times 1.3) + (2 \times 1.3^2) = 13.78\ m^2$

$A_9 = bd_9 + nd_9^2 = (8 \times 2.1) + (2 \times 2.1^2) = 25.62\ m^2$

$A_{10} = bd_{10} + nd_{10}^2 = (8 \times 1.9) + (2 \times 1.9^2) = 22.42\ m^2$

$A_{11} = bd_{11} + nd_{11}^2 = (8 \times 1.8) + (2 \times 1.8^2) = 20.88\ m^2$

Volume of filling $V = \frac{30}{3}(2.58 + 20.88 + 4\{13.78 + 2$

$= 10(23.46 + 144.8 + 51.24)$

$= 10 \times 219.5 = 2195\ m^3$

Total volume of cutting $= 960 + 9.96$

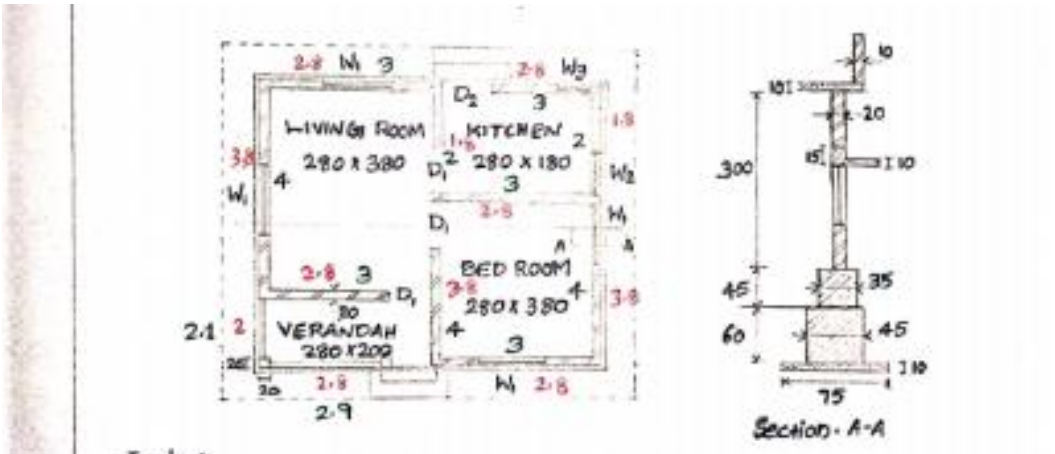
$= 969.96\ m^3$

Total volume of filling $= 2195 + 23.22$

$= 2218.22\ m^3$

7

Remarks:

V	 Index D_1 = 90 x 200 D_2 = 80 x 200 W_1 = 150 x 120 W_2 = 100 x 120 W_3 = 50 x 120 Ans: CL = 2.1 + 2.9 + 3 + 4 + 3 + 2 + 2 + 3 + 3 + 4 + 4 + 3 = 36 m No. of T-Junctions = 6.		3 3	15

Sl. No.	Items.	Nos.	Measurements L	B	H	Quantity	Remarks.	
1	Earth work excavation and deposition on the banks for foundation.	1	33.75	0.75	0.7	17.718 m^3	L = CL - (B/2 × No. of T-Junctions) 36 - (0.75/2 × 6) = 33.75	3
2	Plinth in Foundation.							
	Foundation	1	34.65	0.45	0.6	9.35 m^3	36 - (0.45/2 × 6) = 34.65	3
	Basement	1	34.95	0.35	0.45	5.504 m^3	36 - (0.35/2 × 6) = 34.95	
						14.854 m^3		
3	1st class brick work in Cement mortar.	1	35.4	0.2	3	21.24 m^3	36 - (0.2/2 × 6) = 35.4	3

Remarks:

VI

Here the centre line length = 19.38 m

item	Sl no	L	B	H	QTY	Remarks
Earthwork excavation	**1**	**19.38**	**0.9**	**1.0**	**17.447 m^3**	
First class brickwork in super structure with CM 1:6	**1**	**19.38**	**0.40**	**3.50**	**27.132 m3**	
Deductions						
Window	**5**	**1.1**	**0.40**	**1.50**	**3.3**	
Door	**1**	**1.2**	**0.40**	**2.10**	**1.008**	
Lintel over w	**5**	**1.55**	**0.40**	**0.10**	**0.31**	
Lintel over D	**1**	**1.65**	**0.40**	**0.10**	**0.066**	
					22.448	
Lintel over w	**5**	**1.55**	**0.40**	**0.10**	**0.31**	
Lintel over D	**1**	**1.65**	**0.40**	**0.10**	**0.066**	
					.376	
Roof slab	**1**	**Area = 43.61**		**0.06**	**2.6166**	

2

2

2

2

8

15

VII.a

item	No	L	B	H	Quantity	remarks
Plastering						
Inside walls	6	3		3.5	63 m^2	
Outside wall	6	3.46		3.5	72.69 m^2	
deductions						
windows	5	1.1		1.5	8.25m^2	
door	1	1.2		2.1	2.52m^2	
					124.92	

8

15

Remarks:

VII.b

Item	no	L	B	H	Qty	Remarks
Cement plastering of 20 mm thick						
Inside wall	4	4.0	-	4.0	64 m^2	
Top wall		16.8	0.2		3.36 m^2	
					67.36 m^2	

7

VIII.a

Item	no	L	B	H	Qty	Remarks
Earthwork excavation for foundation	1	4.4	4.4	4.3	83.248 m^3	
Cement concrete 1:2:4						
Bottom slab	1	4.4	4.4	0.3	5.808 m^3	
Side walls	1	16.8	0.2	4.0	13.44m^3	

7

VIII.b

Item	no	L	B	H	Qty	Remarks
Paiting						
varandah	1	2.8		3.00	8.4	
	1	2.0		3.0	6.0	
bedroom	2	3.80		3.0	22.8	
	2	2.80		3.0	16.8	
kitchen	2	2.80		3.0	16.8	
	2	1.80		3.0	10.8	
living	2	2.80		3.0	16.8	
	2	3.80		3.0	22.8	
					121.2 m^2	
deduction						
D1	3	.9		2.0	5.4	
D2	1	.8		2.0	1.6	
W1	3	1.5		1.2	5.4	
W2	1	1.0		1.2	1.2	
W3	1	0.5		1.2	0.6	
					107 m^2	

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15

Remarks:

IX

Particular	Quantity	Unit	Rate	Unit	Amount	Remarks
Materials						
Stone	12.5	m^3	1200	m^3	15000	
Cement	0.7	m^3	7650	m^3	5355	
Sand	4.2	m^3	700	m^3	2940	
labours						
mason	12	NOS	300	Head/day	3600	
Mazdoor	10	nos	220	Head/day	2200	
Coolie	10	nos	200	Head/day	2000	
Sundries Tand P					300	
					31395	

Add 1.5 % water charge= 470.925+31395 = 31865.925/-
Add 10% contractors profit =3186.5925+31865.925= **35052.5175**

5 **5** **5** **15** **15**

X

Particular	Quantity	Unit	Rate	Unit	Amount	Remarks
MATERIAL						
Country brick	500	nos	9000	/1000 nos	4500	
cement	105	kg	8000	tonn	840	105x(8000/1000)
sand	0.42	m^3	1200	m^3	504	
labours						
Mason	1.4	nos	850	Head/day	1190	
Men mazdoor	0.7	nos	750	Head/day	525	
Women coolie	2.1	nos	700	Head/day	1470	
conveyance						
brick	18	km	12	km	216	
					9245	

Add 10 % contractors profit = 924.5+9245 = **10169.5/-**

5 **5** **5** **15** **15**

Remarks: