

373 17-11-23

NOV 23

Revision (15) 4013

Course title: **Quantity Surveying I**

Qst. No.	Scoring indicator	Split up score	Sub Total	Total
PART A				
I (1)	$V = \frac{L}{2} [(A_1 + A_n) + 2(A_2 + A_3 + \dots + A_{n-1})]$	2		2
I (2)	1. Centreline method 2. Long wall – Short wall method	1 1		2
I (3)	(a) Fully Glazed Window - 1 (b) Iron Grills in window - 1	1 1		2
I (4)	(a) Sq.m (b) Cu.m	1 1		2
I (5)	To meet expenses of office rent, depreciation of equipment salaries of staff postage- amount of 4% of estimate cost is allocated.	2		2
PART B				
II (1)	<p>Plinth Area is the area of a building measured at floor level. It is measured by taking external dimensions excluding plinth offset if any.</p> <p>Floor area of a building is the total area of floor in between walls and consists of floor of all rooms, verandahs, passages, staircase room, entrance halls, kitchen, stores, bath and latrine (W Cs.) etc. Sills of doors and openings are not included in the Floor area. Area occupied by walls, pillars, pilaster, and other intermediate supports are not included in the Floor area.</p> <p>Carpet Area of building is the useful area or liveable area. This is the total floor area minus the circulation area, veranda, corridors, passages, staircase, lift, entrance hall etc. and minus other non- useable areas as sanitary accommodations like bathrooms and W.Cs.etc.</p>	2 2 2		6
II (2)	<ol style="list-style-type: none"> 1. Preparing bill of quantities (taking off, squaring, abstracting and billing) 2. Preparing bills for part payments at intervals during the execution of work. 3. Preparing bill of adjustment in the case of variations ordered during the execution of work. 4. Giving legal advice in case of court proceedings. 	6		6
II (3)	<p>Plinth Area Method: It is only an approximate estimate, to know the approximate cost.</p> <p>It is prepared on the basis of plinth area of building, the rate being arrived from the cost of similar building having similar specification, heights and construction in the locality.</p>	3		

	<p>-Plinth area estimate is calculated by finding the plinth area of the building and multiplying by plinth area rate.</p> <p>-Plinth area should be calculated for the covered area by taking external dimension of the building at the floor level.</p> <p>-Courtyard and other open area should not be included in the plinth area.</p> <p>-For storeyed building, the Plinth Area Estimate is prepared for each storey separately</p> <p>Cubic Content Method: -The cubical contents of a building means plinth area x Height of the building</p> <p>-The Height is taken from top of floor level to top of roof.</p> <p>-The cubic contents of the proposed building are multiplied with cubic rates arrived at for the similar construction ie Total cost of construction divided by cubic contents = Cost per Cubic metre</p>	3		6
II (4)	<p>Long wall - Short wall method:</p> <p>-In this method, longer walls in a building are considered as long walls and measured from out to out</p> <p>-Shorter walls are considered as short walls and are measured from in to in</p> <p>-Long wall length, out to out = Centre to centre length + one breadth</p> <p>-Short wall length, in to in = centre to centre length – one breadth</p> <p>-Method is simple and accurate and there is no chance of any mistake</p>	6		6
II (5)	<p>It is measured in m² unless or otherwise described. No deduction is made for end of joist, beams, post etc and openings not exceeding 0.5 m² each and no additions shall be made for reveals, jambs, soffits, sills, etc</p> <p>Deduction for opening exceeding 0.5m² but not exceeding 3m² is made as follows. When both faces of walls are plastered with the same plaster, deduction for opening is made plaster, deduction for openings made for one face only. When two faces are plastered with different plaster, deduction shall be made for doors and windows etc. On when the width of reveals is less than that on the other side, but no deduction shall be made from plaster on the other side.</p> <p>In case of openings of area above 3m² each deduction is made for openings, bust jambs, soffits and sill shall be measured.</p>	6		6
II (6)	<p>(a) This is a book which is and kept in PWD and is prepared by Superintending Engineer and got approved by Chief Engineer. It describes the quantity of materials and labour to complete one unit of each item.</p> <p>(b) This book explains the rates of materials and wages of different categories of labour, transportation etc. This book is prepared by SE in-charge of circle and any modification necessary shall be got approved by CE intime and brought in force from the next financial year. The SOR is exclusive of conveyance charges of materials to site of work and required % of CP.</p>	3		6
II (7)	<p>(a) Work Charged Establishment is provided for accompanying payment or salary to supervisors, technical persons etc. Those employed person in the project for work charged establishment an amount of 2% to 2.5 % of estimated cost of the work is provided in</p>	3		

	estimate. (b) The contingencies indicate the incidental expenses of miscellaneous character which cannot be classified under any distinct item. In an estimate for contingencies an amount of 3% to 5 % of estimated cost of the work is provided to allow for the petty items of work.	3		6
PART C				
III (a)	Supplementary Estimate: It is the detailed estimate and prepared when additional work are required to supplement original work or when future development are required during progress of work. Revised Estimate: It is a detailed estimate and is required to be prepared under any one of the reasons: i) When the original sanctioned estimate is exceeded or likely to be exceed more than 5%. ii) When the expenditure on a work exceed or likely to be exceed by more than 10%. iii) When there is material deviation from the original proposal even though the cost may be met from the sanctioned amount.	3 4		7
III (b)	Using Trapezoidal Formula, Volume $V = \frac{L}{2} [(A_1 + A_n) + 2(A_2 + A_3 + \dots + A_{n-1})]$ Where V= Volume ($A_1, A_2 \dots A_n$ = Areas of contour lines Volume, $V = \frac{5}{2} [1400 + 9900) + 2(2300 + 3800 + 4900 + 6400 + 8700)]$ $= 158750m^3$ Therefore, Capacity of reservoir = $158750m^3$	2 1 4 1		8 15
IV (a)	i) Plinth Area method: Cost of building of $125m^2$ Plinth Area = Rs.6,50,000 Plinth Area rate per sq.m = $\frac{6,50,000}{125} = Rs.5200$ Therefore, cost of similar building of $160m^2$ Plinth Area = $160 \times 5200 = Rs.8,32,000$ ii) Cubic content method: Cubic content of existing building = Plinth Area x Height of building $= 125 \times 3.2 = 400m^3$ Cubic metre volume rate = $\frac{6,50,000}{400} = Rs.1625$ Volume of similar building = $160 \times 3.2 = 512m^3$ Therefore, cost of similar building = $512 \times 1625 = Rs.8,32,000$	1.5 1.5 1 1 1 1		3 4
IV (b)	Mean height, $d = \frac{2.5+3.5}{2} = 3m$ Sloping breadth at the mid section = $d\sqrt{s^2 + 1}$ $= 3\sqrt{2^2 + 1} = 6.71m$ Area of two side slopes = $2L \times d\sqrt{s^2 + 1} = 2 \times 200 \times 6.71 = 2684m^2$ Quantity of pitching = Area x Thickness $= 2684 \times 0.15 = 402.6 \text{ cum}$	4		15

	Cost of stone pitching = $402.6 \times 400 = \text{Rs.}1,61,040$						4	8													
V (a)	Total c/c length = 45.30m No of T junctions = 6 Corrected c/c length = $45.3 - 6 \times 0.9/2 = 42.60\text{m}$						2 1 1														
	Details	No	L	B	H/D	Qty	Remarks	4	8												
	E.W excavation	1	42.6	0.9	0.8	30.67m^3															
V (b)	Details	No	L	B	H/D	Qty	Remarks														
	D	1	5.2	0.12	0.08	0.05	$2 \times 2.1 + 1 = 5.2$														
	D1	4	5.1	0.12	0.08	0.20															
	W	2	11	0.10	0.08	0.18															
	W1	4	9	0.10	0.08	0.29															
	W2	1	8.2	0.10	0.08	0.07															
					Total	0.79 m^3		7	7												
VI (a)	Total c/c length = 45.30m No of T junctions = 6 Corrected c/c length for foundation = $45.3 - 6 \times 0.6/2 = 43.5\text{m}$ Corrected c/c length for basement = $45.3 - 6 \times 0.45/2 = 43.95\text{m}$						2 1 1 1														
	Details	No	L	B	H/D	Qty	Remarks														
	Foundation	1	43.5	0.6	0.6	15.66m^3															
	Basement	1	43.95	0.45	0.50	9.89 m^3															
					Total	25.55 m^3		3	8												
VI (b)	Details	No	L	B	H/D	Qty	Remarks														
	For roof slab	1	8.8	7.5	0.12	7.92															
	For lintel-LW	3	8.4	0.2	0.15	0.76	$8.2 + 0.2 = 8.4$														
	SW	3	3	0.2	0.15	0.27	$3.2 - 0.2 = 3$	5													
	SW	3	3.5	0.2	0.15	0.32	$3.7 - 0.2 = 3.5$														
					Total	9.27 m^3		2	7												
VII (a)	Length = 5m Width = 3m Height = 2m Base and wall thickness = 0.3m <u>Quantity of RCC work</u> Long wall = $2 \times 5.6 \times 0.2 \times 2 = 4.48 \text{ m}^3$ Short wall = $2 \times 3 \times 0.2 \times 2 = 2.4 \text{ m}^3$ Base slab = $1 \times 5.6 \times 3.6 \times 0.2 = 4.032 \text{ m}^3$ Total = 10.912 m^3 Therefore quantity of RCC for water tank = 10.912 m^3						1														
								5													
								1	7												
VII (b)	<table border="1"> <thead> <tr> <th>ITEM</th> <th>No</th> <th>L (m)</th> <th>B (m)</th> <th>H/D (m)</th> <th>QTY (m²)</th> </tr> </thead> <tbody> <tr> <td>12 mm cement plastering 1:6 inside and outside</td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						ITEM	No	L (m)	B (m)	H/D (m)	QTY (m ²)	12 mm cement plastering 1:6 inside and outside								
ITEM	No	L (m)	B (m)	H/D (m)	QTY (m ²)																
12 mm cement plastering 1:6 inside and outside																					

	<table border="1"> <thead> <tr> <th>walls</th> <th></th> <th></th> <th></th> <th></th> <th></th> </tr> </thead> <tbody> <tr> <td>Inside</td> <td>6</td> <td>3</td> <td>-</td> <td>3.5</td> <td>63</td> </tr> <tr> <td>Outside above plinth</td> <td>6</td> <td>3.46</td> <td>-</td> <td>3.5</td> <td>72.66</td> </tr> <tr> <td>Outside plinth level</td> <td>6</td> <td>3.52</td> <td>-</td> <td>0.7</td> <td>14.78</td> </tr> <tr> <td colspan="5" style="text-align: right;">Total</td> <td>150.44</td> </tr> <tr> <td>Deduct door opening</td> <td>1</td> <td>1.2</td> <td>-</td> <td>2.1</td> <td>1.52</td> </tr> <tr> <td>Deduct window</td> <td>5</td> <td>1.1</td> <td>-</td> <td>1.5</td> <td>8.25</td> </tr> <tr> <td colspan="5" style="text-align: right;">Total</td> <td>10.77</td> </tr> <tr> <td colspan="5" style="text-align: right;">Net Total</td> <td>1139.67 m²</td> </tr> </tbody> </table>	walls						Inside	6	3	-	3.5	63	Outside above plinth	6	3.46	-	3.5	72.66	Outside plinth level	6	3.52	-	0.7	14.78	Total					150.44	Deduct door opening	1	1.2	-	2.1	1.52	Deduct window	5	1.1	-	1.5	8.25	Total					10.77	Net Total					1139.67 m ²	4.5													
walls																																																																					
Inside	6	3	-	3.5	63																																																																
Outside above plinth	6	3.46	-	3.5	72.66																																																																
Outside plinth level	6	3.52	-	0.7	14.78																																																																
Total					150.44																																																																
Deduct door opening	1	1.2	-	2.1	1.52																																																																
Deduct window	5	1.1	-	1.5	8.25																																																																
Total					10.77																																																																
Net Total					1139.67 m ²																																																																
VIII a.	Quantity of cement concrete = 1 x 1000 x 3.70 x 0.08 = 296 cu. m Cost per km of road = 296 x 375 = Rs. 1,11,000	4																																																																			
VIII b.	Roof area = 6 x area of one outside triangle = 6 x (1/2 x 3.46 x 3.46 x (tan 60)/2) = 31.10 m ²	3	7																																																																		
	<table border="1"> <tbody> <tr> <td>RCC roof Slab</td> <td>Roof Area 31.10</td> <td>0.13</td> <td>4.043 m³</td> </tr> <tr> <td>Lime concrete in roof terracing</td> <td>Same as roof area</td> <td></td> <td>31.10 m³</td> </tr> </tbody> </table>	RCC roof Slab	Roof Area 31.10	0.13	4.043 m ³	Lime concrete in roof terracing	Same as roof area		31.10 m ³	4																																																											
RCC roof Slab	Roof Area 31.10	0.13	4.043 m ³																																																																		
Lime concrete in roof terracing	Same as roof area		31.10 m ³																																																																		
		4	8	15																																																																	
IX a	(i) Sometimes while preparing estimate for certain small items like front architectural or decoration work of a building it is not possible to work out detailed quantities. Such items are done on lump sum rate basis. (ii) <u>Rate at Source</u> : It is the basic rate per unit of the materials at the place of manufacture or production. <u>Rate at Site</u> : It is the rate at source plus the cost of conveyance charges of the materials from the source to the work site	3																																																																			
		3	6																																																																		
IX b	<table border="1"> <thead> <tr> <th>Description</th> <th>Qty</th> <th>Unit</th> <th>Rate</th> <th>Amount</th> </tr> </thead> <tbody> <tr> <td colspan="5"><u>Materials</u></td> </tr> <tr> <td>Bricks</td> <td>500</td> <td>No.s</td> <td>5500/1000</td> <td>2750.00</td> </tr> <tr> <td>Sand</td> <td>0.25</td> <td>m³</td> <td>1050</td> <td>262.50</td> </tr> <tr> <td>Cement</td> <td>58</td> <td>kg</td> <td>7000/1000</td> <td>406.00</td> </tr> <tr> <td colspan="5"><u>Labour</u></td> </tr> <tr> <td>Brick Mason</td> <td>0.7</td> <td>E</td> <td>650</td> <td>455.00</td> </tr> <tr> <td>Man</td> <td>0.35</td> <td>E</td> <td>450</td> <td>157.50</td> </tr> <tr> <td>Women</td> <td>0.7</td> <td>E</td> <td>375</td> <td>262.5</td> </tr> <tr> <td>Scaffolding- LS--</td> <td></td> <td></td> <td>25</td> <td>25.00</td> </tr> <tr> <td colspan="4" style="text-align: right;">Total</td> <td>4318.50</td> </tr> <tr> <td colspan="4" style="text-align: right;">Add 10% CP</td> <td>431.85</td> </tr> <tr> <td colspan="4" style="text-align: right;">Total</td> <td>Rs.4750/m³</td> </tr> </tbody> </table>	Description	Qty	Unit	Rate	Amount	<u>Materials</u>					Bricks	500	No.s	5500/1000	2750.00	Sand	0.25	m ³	1050	262.50	Cement	58	kg	7000/1000	406.00	<u>Labour</u>					Brick Mason	0.7	E	650	455.00	Man	0.35	E	450	157.50	Women	0.7	E	375	262.5	Scaffolding- LS--			25	25.00	Total				4318.50	Add 10% CP				431.85	Total				Rs.4750/m ³	9		15
Description	Qty	Unit	Rate	Amount																																																																	
<u>Materials</u>																																																																					
Bricks	500	No.s	5500/1000	2750.00																																																																	
Sand	0.25	m ³	1050	262.50																																																																	
Cement	58	kg	7000/1000	406.00																																																																	
<u>Labour</u>																																																																					
Brick Mason	0.7	E	650	455.00																																																																	
Man	0.35	E	450	157.50																																																																	
Women	0.7	E	375	262.5																																																																	
Scaffolding- LS--			25	25.00																																																																	
Total				4318.50																																																																	
Add 10% CP				431.85																																																																	
Total				Rs.4750/m ³																																																																	

X	Description	Qty	Unit	Rate	Rate per	Amount	Remarks		
	RCC 1:2:4 using 20 mm broken stone								
	<u>Materials</u>								
	Broken Stone	0.009	m ³	1200	m ³	10.8			
	Sand	0.0045	m ³	2100	m ³	9.45			
	Cement	3.3	kg	8250	t	27.23			
	<u>Labour</u>								
	Mason	0.002	No.s	850	Each	1.70			
	Man	0.01	No.s	500	Each	5.00			
	Woman	0.05	No.s	400	Each	20.00			
	<u>Conveyance</u>								
	Broken Sand	0.009	m ³	25	km/ m ³	4.5	20km		
	Sand	0.0045	m ³	20	km/ m ³	2.25	25km		
	Cement	3.3	kg	65	km/t	2.15	10km		
	Total					83.08			
	Contractor Profit = 10% = 8.31								
	Rate per unit of RCC = 83.08+8.31 = Rs.91.39								
								15	15

4013