

143

SCHEME OF VALUATION

April - 24
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(Scoring Indicators)

Revision: 15		Course code: 4013		
Course Title: Quantity Surveying I				
Qst No.	Scoring Indicator	Splitup score	Subtotal	Total
I.	<u>PART -A</u>			
1.	Lead is the Average straight horizontal distance through which the earth can be carried from the source to the place of deposit or filling.	2	2	2
2.	Sundries are miscellaneous small items or works that do not readily fit into standard categories.	2	2	2
3.	Earthwork in excavation, PCC 1:4:8 in foundation.	1+1	2	2
4.	Number or each, metres.	1+1	2	2
5.	An abstract estimate is prepared in order to enable the authority competent to give administrative approval to the expenditure of the nature, to form a reasonably accurate idea of the probable expenditure and such other data sufficient to enable that authority to gauge adequately the financial prospects of the proposal.	2	2	2
II.	<u>PART -B</u>			
1.	Contingencies refers to the incidental expenses of miscellaneous character which cannot be classified under any distinct item sub-head, yet pertain to the work as a whole. To meet such unforeseen expenses an additional amount of 3% to 5% of the estimated cost of the works is provided in the total estimate. Work charged Establishment charges includes charges incurred for temporary employment of the establishment/staff for execution or immediate technical supervision, guard etc in connection with the specific work. Employed on monthly basis /temporary basis for a limited period according to the progress of work. Every payment made to a member of the work charged establishment whether on account of his wages or actual travelling expenses is charged to the work estimate on which they are employed. For such work charged establishment an amount of 1.5% to 2% of the estimated cost of the works is provided in the estimate.	3+3	6	6
2.	Approximate Estimate: <ul style="list-style-type: none"> prepared after preliminary investigation of the construction site. without detailed surveying, design or drawings. prepared in a short period of time. Detailed Estimate: <ul style="list-style-type: none"> It is the complete and comprehensive estimate of a work, in which all items are individually quantified and the cost 	3	6	6
		3		

	<p>estimated.</p> <ul style="list-style-type: none"> based on the rates given in the Schedule of Rates for those items covered by it and on Market Rates for the remaining items, supported by detailed drawings and specifications. 			
3.	<p>This method identifies the walls of the building as Long Walls & Short Walls, such that:</p> <ul style="list-style-type: none"> Long Walls refer to all walls of that building in a single direction, and are predominantly longer; Short Walls refer to all other walls of that building, which are perpendicular to the direction of Long Walls. Long Walls are expressed in terms of its out-to-out length; Short Walls are expressed in terms of its in-to-in length. 	6	6	6
4.	<p>Plain, Reinforced and Prestressed concrete works shall each be measured separately. Quantity: Generally, measured in Volume (m³) Measurement:</p> <ul style="list-style-type: none"> Dimensions shall be measured to nearest 0.01m, except for the thickness of slab which shall be measured to nearest 0.005 m. Volumes shall be worked out to the nearest 0.01m³. <p>Exemptions: No deduction shall be made for the following cases:</p> <ul style="list-style-type: none"> for openings $\leq 0.1m^2$. for the volume occupied by the steel reinforcements. for volume occupied by pipes, conduits, etc 	6	6	6
5.	<ul style="list-style-type: none"> Deductions in measurement for Wall Openings: <ul style="list-style-type: none"> For openings of area $\leq 0.5m^2$: <ul style="list-style-type: none"> (i) No deductions shall be made. (ii) No additions shall be made for jambs/soffit/sill of that opening. For openings of area $> 0.5m^2$ and $\leq 3m^2$: <p>Subcase 1: If both faces of walls are provided with same finish,</p> <ul style="list-style-type: none"> (i) deductions shall be made for one face only. (ii) No additions shall be made for jambs/soffit/sill of that opening. <p>Subcase 2: If two faces of wall are provided with different types of finish,</p> <ul style="list-style-type: none"> (i) deduction shall be made only from the finish on that side of wall on which width of reveal is less than that on the other side, (ii) no deduction shall be made on the other side with greater width of reveal. (iii) If widths of reveals on both faces of wall are equal, deduction of 50 % of area of opening shall be made on each face of wall. (iv) No additions shall be made for jambs/soffit/sill of that opening. For openings of area $> 3m^2$: <ul style="list-style-type: none"> (i) deduction shall be made for opening on each face (ii) Addition of area of jambs, soffits and sills shall be made. Note that, deduction shall not be made for the area of jambs/soffit/sill in contact with the frames of doors, windows etc. 	6	6	6

6.	<p>Analysis of Rates:</p> <ul style="list-style-type: none"> • forms the basis for arriving at a correct rate per unit quantity of an item of work listed in the SOR. • Delhi Analysis of Rates (DAR) incorporates all the analysis of items of Delhi Schedule of Rates (DSR). • It explains how the rate of an item is worked out. The rate of an item includes: <ul style="list-style-type: none"> i. Cost of Materials ii. Cost of Conveyance of Materials to worksite iii. Cost of Labour iv. Cost of Tools/Equipments/Machinery v. Cost of Sundries (i.e., various items not important enough to be mentioned individually) vi. Miscellaneous Levies (or Add-on Costs) <p>The sum of costs from (i) to (v) is known as Bare Rate.</p>	6	6	6
7.	<p>Schedule of Rates (SOR):</p> <ul style="list-style-type: none"> • contains list of rates of various items of work. • Central Public Works Department (CPWD) publishes Schedule of Rates known as Delhi Schedule of Rates (DSR). • DSR is based on the prevailing market rates of materials in Delhi as on a specific date. • The labour rates adopted are as per minimum wages applicable with effect from a date notified by Govt. of Delhi/ Govt. of India, whichever is higher. • The technical sanctioning authority may decide rates of non-schedule items judiciously based on market rates without adding cost index. 	6	6	6
	<p><u>PART C</u></p>			
III. (a)	<p>Plinth area method</p> <ul style="list-style-type: none"> • Estimated Cost of building = Total Plinth Area of the building x Plinth Area Rate • Plinth Area is the builtup covered area, measured at the floor level of any storey of the building . • Total Plinth Area is sum of Plinth area at all floors of the building.(As per IS 3861) <p>Service unit method or Unit Rate Method</p> <ul style="list-style-type: none"> • A Service Unit refers to the most important unit in a structure or a unit quantity. • A structure shall comprise a number of service units. • Estimated Cost of the building = Cost of a service unit x Number of service units in the building • Cost of a service unit may be worked out independently or from a similar structure in the locality. 	3.5+3.5	7 8	7 7

(b)	<p>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, $V = \frac{10}{2} [1400 + 9900) + 2(2300 + 3800 + 4900 + 6400 + 8700)]$ $= 317500 \text{ m}^3$ Therefore, Capacity of reservoir $= 317500 \text{ m}^3$</p>	8		8
IV (a)	<p>Supplementary Estimate</p> <ul style="list-style-type: none"> It is an original estimate for the additional works consequent on the development or extension of a project or work under execution. Administrative approval shall therefore be obtained for the supplementary estimate from the same authority, which sanctioned the original estimate, even if the cost can be met from savings in the original estimate <p>Revised Estimate: used under following circumstances</p> <ul style="list-style-type: none"> When there are deletions, additions or alterations to the scope of the work as originally sanctioned needing revised administrative sanction. When there are major structural alterations from the design as originally sanctioned. When the cost of a work is likely to exceed by more than 5% of T/S amount. The revised estimate shall not be kept waiting till the work is completed or reaches an advanced stage of completion; but shall be prepared and got sanctioned as soon as any of the above conditions are anticipated during the course of execution of work. 	3.5+3.5	7	7
(b)	<p>● Mid-section Formula: based on mean depth of the segment, determined by averaging the depth of preceding and succeeding sections of that segment.</p> <ul style="list-style-type: none"> Mean depth of 1st segment $= d_{m1} = \frac{d_1 + d_2}{2}$ \Rightarrow Volume of 1st segment $= V_1 = L(Bd_{m1} + Nd_{m1}^2)$ Mean depth of 2nd segment $= d_{m2} = \frac{d_2 + d_3}{2}$ \Rightarrow Volume of 2nd segment $= V_2 = L(Bd_{m2} + Nd_{m2}^2)$ can be determined upto k^{th} segment. Volume of earthwork $V = V_1 + V_2 + V_3 + \dots + V_k$ 	8	8	8

② **Average End-Area Formula (Trapezoidal Formula):** based on mean area of the segment, determined by averaging the area of preceding and succeeding sections of that segment.

• Mean area of 1st segment = $A_{m1} = \frac{A_1 + A_2}{2}$

• If there are 'k' segments, the above equation may be simplified to obtain:

$$V = \frac{L}{2}(A_1 + A_{k+1} + 2(A_2 + A_3 + \dots + A_k))$$

③ **Prismoidal Formula:**

• This is applicable only in cases of **odd number of sections** or **even number of segments**.

• In case of even number of sections, the end segment shall be treated separately.

• According to this, if there are 'k' segments, volume of earthwork:

$$V = \frac{L}{3}(A_1 + A_{k+1} + 4(A_2 + A_4 + \dots + A_k) + 2(A_3 + A_5 + \dots + A_{k-1}))$$

V.

(a) Total c/c length = 45.30m
 No of T junctions = 6
 Corrected c/c length = 45.3 - 6 x 0.9/2 = 42.60m

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(b) Centreline length of the given building = 45.3m
 Net length for basement = 45.3 - 6x0.45/2 = 43.95 m

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Quantity of RR masonry in foundation = 43.95 x 0.45 x 0.5 = 9.89m³

VI.
(a)

Details	No	L	B	H/D	Qty
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

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Total = 0.54m³

(b)

Details	No	L	B	H/D	Qty
For roof slab	1	8.8	7.5	0.12	7.92 m ³

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VII. (a)	<p>Plastering: Quantity: Generally measured in Area (m²) Measurement: Length and breadth shall be measured correct to 0.01m. Area shall be calculated correct to 0.01m². Plastering on roofs, ceilings and walls shall be measured separately. Wall plaster is computed as: Quantity = Length of Wall surface x Height of Wall surface. Length is measured between the walls or partitions (the dimensions before the plaster shall be taken). Height is measured between top of floor surface/skirting to the ceiling.</p>	7	7	7
(b)	<p>Quantity of cement concrete = $1 \times 1000 \times 3.70 \times 0.08 = 296 \text{ cu. m}$ Cost per km of road = $296 \times 375 = \text{Rs. } 1,11,000$</p>	8	8	8
VIII. (a)	<p>The given tank is decomposed into several components such as Base bed of PCC, Bottom RCC slab, RCC side walls, RCC haunch (triangular section at the interface of side wall and bottom slab), RCC top cover slab.</p> <p>From the given dimensions, the volume of concrete in each of these components is computed using formulas of mensuration.</p> <p>It is to be noted that no deduction shall be made for the following cases:</p> <ul style="list-style-type: none"> • for openings $\leq 0.1\text{m}^2$. • for the volume occupied by the steel reinforcements. • for volume occupied by pipes, conduits, etc of cross-sectional area $\leq 25\text{cm}^2$ for RCC. 	7	7	7
(b)	<p>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</p>	8	8	8

IX.

Sl. No.	Description	Quantity	Unit	Rate	per unit	Amount
Materials:						
1	Broken stone	0.01	m3	1200	per m3	12
2	Sand	0.004	m3	2100	per m3	8.4
3	Cement	0.0034	ton	8250	per ton	28.05
Labour:						
4	Mason	0.005	each	850	per each	4.25
5	Man	0.02	each	500	per each	10
6	Woman	0.02	each	400	per each	8
Hire Charges:						
7	Broken stone	20	km	25	per km/m3	5
8	Sand	25	km	20	per km/m3	2
9	Cement	10	km	65	per km/ton	2.21
Total						79.91
1% water charge						0.7991
Total						80.7091
15% CPOH						12.106365
Total Rate per unit Quantity =						92.82

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X.

Sl. No.	Description	Quantity	Unit	Rate	per unit	Amount
Materials:						
1	Stone Aggregate	0.84	m3	1400	per m3	1176
2	Sand	0.42	m3	1500	per m3	630
3	Cement	0.38	tons	5000	per ton	1900
Labour:						
4	Mason	0.12	each	750	per each	90
5	Beldar	1.5	each	650	per each	975
6	Bhisti	0.65	each	720	per each	468
Hire Charges:						
7	Concrete Mixer	0.06	days	800	per day	48
8	Needle vibrator	0.06	days	350	per day	21
Total						5308
1% water charge						53.08
Total						5361.08
15% CPOH						804.162
Total Rate per unit Quantity =						6165.24

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