

Qst. No.	Scoring indicator	Split up score	Sub Total	Total																																			
I	<u>Part A</u>																																						
1.	i) Gable Roof ii) Hip Roof.	1 1	2																																				
2.	0.6 x eave span	2																																					
3.	Retaining walls are designed to restrain soil at an angle steeper than the materials' angle of repose.	2																																					
4.	Total length of bar = $l + 18\phi$	2																																					
5.	Valuation is the technique of estimating or determining the fair price or value of a property such as a building, factory, land etc.	2		10																																			
II	<u>Part B</u>																																						
1.	<table border="1"> <thead> <tr> <th>Description</th> <th>No</th> <th>L</th> <th>B</th> <th>H</th> <th>Qty</th> <th>Remarks</th> </tr> </thead> <tbody> <tr> <td>Earthwork excavation Sephic Tank</td> <td>1</td> <td>2.8</td> <td>1.7</td> <td>1.95</td> <td>9.28</td> <td><math>1.95 = 1.4 + 0.3 + 0.2 + 0.05</math></td> </tr> <tr> <td>Soak pit upto 3m depth</td> <td>1</td> <td><math>\frac{\pi \times 2^2}{4}</math></td> <td>-</td> <td>3</td> <td>9.42</td> <td></td> </tr> <tr> <td>Soak pit lower portion</td> <td>1</td> <td><math>\frac{\pi \times 1.4^2}{4}</math></td> <td>-</td> <td>0.2</td> <td>0.30</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>Total</td> <td>19 m<sup>3</sup></td> <td></td> </tr> </tbody> </table>	Description	No	L	B	H	Qty	Remarks	Earthwork excavation Sephic Tank	1	2.8	1.7	1.95	9.28	$1.95 = 1.4 + 0.3 + 0.2 + 0.05$	Soak pit upto 3m depth	1	$\frac{\pi \times 2^2}{4}$	-	3	9.42		Soak pit lower portion	1	$\frac{\pi \times 1.4^2}{4}$	-	0.2	0.30						Total	19 m <sup>3</sup>		2 2 2		6
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Qst. No.	Scoring indicator							Split up score	Sub Total	Total
3.	Description	No	L	B	H	Qty	Remarks			
	RCC work 1:2:4 excluding steel & its bending.									
	Base slab (Toe & Heel)	1	30	3	0.5	45		3		
	Stem	1	30	$\frac{0.6+0.2}{2}$	6	72		3		6
						Total = 117 m <sup>3</sup>				
	Description	No	L	B	H	Qty	Remarks			
4.	RCC Work 1:2:4 excluding steel and its bending	1	8.6	0.4	0.75	2.58 Cum.		6		6
5.	<p><u>Pointing</u>: The joints of the brickwork shall be raked out to a depth of 20mm and the surface of the wall washed and cleaned and kept for two days before pointing.</p> <ul style="list-style-type: none"> <li>- The materials of mortar are cement, sand or lime as specified. The materials shall be first dry mixed to have required proportion (1:2 or 1:3) and then mixed by adding water.</li> <li>- Mortar shall then be applied in the joints slightly in excess &amp; pressed by a proper tool of the required shape.</li> <li>- Flush pointing</li> <li>- Ruled pointing</li> <li>- Weather or Guck pointing</li> <li>- Raised Pointing.</li> </ul>									
								6		6

Qst. No.	Scoring indicator	Split up score	Sub Total	Total
6.	<p>a) Annuity : It is the annual periodic payments for repayments of the capital amount invested by a party. These annual payments are either paid at the end of the year or at the beginning of the year, usually for a specified no. of years.</p> <p>b) Obsolescence : The value of property or structure become less due to changes in style, design etc and this is termed as obsolescence.</p> <p>c) Years' purchase : It is defined as the capital sum required to be invested in order to receive an annuity of Rs. 1 at certain rate of interest.</p> $\text{Year's purchase} = \frac{100}{\text{Rate of Interest}}$	2  2  2		6
7.	<p><u>Purposes of Valuation :</u></p> <p>a) Buying or selling property.</p> <p>b) Taxation</p> <p>c) Rent Fixation</p> <p>d) Security of Loans</p> <p>e) Compulsory Acquisition</p> <p>f) Insurance, betterment charges</p> <p>g) Speculations etc.</p> <p>- Any six points - 1 mark each</p>			6

Qst. No.	Scoring indicator							Split up score	Sub Total	Total																
<u>III</u>	<u>Part C</u>																									
Inside dimension = $9.9 \times 5.4$ m																										
outside dimension = $10.3 \times 5.8$ m																										
c/c dimension of wall plate = $10.18 \times 5.68$																										
a) Total centreline perimeter = $31.72$ m.																										
<table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th data-bbox="236 685 427 730">Item of work</th> <th data-bbox="427 685 475 730">No</th> <th data-bbox="475 685 555 730">L</th> <th data-bbox="555 685 603 730">B</th> <th data-bbox="603 685 683 730">H/D</th> <th data-bbox="683 685 762 730">Qty</th> <th data-bbox="762 685 874 730">Unit</th> <th data-bbox="874 685 1198 730">Remarks</th> </tr> </thead> <tbody> <tr> <td data-bbox="236 730 427 775">Wall Plate</td> <td data-bbox="427 730 475 775">1</td> <td data-bbox="475 730 555 775">31.72</td> <td data-bbox="555 730 603 775">0.12</td> <td data-bbox="603 730 683 775">0.15</td> <td data-bbox="683 730 762 775">0.571</td> <td data-bbox="762 730 874 775">m<sup>3</sup></td> <td data-bbox="874 730 1198 775">Size of wall plate is 120 x 150 mm.</td> </tr> </tbody> </table>											Item of work	No	L	B	H/D	Qty	Unit	Remarks	Wall Plate	1	31.72	0.12	0.15	0.571	m <sup>3</sup>	Size of wall plate is 120 x 150 mm.
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Wall Plate	1	31.72	0.12	0.15	0.571	m <sup>3</sup>	Size of wall plate is 120 x 150 mm.																			
5																										
b) Eave to eave length = $9.9 + 2 \times 0.2 + 2 \times 0.6 = 11.5$ m																										
Eave to eave span = $5.4 + 2 \times 0.2 + 2 \times 0.6 = 7$ m																										
Length of ridge piece = $11.5 - 2 \times 3.5 = 4.5$ m																										
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Ridge piece	1	4.5	0.12	0.15	0.081	m <sup>3</sup>	size of ridge piece is 120 x 150 mm.																			
5																										
c) No. of Common rafters on one side = $\frac{4.5}{0.5} + 1 = 10$																										
on both sides = $2 \times 10 = 20$																										
on hip sides = $1 + 1 = 2$																										
Total no. of common rafters = 22 Nos.																										
Length of C.R = $\sqrt{\left(\frac{\text{span}}{2}\right)^2 + \text{Rise}^2}$																										
= $\sqrt{3.5^2 + (7/3)^2} = 4.2$ m																										
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15																										

Qst. No.	Scoring indicator							Split up score	Sub Total	Total
IV	Description of item	No	L (m)	B (m)	H/D (m)	Qty	Remarks	8	15	
	a) First class brickwork in 1:4 CM in S-tank.									
	<u>Long walls</u>									
	1st step	2	2.6	0.3	0.6	0.94				
	2nd step	2	2.4	0.2	1.15	1.10				
	<u>Short walls</u>									
	1st step	2	0.9	0.3	0.6	0.32				
	2nd step	2	0.9	0.2	1.15	0.42				
					Total	2.78 m <sup>3</sup>				
	b) Second class brickwork in 1:6 CM in soak pit									
	Upper portion	1	$(\pi \times 1.20) \times 0.20$		0.50	0.38				
	Lower portion	1	$(\pi \times 1.20) \times 0.20$		0.20	0.15				
					Total	0.53 m <sup>3</sup>				
	c) Precast RC Work:									
	Roof cover slab of S-tank	1	2.40	1.30	0.075	0.234				
Roof cover slab of soak pit	1	$\frac{\pi \times 1.4^2}{4}$		0.075	0.115					
Baffle wall in S-tank	1	1.00	0.04	0.45	0.08					
				Total	0.367 m <sup>3</sup>					
V	Description	No	L (m)	B (m)	H (m)	Qty	Remarks	4	15	
	a) Earthwork excavation									
	Abutments	2	5.1	0.7	0.6	4.28				
	Wing Walls	4	1.20	0.7	0.6	2.02				
					Total	6.30 m <sup>3</sup>				
	b) RCC Work 1:2:4 in slab	1	4.8	2.1	0.20	2.016 m <sup>3</sup>				
	c) First class brickwork in 1:4 CM.									
	Abutments	2	4.8	0.4	1.5	5.76				
	Wing Walls	4	1.20	0.4	1.5	2.88				
	Parapets upto kerb	2	4.7	0.4	0.3	1.13				
	Parapets above kerb	2	4.7	0.3	0.5	1.41				
	Parapets coping	2	4.9	0.4	0.1	0.39				
	Deduct: bearing of RCC slab in abutment	2	4.8	0.3	0.2	0.57				
						11.00 m <sup>3</sup>				

Qst. No.	Scoring indicator	Split up score	Sub Total	Total	
<u>VI</u>	<p><u>Description</u></p> <p>a) <u>Stem Right Side</u></p> <p><u>22mm dia bars</u></p> <p>22mm dia main bars @ 40cm c/c (full height)</p> <p>No = <math>\frac{30\text{cm} - \text{cover}}{0.40} + 1</math></p> <p><math>= \frac{29.90}{0.40} + 1 = 76 \text{ Nos}</math></p> <p>22mm dia main bars upto 3.60m ht @ 40cm c/c</p> <p>No = <math>\frac{29.90 - 2 \times 0.2}{0.40} + 1</math></p> <p><math>= 75 \text{ Nos}</math></p> <p>22mm dia main bars upto 1.80m ht @ 20cm c/c</p> <p>No = <math>\frac{29.90 - 2 \times 0.1}{0.20} + 1 = 150</math></p> <p>Total of 22mm <math>\phi</math> bars = 1456.53m</p> <p>@ 2.98 kg = 4340.46 kg.</p> <p><u>14mm dia bars</u></p> <p>14mm dia distributing bars right side of stem @ 25cm c/c</p> <p>No = <math>\frac{6.5 - 0.05 - 0.07}{0.25} + 1</math></p> <p><math>= 27 \text{ Nos}</math></p> <p>14mm dia vert bars left side of stem @ 30cm c/c</p> <p>No = <math>\frac{30 - 0.1}{30} + 1 = 101 \text{ Nos}</math></p> <p>Total of 14mm dia bars = 1520.67m</p> <p>@ 1.21 kg = 1840 kg.</p> <p><u>10mm dia bars</u></p> <p>10mm dia distributing bars left side of stem @ 30cm c/c</p> <p>No = <math>\frac{6.5 - 0.05 - 0.07}{0.30} + 1</math></p> <p><math>= 22 \text{ Nos}</math></p>				
	<p>No.</p> <p>L</p> <p>Qty</p> <p><math>L = 6.5 - 0.05 - 0.07 + (18 \times 0.022) + 0.75</math></p> <p><math>572.28\text{m} = 7.53\text{m}</math></p> <p><math>L = 7.53 - 2.40</math></p> <p><math>384.75\text{m} = 5.13\text{m}</math></p> <p><math>L = 7.53 - 4.20</math></p> <p><math>499.50\text{m} = 3.33\text{m}</math></p> <p><math>L = 30 - 0.1 + (2 \times 40 \times 0.014) + (6 \times 9 \times 0.014)</math></p> <p><math>= 31.52\text{m}</math></p> <p>(Assuming two joints)</p> <p><math>L = 6.5 - (0.05 + 0.07) + (18 \times 0.014)</math></p> <p><math>= 6.63\text{m}</math></p> <p><math>L = 30 - 0.1 + (2 \times 40 \times 0.01) + (6 \times 9 \times 0.01) = 31.06\text{m}</math></p> <p>(Assuming 2 joints)</p>				
				9	

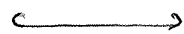



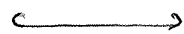



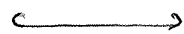



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<u>VII</u>	<p>a) <u>Reinforced Cement Concrete</u></p> <ul style="list-style-type: none"> <li>- Steel : Mild steel / deformed steel</li> <li>- Centering &amp; shuttering</li> <li>- Proportion : 1:2:4 for slabs, beams etc &amp; 1:1.5:3 for columns unless otherwise specified.</li> <li>- Materials : Cement, sand &amp; coarse aggregates.</li> <li>- Mixing, Laying</li> <li>- Curing &amp; finishing</li> </ul> <p>— Explanation of above points.</p>	8																																		

Qst. No.	Scoring indicator	Split up score	Sub Total	Total
	b) <u>Earthwork excavation in foundation</u> - Excavation - Finish of trench - Finds - Water in foundation - Trench filling - Measurement  - Explanation of above points.	7		15

VIII	Description	No	L	B	H	Qty	Remarks
	Main bars 22mm dia straight bars @ 2.98 kg/m	4	8.92	35.68	2.98	106.33 kg	$L = 8.6 - (2 \times 0.04)$ $+ (18 \times 0.022)$ $= 8.92 \text{ m}$
	20mm dia bent up bars @ 2.47 kg/m	4	9.48	37.92	2.47	93.66	$L = 8.6 - 8 \text{ cm}$ $+ (18 \times 20 \text{ mm}) + 60 \text{ cm}$ $= 9.48 \text{ m}$
	12mm dia top bars @ 0.89 kg/m	2	8.74	17.48	0.89	15.56	$L = 8.6 - 8 \text{ cm}$ $+ (18 \times 12 \text{ mm})$ $= 8.74 \text{ m}$
	Stirrups, 10mm dia bars @ 0.62 kg/m						
	At end 12cm c/c	5x2	2.42				
	Next at 20cm c/c	4x2	2.42				
	Total	18	2.42			40.32	$40.32 \times 0.62 = 27.01 \text{ kg}$
	Stirrups 6mm dia @ 0.22 kg/m, At Central remaining length of 5.2m at 35 cm c/c	14	2.42				
	Total	14	2.42			33.88	$33.88 \times 0.22 = 7.45 \text{ kg}$

10



Qst. No.	Scoring indicator	Split up score	Sub Total	Total																																										
	<u>Schedule of bars</u>																																													
	<table border="1"> <thead> <tr> <th>Description</th> <th>Shape of bending</th> <th>Length (m)</th> <th>No</th> <th>Total Length</th> <th>Weight (Kg)</th> </tr> </thead> <tbody> <tr> <td>Main st. bars 22mm dia</td> <td></td> <td>8.92</td> <td>4</td> <td>35.68</td> <td>106.33</td> </tr> <tr> <td>Main bent up bars 20mm dia</td> <td></td> <td>9.48</td> <td>2</td> <td>18.96</td> <td>46.83</td> </tr> <tr> <td>Main bent up bars 20mm dia</td> <td></td> <td>9.48</td> <td>2</td> <td>18.96</td> <td>46.83</td> </tr> <tr> <td>Top st. bars 20mm φ</td> <td></td> <td>8.74</td> <td>2</td> <td>17.48</td> <td>15.56</td> </tr> <tr> <td>Stirrups 10mm φ</td> <td></td> <td>2.24</td> <td>18</td> <td>40.32</td> <td>25</td> </tr> <tr> <td>Stirrups 6mm φ</td> <td></td> <td>14</td> <td>31.36</td> <td>6.90</td> <td></td> </tr> </tbody> </table>	Description	Shape of bending	Length (m)	No	Total Length	Weight (Kg)	Main st. bars 22mm dia		8.92	4	35.68	106.33	Main bent up bars 20mm dia		9.48	2	18.96	46.83	Main bent up bars 20mm dia		9.48	2	18.96	46.83	Top st. bars 20mm φ		8.74	2	17.48	15.56	Stirrups 10mm φ		2.24	18	40.32	25	Stirrups 6mm φ		14	31.36	6.90		5		15
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<u>IX</u>	<p>a) Sinking Fund : The fund which is gradually accumulated by way of periodic annual deposit for the replacement of the building or structure at the end of its useful life, is termed as Sinking fund.</p>	2																																												
	$I = \frac{Si}{(1+i)^n - 1}$ <p>where</p>																																													
	<p>S = total amount of Sinking fund to be accumulated</p>																																													
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	<p>i = rate of interest</p>		4																																											
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	<p>b) Depreciation : It is the gradual exhaustion of the usefulness of a property. This may be defined as the decrease or loss in the value of property due to structural deterioration, use, life, wear and tear etc.</p>	2																																												
	<p>- Different methods to calculate depreciation</p>																																													

Qst. No.	Scoring indicator	Split up score	Sub Total	Total
	<p>include:</p> <ul style="list-style-type: none"> <li>i) Straight line method</li> <li>ii) Constant Percentage method</li> <li>iii) Sinking fund method</li> <li>iv) Quantity Survey method.</li> </ul> <p>c) i) <u>Rental Methods of valuation</u>: - In this method, net income by way of rent is found out by deducting all outgoings from gross rent. Net income multiplied by Year's purchase gives the capitalized value or valuation</p> <p>ii) <u>Valuation based on profit</u>:  - This method is suitable for buildings like hotels, cinemas, theatres etc for which the capitalized value depends on the profit.  - or explanation of any other methods.</p>	2	4	
<u>X</u>	<p>a) i) <u>Scrap value</u>: When the life of the building is over, after its utility period, the dismantled material such as bricks, timber, steel etc will fetch certain amount which is called as the scrap value.  - usually 10% of cost of construction.</p> <p>ii) <u>Salvage value</u>: Estimated value of the property, at the end of its life period without being dismantled.</p>	2	7	15

Qst. No.	Scoring indicator	Split up score	Sub Total	Total
	<p>iii) <u>Book value</u> : Value of property shown in the account books in that particular year. Book value is the original cost minus depreciation till that year.</p> <p>iv) <u>Market Value</u> : The local prevailing rate of property at a particular time is called Market Value of that property whenever put for sale.</p> <p>v) <u>Annuity</u> : Annuity is the net installment of annual or periodical payment of the capital amount invested in a property for a specific period. It is paid either at the beginning or at the end of each installment.</p>	2		
	<p>b) Coefficient of Sinking fund, <math>y_c = \frac{i}{(1+i)^n - 1} = \frac{0.06}{(1+0.06)^{25} - 1}</math></p> <p style="text-align: center;"><math>= 0.01823</math></p>	2.5	10	
	<p>Yearly installment of Sinking fund, <math>y = F \times y_c</math></p> <p style="text-align: center;"><math>= 75000 \times 0.01823</math></p> <p style="text-align: center;"><math>= \underline{\underline{1367}}/-</math></p>	2.5	5	15