

DIPLOMA EXAMINATION IN ENGINEERING/TECHNOLOGY/
MANAGEMENT/COMMERCIAL PRACTICE — APRIL, 2018

QUANTITY SURVEYING - II

[Time : 3 hours

(Maximum marks : 100)

- [Note :—1. Missing data if any suitably assumed.
2. Steel table is permitted.
3. Quantities are to be worked out in standard form.
4. Sketches accompanied.]

PART — A

(Maximum marks : 10)

Marks

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

1. Calculate the length of ridge in terms of eave length and eave span of a hipped roof, when the rise is $\frac{1}{3}$ span.
2. Differentiate between abutment and wing wall of a culvert.
3. Mention bar bending schedule of reinforcement.
4. State the different types of specification.
5. Define valuation.

(5 × 2 = 10)

PART — B

(Maximum marks : 30)

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

1. Calculate the quantity of wood work for common rafter for the figure-I. Assume the size of common rafter is 50 × 125 mm, spacing between common rafter is 480 mm.
2. Determine the total plastering area of walls in figure - I of building.
3. Compute the quantity of first class brick work in cut water end of a bridge pier shown in figure - II.
4. The plan and section of column footing is shown in figure - III. Calculate the quantity of cement concrete of nominal mix 1:4:8 for base and RCC work with nominal mix of 1:2:4 in footing excluding steel.

5. Write the detailed specification of plastering.
6. State the factors governing valuation.
7. An employee purchased an old building for ₹ 4,20,000 excluding the cost of land. Calculate the annual sinking fund at 5% of interest. Assuming the future life of the building as 15 years and scrapvalue of the building as 10% of cost of purchase. (5×6 = 30)

PART — C

(Maximum marks : 60)

(Answer *one* full question from each unit. Each full question carries 15 marks.)

UNIT — I

- III (a) Calculate the quantity of hip rafter and first collar for the figure - I. The rise is $\frac{1}{3}$ span. Assume the size of hip rafter and collar as 50×125 mm. The spacing between common rafter is 480 mm. 7
- (b) Calculate the quantity of brick work in CM 1:5 for figure - I of building. 8

OR

- IV (a) Compute the quantity of brick work in cement mortar 1:6 and dry brick work from given figure - IV in soak pit of septic tank. 7
- (b) Calculate the quantity of the following items for the given steel roof truss shown in figure- V. 8
- (i) Principal rafter.
 - (ii) Tie 50×8 mm Flat beam 3.3m long.
 - (iii) Gusset plate.

UNIT — II

- V Determine the quantities of the following items from the figure - II of bridge pier. 15
- (i) Earthwork excavation.
 - (ii) Cement concrete with a nominal mix of 1:4:8.
 - (iii) Brick work in cement mortar 1:5 from footing to springing level of pier.

OR

- VI Compute the quantity of the following items from the figure-VI of RCC retaining wall. 15
- (i) RCC work with nominal mix of 1:2:4 for stem and base slab.
 - (ii) Steel bars in reinforcement for stem.

UNIT — III

- VII Cross section of the RCC roof slab of 3 m clear span and 6 m long shown in figure- VII. Prepare a detailed estimate and bar bending schedule. 15

OR

VIII Write the detailed specification for the following items.

- | | |
|----------------------------|---|
| (a) Damp proof course. | 7 |
| (b) Earth work excavation. | 8 |

UNIT — IV

- | | |
|---|--------------------|
| IX (a) List the different methods of valuation. | 7 |
| (b) Discuss the following. | |
| (i) Scrapvalue | (ii) Salvage value |
| (iii) Book value | (iv) Out goings |
| | 8 |

OR

- | | |
|--|---|
| X (a) List the methods of calculating depreciation. | 7 |
| (b) A building situated by the side of a main road of land 600 m ² . The built up area is 300 m ² . The building is first class type provided with all facility like water supply, sanitary and electrification. The rate of depreciation as 1%, the age of the building is 25 years. Assume the plinth area rate is ₹ 2500/ m ² . The cost of land is ₹ 1000/m ² . Calculate the present value of the property. | 8 |

Scoring Indicators

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Qn:No	Scoring Indicators	Split score	Total score
I	<p style="text-align: center;">Quantity Surveying - II.</p> <p>PART A</p> <ol style="list-style-type: none"> 1. The ridge length = eave length - eave span. 2. Abutment :- It is a masonry or RCC wall, which forms the end support of culvert, bridge or similar structure. Wing wall :- It is masonry or RCC wall which sustains the horizontal pressure of the embankment of approaches wing walls remain attached to the abutment. 3. It is the list of reinforcement in a tabular form giving the particulars of bars, shape of bending, with sketch, length of each, total length and total weight. 4. Brief or general specifications :- It gives the nature and class of work and also materials in general terms. Detailed specifications :- It is in terms of work is a detailed description of the work and detailed description of requirements. 5. Valuation is the technique of determining the fair price or value of a property. <p>PART B.</p> <ol style="list-style-type: none"> 1. Eave length = $0.6 + 0.2 + 6.2 + 0.2 + 3 + 0.2 + 1.6 = 11m$ Eave span = $0.6 + 0.2 + 3 + 0.2 + 3 + 0.2 + 0.6 = 7.8m$ 	<p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	<p>10</p>

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	<p>length of ridge = $11 - 7.8 = 3.2\text{m}$.</p> <p>Length of CR = $0.6 \times 7.8 = 4.68\text{m}$.</p> <p>No of CR = $\frac{3.2}{0.48} + 1 = 7.67$ say 8 Nos.</p>																																																																																																																		
	<table border="1"> <thead> <tr> <th>Description</th> <th>N</th> <th>L</th> <th>B</th> <th>H</th> <th>Qty</th> <th>T Qty</th> </tr> </thead> <tbody> <tr> <td>Comm reflect</td> <td>16</td> <td>4.68</td> <td>0.05</td> <td>.125</td> <td><u>0.468</u></td> <td>³m</td> </tr> <tr> <td>2. Plastering (inside) Hall</td> <td>1</td> <td>18.4</td> <td></td> <td></td> <td>3</td> <td>55.2</td> </tr> <tr> <td>Beds, & kitchen</td> <td>3</td> <td>12</td> <td></td> <td></td> <td>3</td> <td>108.0</td> </tr> <tr> <td>Work area</td> <td>1</td> <td>9</td> <td></td> <td></td> <td>3</td> <td>27</td> </tr> <tr> <td>Bath</td> <td>1</td> <td>8.8</td> <td></td> <td></td> <td>3</td> <td><u>26.4</u></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>216.6 m²</td> </tr> <tr> <td>Outside plastering</td> <td>1</td> <td>32.8</td> <td></td> <td></td> <td>3</td> <td>98.4</td> </tr> <tr> <td>Deductions</td> <td>1</td> <td>1</td> <td></td> <td></td> <td>2.1</td> <td>2.1</td> </tr> <tr> <td> D Door</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td> D₁ "</td> <td>5</td> <td>0.9</td> <td></td> <td></td> <td>2.1</td> <td>9.45</td> </tr> <tr> <td> D₂</td> <td>1</td> <td>0.8</td> <td></td> <td></td> <td>2.1</td> <td>1.68</td> </tr> <tr> <td>Window W</td> <td>6</td> <td>1.5</td> <td></td> <td></td> <td>1.5</td> <td>13.5</td> </tr> <tr> <td> W₁</td> <td>1</td> <td>1.5</td> <td></td> <td></td> <td>1.3</td> <td>1.95</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td><u>28.68</u></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td>Total less deductions = $98.4 - 28.68 + 216.6 = \underline{286.32}$ m²</td> </tr> </tbody> </table>	Description	N	L	B	H	Qty	T Qty	Comm reflect	16	4.68	0.05	.125	<u>0.468</u>	³ m	2. Plastering (inside) Hall	1	18.4			3	55.2	Beds, & kitchen	3	12			3	108.0	Work area	1	9			3	27	Bath	1	8.8			3	<u>26.4</u>							216.6 m ²	Outside plastering	1	32.8			3	98.4	Deductions	1	1			2.1	2.1	D Door							D ₁ "	5	0.9			2.1	9.45	D ₂	1	0.8			2.1	1.68	Window W	6	1.5			1.5	13.5	W ₁	1	1.5			1.3	1.95							<u>28.68</u>							Total less deductions = $98.4 - 28.68 + 216.6 = \underline{286.32}$ m ²	3	6
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Scoring Indicators

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Qn:No	Scoring Indicators							Split score	Total score
3.	Description	N	L	B	H	Qty	Qty		
	cut wall end of bridge pier.								
	1 st footing	1	$\frac{1}{2}[1.8 \times 1.8 \times .866]$		0.3	0.42			
	2 nd footing	1	$\frac{1}{2}[1.7 \times 1.7 \times .866]$		0.3	0.37			
	3 rd footing	1	$\frac{1}{2}[1.6 \times 1.3 \times .866]$.3	0.33			
	Above footing upto Springing level	1	$\frac{1}{2}[1.2 \times 1.2 \times .866]$		3/4	2.24		1 1/2 x 4	6
					Total	<u>3.36 m³</u>			
4	Cement concrete 1:4:8	1	2.0	2.0	0.08		<u>0.32 m³</u>	2	
	Rec work 1:2:4								
	1/2 footing excluding steel								
	hollow square post	1	2.0	2.0	0.25		1	2	
	Trapezoidal post						$\frac{0.5}{6} [2^2 + 0.35^2 + 4(\frac{2+0.35}{2})^2] = 0.804$		
					Total		<u>1.804 m³</u>	2	6
5.	<p>Plastering :-</p> <p>materials - The materials for plastering is cement mortar - cement & sand - water. Materials shall be mixed dry by measuring in boxes.</p> <p>Preparation of surface. - raked to a depth of 18mm.</p> <p>The joints shall be thoroughly washed. -</p> <p>Uniform thickness of plaster patches.</p> <p>Proportioning :-</p>								

Scoring Indicators

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Qn:No	Scoring Indicators	Split score	Total score
6.	<p>Cement mortar 1:3, 1:4, 1:5, 1:6</p> <p>Plastering:- Plastering may be done in single single coat or three coats. Single coat - three coat.</p> <p>Finish Surface measured in m²</p> <ol style="list-style-type: none"> 1. Forces on demand and supply 2. Rise in population 3. Cost of production 4. Rent restriction act 5. Improvement on public schemes. 6. purpose of purchase 7. Imposition of control of prices of building materials. 	6.	6
7.	$S = 420000 \times \frac{90}{100} = 378000$ <p>Annual instalment of sinking fund</p> $= \frac{Si}{(1+i)^n - 1}$ $= \frac{378000 \times 0.05}{(1+0.05)^{15} - 1} = \underline{\underline{9545.78}}$ <p>The annual sinking fund required for 15 year</p> $= \underline{\underline{9545.78}}$	2. 1 3	6

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Qn:No	Scoring Indicators						Split score	Total score
IV a.	Descriptin	N	L	B	H	Qty		
	upper portion of Soak pit	1	11 x 1.2	0.2	0.5	0.38		
	Lower portion	1	11 x 1.2	0.2	0.2	0.15		
	Dry brickwork in soak pit	1	11 x 1.2	0.2	2.5	<u>1.88 m³</u>	2+1	7
						0.53 m ³	4	
	b. Principal rafter	4	7.6			7.4 kg/m	224.96 kg	2
	Tie	2	3.3			3.1 kg/m	20.46 kg	2
	Gusset plate at apex	1	.75	.45				
	at base	2	.7	.45				
	Head of strut	2	0.75	.25				
"	4	0.25	0.20					
bottom of strut	2	0.35	.25					
"	2	.45	.32					
at inclined tie	2	.32	.25					
bottom of suspender	1	0.25	0.2					
						$2.216 \times 62.8 \text{ kg/m}^2$ $= 139.165$		
						<u>384.585 kg</u>	4	8
V a.	Earthwork excavation in foundation (per)	1	10.4	2.2	1.35	30.88		

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Qn:No	Scoring Indicators					Split score	Total score
VI	Cutwalu end	1	0.55	1.6	1.35	1.19	3
						<u>32.07 m³</u>	1
	Cement concrete 1:4:8 per →	1	10.4	2.2	1.35 0.45	10.296	
	Cutwalu end	1	0.55	1.6	0.45	0.396	3
						<u>10.692 m³</u>	1
	1 st class in CM 1:5						
	1 st footing	1	8.3	1.8	0.3	4.48	
	2 nd footing	1	8.3	1.7	0.3	4.233	
	3 rd footing	1	8	1.6	0.3	3.84	
	Above footing to Springing level	1	8.3	$\frac{1.5+9}{2}$	3.6	35.86	6
						<u>48.409 m³</u>	1
	Rcc 1:2:4						
	Base (16 x 14)	1	30	3	0.5	45.00	
	Steps	1	30	$\frac{6+2}{2}$	6	72.00	
						<u>117.00 m³</u>	
Steel bars including bending in reinforcement Stem (right side) 22mm ϕ main bar at 40cm c/c No = $\frac{29.9}{4} + 1$	76	7.53		2.98 kg/m	1705.39	2	

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Qn:No	Scoring Indicators	Split score	Total score
	22mm ϕ main bars up to 3.6m @ 60cm c/c No: $\frac{29.9 - 2 \times 2}{0.4} + 1$	75 5.13 @ 2.98 1146.56	2
	22mm ϕ main bars up to 1.8m @ 20cm c/c No: $\frac{29.9 - 2 \times 1}{0.2} + 1$	150 3.33	2
	Total ϕ 22mm ϕ bars	1488.51	2
		4340.46 kg	1
	14mm bar distributed right @ 25cm c/c No: $\frac{6.5 - 0.05 - 0.07}{0.25} + 1$	27 31.78 @ 1.21 kg	1038.25
	14mm ϕ vertical bars left side of stem @ 30cm c/c $\frac{30 - 1}{0.3} + 1$	101 6.63 @ 1.21 kg	816.25
		1848.50 kg	6
	10mm ϕ distributing bars left side of stem @ 30cm c/c No: $\frac{6.5 - 0.05 - 0.07}{0.3} + 1$	22 31.74 @ 0.62 kg	426.14
			2
<u>VII</u>	Rcc 1:2:4	1 6.3 3.3 0.12	2.495 m ³
	Steel bars 12mm ϕ straight 24cm c/c No: $\frac{6.3 - 0.08}{0.24} + 1$	27 3.44 @ 0.89	82.66
	Bent up bars	26 3.52 @ 0.89	81.45
			4
		164.11 kg	

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Scoring Indicators

(5)

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Qn:No	Scoring Indicators	Split score	Total score																																										
	<p>Distribution bars 6mm ϕ @ 0.22 k/m. 18cm c/c No = $\frac{2}{.18} + 1 = 12$</p> <p>bottom bars two sides 2x3 6.33 @ 0.22</p> <p>top bars two sides 2x3 6.33 @ 0.22</p>	<p>16.71</p> <p>8.36</p> <p>8.36</p> <p>33.431 kg. 4</p>																																											
	<table border="1"> <thead> <tr> <th>Descriptor of bars</th> <th>Shape</th> <th>length</th> <th>NO</th> <th>Total length</th> <th>wt.</th> </tr> </thead> <tbody> <tr> <td>Main straight bar.</td> <td></td> <td>3.44</td> <td>27</td> <td>92.88</td> <td></td> </tr> <tr> <td>Main bent up bar</td> <td></td> <td>3.52</td> <td>26</td> <td>91.52</td> <td></td> </tr> <tr> <td>bottom distribution</td> <td></td> <td>6.33</td> <td>12</td> <td>113.94</td> <td>164.12</td> </tr> <tr> <td>Top distribution</td> <td></td> <td>6.33</td> <td>6</td> <td>37.98</td> <td>33.42</td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>184.40</td> <td></td> </tr> <tr> <td></td> <td></td> <td></td> <td></td> <td>151.92</td> <td></td> </tr> </tbody> </table>	Descriptor of bars	Shape	length	NO	Total length	wt.	Main straight bar.		3.44	27	92.88		Main bent up bar		3.52	26	91.52		bottom distribution		6.33	12	113.94	164.12	Top distribution		6.33	6	37.98	33.42					184.40						151.92		5	
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VIII	<p>Damp proof course :- materials - cement - coarse sand - Stone aggregate - 1:1½:3. 2% Proofing compound.</p> <p>Mixing :- done in masonry platform - Sheet of iron tray. - measuring boxes. - Laying - level of the surface of plinth shall be checked longitudinally and transversely. The DPC shall be laid in continuation in one day. Curing - cured by watering for 7 days.</p>																																												

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	<p>Painting with Asphalt: - two coats of asphalt painting may be applied on the upper surface of D.P.C.</p> <p>2. Earthwork excavations :- Excavations - Trenches shall be dug out to the exact width of foundation, sides shall be vertical. Finish of trench - The bottom of foundation trench shall be perfectly levelled both longitudinally and transversely. Find - any treasure and valuable materials found during the excavation. Water in foundation - pumped out without any extra payment if water present in trenches. Trench filling :- The trench shall be laid masonry has been constructed the remaining portion of the trench shall be filled up with earth in layers of 15 cm. and watered and well rammed. Measurement :- shall be taken of in Cubic meter.</p> <p><u>IX</u> a. Rental method ② Direct comparison with the capital value, ③ valuation based on profit ④ valuation based on cost ⑤ Development method of valuation ⑥ Depreciation method</p>	<p>8</p> <p>8</p> <p>8</p>	<p>7</p> <p>7</p> <p>7</p>

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	<p>$n = 25 \text{ year.}$</p> <p>rd is taken as 1.0</p> $D = P \left(\frac{100 - rd}{100} \right)^n$ $= 750000 \left(\frac{100 - 1}{100} \right)^{25}$ $= \underline{583366.0}$ <p>The cost of land = 600×1000 = 600000</p> <p>The total value of property = 600000 + 583366.0 = <u>1183366</u></p>	<p>1</p> <p>3</p> <p>3</p>	<p>8</p>