TED (15) – 4013 Reg. No...

(REVISION — 2015) Signature ....

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

QUANTITY SURVEYING – I

[*Time* : 3 hours

(Maximum marks : 100)

[*Note* :—1. Missing data may be suitably assumed.

2. Quantities should be worked out in standard form.

3. Sketches accompanied.]

PART — A

(Maximum marks : 10)

Marks

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

1. Define Contingencies.
2. What are the methods of taking out estimates ?
3. What is meant by Lump-sum item ?
4. What is Preliminary estimate ?
5. What is meant by Rates ? (5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. What are the data required to prepare an estimate ?
2. Estimate the quantities of brickwork and plastering required in a wall 5.50m long, 3m high and 30 cm thick. Calculate also the cost, if the rate of brick work is Rs. 520.00 per cu m and of plastering is Rs. 12.50 per sq m.
3. Write the duties of Quantity Surveyor.
4. Define (a) Plinth area and (b) Carpet area.
5. Briefly explain about Supplementary Estimate.
6. What is meant by Cubical Content Estimate ?
7. What is meant by Overhead costs ? (5×6 = 30)

Marks

PART — C

(Maximum marks : 60)

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

UNIT — I

III (a) Prepare a preliminary estimate of a four storeyed office building having a carpet area of 2000 sq.m for obtaining the administrative approval of the Government given the following data. It may be assumed that 30% of the built up area will be taken up by the corridors, verandahs, lavatories, staircase etc. and 10 % of the built up area will be occupied by walls.

(i) Plinth Area rate is — Rs. 950.00/m^2

(ii) Extra due to deep foundation at site — 1 % of building cost.

(iii) Extra for special Architectural treatment — 0.5 % of building cost.

(iv) Extra for water supply and sanitary installation — 6 % of building cost.

(v) Extra for Electric installations — 12.5 % of building cost.

(vi) Extra for other services — 5 % of building cost.

(vii) Contingencies — 2.5 %.

(viii) Supervision charges — 8 %. 9

(b) What is meant by Revised Estimate ? On what circumstances this type of estimate is required to be prepared ? 6

OR

IV (a) Calculate the quantity of earthwork by Prismoidal formula for 200 m length for a portion of a road in a uniform ground. The heights of banks at the two ends being 1.00m and 1.60m. The formation width is 10 m and side slopes 2:1 (Horizontal : Vertical). Assume that there is no transverse slope. 8

(b) The Areas with Contours at the site of a proposed reservoir are given below. Find reservoir capacity using Trapezoidal rule. 7

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

UNIT — II

V Estimate the quantities of the following items of a two roomed building from the plan and section given in Figure -1.

General Specification: — Foundation- Lime concrete, Masonry – 1st class brickwork in CM 1 : 6 in foundation and plinth, 2.5 cm CC damp proof coarse, 1st class brickwork in lime mortar in superstructure.

(i) Earthwork in excavation in foundation.

(ii) Lime concrete in foundation.

(iii) 1st class brickwork in lime mortar in superstructure. (5×3=15)

OR

Marks

VI Estimate the quantities of following items of a Masonry Water Tank from the given Figure - 2.

General specifications: — Foundation - Lime concrete, Masonry - 1st class brickwork in CM 1:6, Wall finishing - Inside 12 mm cement plastered 1:2 with coarse sand, Top and Outside 12 mm cement plastered 1:4 with local sand, Flooring - 5 cm CC 1 : 1½ : 3 over 30 cm Lime concrete with neat cement finishing.

(i) Earthwork in excavation.

(ii) Lime concrete in foundation and floor

(iii) 5 cm Cement Concrete floor 1 : 1½ : 3 (5×3 =15)

UNIT — III

VII (a) Estimate the quantity of the following item from the Figure –1. Damp proof coarse 2.5 cm thick CC. 9

(b) Calculate the quantity of cement concrete for cement concreting 1 km length of 3.70 m wide road for 8 cm thick layer. Also calculate cost at the rate of Rs. 375.00 per cu m. 6

OR

VIII Estimate the quantities of the following items from the given Figure – 2.

(i) 12 mm Cement plaster 1:2 with coarse sand inside. 6

(ii) 12 mm Cement plaster 1:4 with local sand outside. 9

UNIT — IV

IX Work out the *rate per cubic meter* of Ashlar Masonry in Superstructure in 1:6 Cement Sand Mortar. Take - 10 cu. m.

Materials

12.5 cu m	Stone (undressed)	@ Rs. 2500/cu m
0.35 cu m	Cement (10 ½ bags)	@ Rs. 3970/cu m
2.10 cu m	Sand (local)	@ Rs. 2000/ cu m

Labour

½ No.	Mistri (Head Mason)	@ Rs. 950/day	
28 Nos.	Mason including cutter	@ Rs. 850/day	
20 Nos.	Mazdoor (Beldar)	@ Rs. 700/day	
20 Nos.	Boy or Women Coolie	@ Rs. 650/day	
1 ½ Nos.	Bhishti	@ Rs. 500/day	
LS	Scaffolding	@ Rs. 250 LS	
LS	Sundries, T & P etc.	@ Rs. 100 LS	15

OR

Marks

X Work out the rate of standard unit for brick work in CM 1:5.

Materials

500 Nos.	Bricks	@ Rs. 3500/1000 Nos.
43 kg	Cement	@ Rs. 350/bag
0.24 cu m	Dry sand	@ Rs. 2500/cu m

Labour

0.7	Brick Mason	@ Rs. 750/Each/day
0.35	Man	@ Rs. 600/Each/day
1.20	Woman	@ Rs. 500/each/day

Conveyance charge of materials

Materials	*Distance in km*	*Rate per km*
Cement	15	50
Sand	27	15
Brick	20	20

15

✓ B

SCHEME OF VALUATION

(Scoring Indicators)

		Revision :2015 Course Title: QUANTITY SURVEYIN-I SET -A		Course Code: 4013	
QN. NO.		Scoring indicator	Split-up score	Sub Total	Total
I		**PART –A**			
	1	In an estimate a certain amount say 3% to 5% of estimated cost is provided to allow for the expenses for miscellaneous petty items which do not fall under any sub-head of items of works is called Contingencies.	2		
	2	i)Centre line method ii)Out to Out and in to in method	2	-	
	3	Sometimes a lump-sum rate is provided for certain small items, for which detailed quantities cannot be taken out easily or it takes sufficient time to find the details.eg. Decoration work of a building.	2	-	
	4	The estimate which prepared using any rough method to get the approximate cost of construction anticipated in a project is called an approximate or rough estimate. Since this estimate is normally prepared in the preliminary estimate.	2		
	5	Rates of different items in the estimate are the current rates for the completion of the items of work which include supply of materials, transport, labour scaffolding, overheads, contractor's profit, taxes etc. The rates are usually taken from the PWD 'Schedule of Rates'.	2	-	2 x 5 = 10
II		**PART - B**			
	1	**Data required to prepare an estimate** 1. Drawings i.e. plans, elevations, sections etc. 2. Specifications. 3. Rates. **1. Drawings:** - If the drawings are not clear and without complete dimensions the preparation of estimation become very difficult. So, it is very essential before preparing an estimate **2. specifications:-** a) **General Specifications**: This gives the nature, quality, class and work and materials in general terms to be used in various parts of wok. It helps no form a general idea of building. b) **Detailed Specifications**: These gives the detailed description of the various items of work laying down the Quantities and qualities of materials, their proportions, the method of preparation workmanship and execution of work. **3. Rates:** - For preparing the estimate the unit rates of each item of work are required. 1. for arriving at the unit rates of each item. 2. The rates of various materials to be used in the construction. 3. The cost of transport materials.	2 2 2		6

		4. The wages of labour, skilled or unskilled of masons, carpenters etc.,			
	2	Quantity of brickwork = Lx B x H = 5.50m x 3m x 0.30m = 4.95 cu.m Quantity of plastering (two faces) = 2 (L X H) = 2 (5.50 X 3) = 33 sq.m Cost of Brickwork = 4.95 x 520.00 = Rs. 2574.00 Cost of plastering = 33 x 12.50 m = Rs. 412.50 Total cost = Rs. 2574.00 + Rs. 412.50 = **Rs. 2986.50/-**	2 2 2		6
	3	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
	4	**Plinth Area** is the area of a building measured at floor level. It is measured by taking external dimensions excluding plinth offset if any. **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.	3 3		6
	5	**Supplementary Estimate** is a detailed estimate and is prepared when additional works are required to supplement the original works, or when further development is required during the progress of work. This is a fresh detailed estimate of the additional works in addition to the original estimate. The Abstract should show the amount of the original estimate and the total amount including the Supplementary amount for which sanction is required.	3 3		6
	6	The **Cubical contents** of a building means plinth area x height of the building. The height is taken from top of floor level to top of roof. The cubic contents of the proposed building are multiplied with cubic rates arrived at for the similar construction i.e. total cost of construction divided by cubic contents = cost per cubic metre.			6
	7	**Overhead costs** include general office expenses, rents, taxes, supervision and other costs which are indirect expenses and not productive expenses on the job. The miscellaneous expenses on overheads may be under the following heads. 1. General overheads 1. Establishment (office staff) 2. Stationary, printing, postages etc. 3. Travelling expenses 4. Telephone 5. Rent and Taxes. 2. Job overheads 1. Supervision (salary of Engineers, Overseers etc.)	3		

		2. Handling of materials 3. Repairs, carriage and depreciation of Tools and Plants 4. Amenities of labour 5. Workmen's compensation, insurance etc. 6. Interest on investment 7. Losses on advances.	3		6
III		**PART – C**			
	(a)	Built-up area or Plinth area = Carpet area + area occupied by corridors (verandas, lavatories, staircases etc.) + area occupied by walls. Let X = Built-up area / Plinth area. X = carpet area + 30 % of built-up area + 10 % of built-up area	3		
		$X = 2000\ m^2 + 30/100(X) + 10/100\ (X)$ $X = 2000 + 3X/10 + X/10$ $10X - 3X - X = 20000$ $6X=20000$; $X = 3333\ ^1/_3\ m^2$, Built-up area / Plinth area	2		
		i)Building cost = $3333\ ^1/_3\ m^2$ @Rs. 950.00 / m^2 $= 3333\ ^1/_3$ x 950 = Rs. 316666.50 ii)Extra for deep foundation = $^1/_{100}$ x 3166663.50= Rs.31666.65 iii)Special Architectural treatment= $^{0.5}/_{100}$ x 3166663.50 = Rs.15833.32	2		
		iv)Water supply and sanitary installations = $^6/_{100}$x 3166663.50 = Rs. 189999.81 v)Electric installations – $^{12.5}/_{100}$ x 3166663.50 = Rs. 395832.93 vi)Other services – 5/100 x 3166663.50 = Rs.158333.17 Total = Rs.3958328.22/- Contingencies = 2 ½% of total = 2.5/100 x 3958328.88 = Rs.98958.22/-	2		9
		Supervision charges = 8% of total = 8/100 x 3958328.88 = Rs. 316666.30/- **Grand total = Rs. 43,73,953.00/-**			
	(b)	**Revised estimate** is a detailed estimate and is required to be prepared under any one of the following circumstances. (i) When the original sanctioned estimate is exceeded or likely to exceed by more than 5 % (ii) When the expenditure on a work exceeds or likely to exceed the amount of administrative sanction by more than 10 % (iii) When there are material deviations from the original proposal, even though the cost may be met from the sanctioned amount.	3		
		The revised estimate should be accompanied by a comparative statement showing the variations of each item of works, its quantity, rate and cost under original and revised, side by side, the excess or saving and reason for variation.	3		6
IV	(a)	Quantity = $^L/_6\ (A_1 + A_2 + 4\ A_m)$ Or Quantity = $[B\frac{(d1+d2)}{2} + S\frac{(d1^2+d2^2+d1d2)}{3}]\ L$	2		
		$A_1 = Bd_1 + sd_1^2 = 10x1 + 2x12 = 12$ sq.m $A_2 = Bd_2 + sd_2^2 = 10\ x1.60 + 2\ x\ 1.602 = 21.12$ sqm	2		

$Am = Bd_m + sd_m^2$, where $d_m = \frac{d_{1+d_2}}{2} = \frac{1.00+1.60}{2} = 1.30$ m. **2**

= 10 x 1.30 + 2 x 1.30 ^{2} = 16.38 sq.m

Quantity = $^{200}/_6$ (12 +21.12 + 4 x 16.38) = $^{200}/_6$ x 98.64 **2** **8**

= **3288 cu m.**

(b) Volume by Trapezoidal Formula method ,V

$V = {}^D/_2\ [A_0+A_n+2(A_1+A_2+A_3+---+A_{n-1}]$ 2

= ½ [528 + 3100 + 2 (910 + 1500 + 1750 + 2100 + 2800)] 3

= 10,874 m^3 2 **7**

V

Item no	Particulars of items	No	L m	B m	H/D m	QTY m ^{3}
1.	**Earthwork in excavation**					
	Long walls	2	11.70	1.10	1.00	25.74
	Short walls	3	5.20	1.10	1.00	17.16
	Total					**42.90**
2.	**Lime concrete in foundation**					
	Long walls	2	11.70	1.10	0.30	7.72
	Short walls	3	5.20	1.10	0.30	5.15
	Total					**12.87**
3.	**1st class Brickwork in Lime mortar in Superstructure**					
	Long walls	2	10.90	0.30	4.20	27.47
	Short walls	3	6.00	0.30	4.20	22.68
	Total (Excluding Deductions)					**50.15**

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

Long wall c/c length =10.60 m; Short wall c/c length = 6.30m.

VI

For all footings, c/c length of long wall =7.50 m

c/c length of short wall = 5.50m

Item No.	Particulars of Item	No.	L m	B m	H/D m	QTY m ^{3}
1	**Earth work in excavation**					
	Long wall	2	8.50	1.00	1.95	33.15
	Short wall	2	4.50	1.00	1.95	17.55
	Central portion (inside)	1	6.50	4.50	1.25	36.56
	Total					**87.26**
2.	Lime Concrete in foundation & floor					
	Long wall	2	8.50	1.00	0.30	5.10
	Short wall	2	4.50	1.00	0.30	2.70

5

			Under CC floor	1	7.00	5.00	0.20	7.00			
			Total					**14.80**	5		
		3.	**5 cm CC floor $1:1^1/_2:3$**	1	7.00	5.00	--	**35.00 m^2**	5		15
VII	(a)	**Item no**	**Particulars of item**	**No**	**L** **m**	**B** **m**	**H/D**	**QTY** **m^2**			
		1.	**Damp Proof Course 2.5 cm thick CC**								
			Long walls	2	11.00	0.40	-	8.80			
			Short walls	3	5.90	0.40	-	7.08			
			Total					**15.88**	3		
			Deduct Door sills	2	1.20	0.40	-	0.96	3		
			Net Total					**14.92**	3		9
	(b)	Quantity of cement concrete = 1 x 1000 x 3.70 x 0.08 = 296 cu m							3 3		
		Cost per kilometer of road = 296 x 375.00 = **Rs. 1,11,000.00/-**							3		6
VIII	(i)	**Item no**	**Particulars of item**	**No**	**L** **m**	**B**	**H/D** **m**	**QTY** **m^2**			
		1.	**12 mm Cement plaster 1:2 with coarse sand inside**								
			Long walls	2	7.00	-	2.50	35.00	3		
			Short walls	2	5.00	-	2.50	25.00			
			Total					**60.00**	3		6
	(ii)	**Item no**	**Particulars of item**	**No**	**L** **m**	**B** **m**	**H/D** **m**	**QTY** **m^2**			
		1.	**12 mm Cement plaster 1:4 with local sand outside**								
			40 cm walls								
			Long walls	2	7.80	-	1.25	19.50			
			Short walls	2	5.80	-	1.25	14.50	3		
			30 cm wall								
			Long walls	2	7.60	-	0.60	9.12			
			Short walls	2	5.60	-	0.60	6.72	3		
			On top of wall								
			Long walls	2	7.60	0.30	-	4.56			
			Short walls	2	5.00	0.30	-	3.00			
			Total					**57.40**	3		9

IX

PARTICULARS	QUANTITY	UNIT	RATE	PER	COST		
(i) Materials							
Stone (undressed)	12.5	Cu m	2500.00	Cu m	31,250.00		
Cement (10 ½ bags)	0.35	Cu m	3970.00	Cu m	1389.50		
Sand (local)	2.10	Cu m	2000.00	Cu m	4200.00		
Total					**36,839.50**	5	
(ii) Labour Mistri (Head mason)	½	No	950.00	Day	475.00		
Mason including cutter	28	Nos	850.00	Day	23,800.00		
Mazdoor (Beldar)	20	Nos	700.00	Day	14,000.00		
Boy or Woman coolie	20	Nos	650.00	Day	13,000.00		
Bhishti	1 ½	Nos	500.00	Day	750.00		
Scaffolding	LS		250.00	LS	250.00		
Sundries (Tools & Plants)etc.	LS		100.00	LS	100.00		
Total					**52,375.00**	5	
Total of (i) + (ii)					**89,214.50**		
Add 10 % Contractor's Profit					**8921.45**		
Grand Total					10 **98,135.95/ cu m.**	5	15
					9813.5/m³		

X

ITEM	QUANTITY	UNIT	RATE	PER	COST	
(i) Materials						
Bricks	500	Nos	3500.00	1000	1750.00	
Cement	43	kg	350.00	Bag	301.00	
Dry sand	0.24	Cu m	2500.00	Cu m	600.00	
Total					**2651.00**	5
(ii) Labour Brick Mason	0.7	Each	750.00	Day	525.00	
Man	0.35	Each	600.00	Day	210.00	
Woman	1.20	Each	500.00	Day	600.00	
Total					**1335.00**	5
(iii) Conveyance	Distance	Km	Rate	Km		
Cement	15	Km	50.00	km	750.00	
Sand	27	Km	15.00	Km	405.00	
Brick	20	km	20.00	Km	400.00	
Total					**1555.00**	

		Total of (i) + (ii) + (iii)		**5541.00**			
		Add 10 % Contractor's Profit		**554.10**			
		Grand Total		**6095.10 / cu m.**	5		15