

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

QUANTITY SURVEYING - I

[Time : 3 hours

(Maximum marks : 100)

PART — A

(Maximum marks : 10)

- [Note :—1. Missing data may be suitably assumed.
2. Quantities should be worked out in standard form.
3. Sketches on 4th page.]

Marks

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

1. Define Estimate.
2. What is meant by Work Charged Establishment ?
3. Give the unit of measurement for (i) Earth filling in Plinth (ii) Pointing.
4. What is specification ?
5. What are the purposes of Rate Analysis ?

(5×2 = 10)

PART — B

(Maximum marks : 30)

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

1. Write down any six types of Estimate.
2. Define Abstract of Estimate.
3. What are the factors considered for fixing the rate per unit of an Item ?
4. What are the procedures of Estimating or method of Estimating ?
5. Define (a) Plinth area and (b) Carpet area
6. Write short notes on (a) Lump sum (b) Schedule of rates
7. Differentiate between Drawing and Specification.

(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) Briefly explain the methods of taking Quantities. 6
- (b) Calculate the area of the side slopes of portion of a bank for a length of 200 m, the heights of banks at the two ends being 2.50 m and 3.50 m and the ratio of the side slope 2:1. 5
- (c) If the side slopes are to be provided with 15 cm thick stone pitching, calculate the cost of pitching at the rate of Rs. 350/cu m. 4

OR

- IV (a) What is meant by Revised Estimate ? On what circumstances this type of estimate is required to be prepared ? 5
- (b) How is Detailed Estimate prepared ? 10

UNIT — II

- V (a) From the given Figure - (2), Hexagonal room, Estimate the Quantity of Earthwork in foundation by Centre line method. 9
- (b) Estimate the quantities of Earthwork, Concrete and Brickwork of a simple step as shown in the figure (1). 6

OR

- VI Estimate from Figure - (2), the quantities of following items by centre line method.
- (i) Concrete in foundation
- (ii) Brickwork in foundation and plinth in 1:6 cement mortar.
- (iii) 2 cm Damp proof course. (3×5=15)

UNIT — III

- VII Find out the quantities of Finishing 20 mm Cement plastered from the given Figure - (1), Simple Step in the standard format. 15

OR

- VIII (a) 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. 4
- (b) Explain Centre line method for taking quantities of building plans. 5
- (c) Explain (i) Lead and (ii) Lift. 6

IX 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
0.24cu 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

<i>Materials</i>	<i>Distance in km</i>	<i>Rate per km</i>
Cement	15	50
Sand	27	15
Brick	20	20

15

OR

X 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
1½ Nos.	Bhishti	@ Rs.500/day
LS	Scaffolding	@ Rs. 250 LS
LS	Sundries, T&P etc.	@ Rs. 100 LS

15

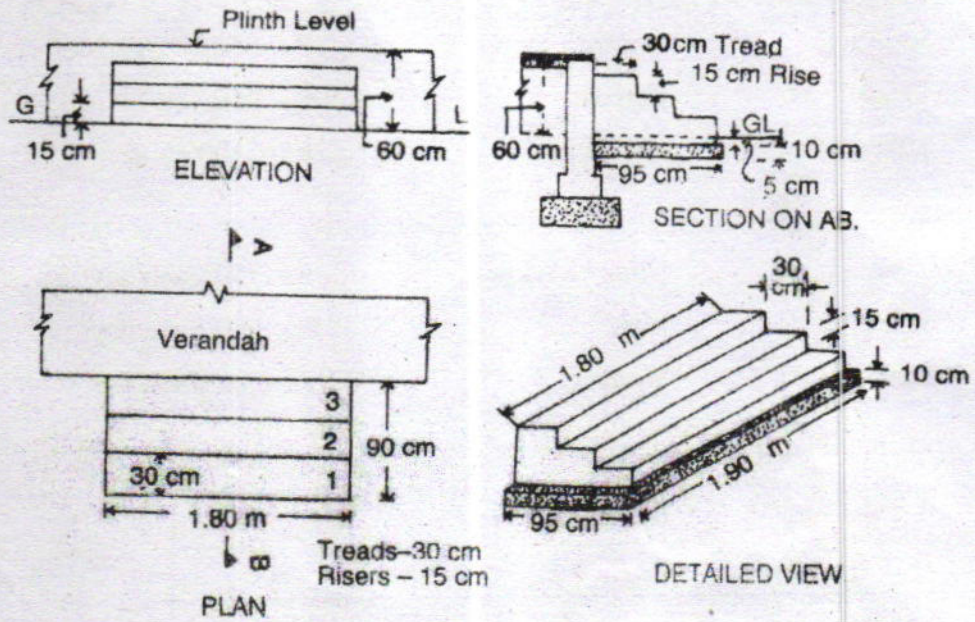


FIGURE:- (1) SIMPLE STEP

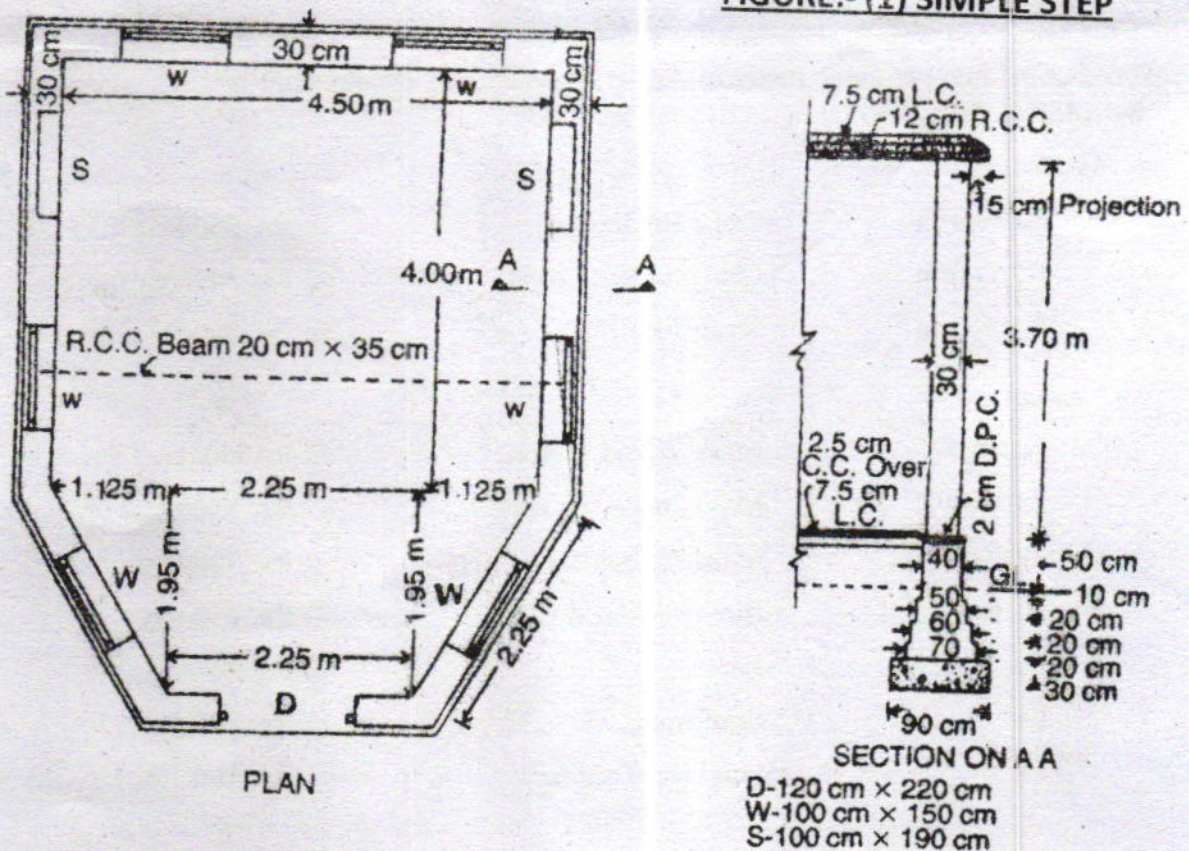


FIGURE (2):- HEXAGONAL ROOM

D 7

SCHEME OF VALUATION

(Scoring Indicators)

Revision :2015		Course Title: QUANTITY SURVEYIN-I		SET -B		Course Code: 4013	
QN. NO.		Scoring indicator	Split-up score	Sub Total	Total		
I		PART -A					
	1	The Estimate is the probable cost of a work and is determined theoretically by mathematical calculations based on the plans and drawing and current rates.	2	-	2		
	2	During the construction of a project considerable number of skilled supervisors, work assistance, watch men etc., are employed on temporary basis. The salaries of these persons are drawn from the L.S. amount allotted towards the work charged establishment. That is, establishment which is charged directly to work. An L.S. amount of 1½ to 2% of the estimated cost is provided towards the work charged establishment.	2		2		
	3	(i) m ³ (ii) m ²	2		2		
	4	Specification is an important document attached with a tender form/contract agreement, which in most cases controls the quality of materials and works.					
	5	1) To determine the actual cost per unit of item. 2) To examines the item for economic process and economic uses of materials involved in making the item.	2		2		
II		PART - B					
	1	The estimates may be divided in to the following categories:- (1) Preliminary or Approximate estimate. (2) Rough cost estimate based on plinth area. (3) Rough cost estimate based on cubic contents. (4) Detailed estimate. (5) Annual repair estimate. (6) Special repair estimate. (7) Revised estimate (8) Supplementary estimate.	6x1		6		
	2	The cost under item of work is calculated from the quantities already computed at workable rate, and the total cost is worked out in a prescribed form. A percentage of 3 to 5 % is added for contingencies, to allow for petty contingent expenditures, unforeseen item etc, A percentage of 1 ½ to 2% is also added to meet the expenditure of work charged establishment. The grand total thus obtained is the estimated cost of the work.	3		3		6
	3	FIXING OF RATE PER UNIT OF AN ITEM The rate per unit of an item includes the following: 1) Quantity of materials & cost: The requirement of materials is taken strictly in accordance with standard data book (S.D.B). The cost of these includes first cost, freight, insurance and transportation charges. 2) Cost of labour: The exact number of labourers required for unit of work and the	2		2		

	<p>multiplied by the wages/ day to get of labour for unit item work.</p> <p>3) Cost of equipment (T&P): Some works need special type of equipment, tools and plant. In such case, an amount of 1 to 2% of estimated cost is provided.</p> <p>4)Overhead charges: To meet expenses of office rent, depreciation of equipment salaries of staff postage, lighting an amount of 4% of estimate cost is allocated.</p>	<u>2</u>		
4	<p>Estimating involves the following operations</p> <ol style="list-style-type: none"> 1. Preparing detailed Estimate. 2. Calculating the rate of each unit of work 3. Preparing abstract of estimate. 	2 2 2		<u>6</u>
5	<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>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>	<u>3</u>		<u>6</u>
6	<p>(i) lump sum While preparing an estimate, it is not possible to work out in detail in case of petty items. Items other than civil engineering such items are called lump sum items or simply L.S. Items. The following are some of L.S. Items in the estimate.</p> <ol style="list-style-type: none"> 1. Water supply and sanitary arrangements. 2. Electrical installations like meter, motor, etc., 3. Architectural features. 4. Contingencies and unforeseen items. <p>In general, certain percentage on the cost of estimation is allotted for the above L.S. Items Even if sub estimates prepared or at the end of execution of work, the actual cost should not exceed the L.S. amounts provided in the main estimate.</p> <p>(ii) Schedule of rates is a list of rates of various items of works. Rate per unit of various items of work and materials, rates of wages of labour and rates of transport are given in the 'Schedule of Rates. P.W.D. maintain printed Schedule of Rate book for various items of the work and estimate is prepared with these rates. The Schedule of Rate is prepared on the basis of analysis of rates. Usually transport of materials up to distance of 8 km included in the rates.</p>	<u>3</u>		<u>6</u>
7	<p>Drawings:-The drawings of a structure will show the proportions and relative positions of its various parts. It is not possible to furnish the data regarding the quality of materials and workmanship on the drawings due to shortage of space.</p> <p>Specification: - the information regarding the quality of materials and workmanship is conveyed in a separate contract document known as the specification for the work.</p> <p>The combination of the drawings and specifications will completely define the structure, physically as well as technically.</p>	3+3		6

III	PART - C			
	<p>(a) The quantities like earth work, foundation concrete, brickwork in plinth and super structure etc., can be worked out by any of the following two methods:</p> <p>a) Long wall - short wall method b) Centre line method.</p> <p>LONGWALL-SHORTWALLMETHOD In this method, the wall along the length of room is considered to be long wall while the wall perpendicular to long wall is said to be short wall. To get the length of long wall or short wall, calculate first the centre line lengths of individual walls. Then the length of long wall, (out to out) may be calculated after adding half breadth at each end to its centre line length. Thus the length of short wall Measured into in and may be found by deducting half breadth from its centre line length at each end. The length of long wall usually decreases from earth work to brick work in super structure while the short wall increases. These lengths are multiplied by breadth and depth to get quantities</p> <p>CENTRE LINE METHOD This method is suitable for walls of similar cross sections. Here the total centre line length is multiplied by breadth and depth of respective item to get the total quantity at a time. When cross walls or partitions or verandah walls join with main all, the centre line length gets reduced by half of breadth for each junction. Such junction or joints are studied carefully while calculating total centreline length. The estimates prepared by this method are most accurate and quick.</p>	3	3	6
	<p>(b) Mean height, $d = \frac{(2.5+3.5)}{2} = 3 \text{ m}$ Sloping breadth at the mid-section = $d \sqrt{(s^2+1)}$ $= 3 \sqrt{(2^2+1)} = 6.71 \text{ m.}$ Area of two side slopes = $2 L \times d \sqrt{(s^2+1)} = 2 \times 200 \times 6.71$ $= 2684 \text{ m}^2$</p>	3	2	5
	<p>(c) Quantity of pitching = Area x thickness $= 2684 \times 0.15 = 402.6 \text{ cu m.}$ Cost of Stone pitching = $402.6 \times 350.00 = \text{Rs.1,40,910.00/-}$</p>	2	2	4
IV	<p>(a) Revised estimate is a detailed estimate and is required to be prepared under any one of the following circumstances.</p> <p>(i) When the original sanctioned estimate is exceeded or likely to exceed by more than 5 %</p> <p>(ii) When the expenditure on a work exceeds or likely to exceed the amount of administrative sanction by more than 10 %</p> <p>(iii) When there are material deviations from the original proposal, even though the cost may be met from the sanctioned amount.</p> <p>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.</p>	5		5

(b) **DETAILED ESTIMATE**

The preparation of detailed estimate consists of working out quantities of various items of work and then determines the cost of each item. This is prepared in two stages.

i) Details of measurements and calculation of quantities

The complete work is divided into various items of work such as earth work concreting, brick work, R.C.C. Plastering etc., The details of measurements are taken from drawings and entered in respective columns of prescribed preformed. The quantities are calculated by multiplying the values that are in numbers column to Depth column as shown below:

2

Details of measurements form

S.No	Description of Item	No	Length (L) m	Breadth (B) m	Depth/Height (D/H)m	Quantity	Explanatory Notes

2

ii) Abstract of Estimated Cost :

The cost of each item of work is worked out from the quantities that already computed in the details measurement form at workable rate. But the total cost is worked out in the prescribed form is known as abstract of estimated form. 4%of estimated Cost is allowed for Petty Supervision, contingencies and Unforeseen items.

2

abstract of estimate form

Item No.	Descriptions/ Particulars	Quantity	Unit	Rate	Per (Unit)	Amount

The detailed estimate should accompanied with

- i) Report
- ii) Specification
- iii) Drawings (plans, elevation, sections)
- iv) Design charts and calculations
- v) Standard schedule of rates.

2

V	(a)	Centre to centre length of inclined wall					<u>2</u>		<u>10</u>	
		$= \sqrt{(1.95 + 0.15)^2 + (1.125 + 0.15)^2} = 2.46 \text{ m.}$ Total centre line length of walls = $4.80 + (2 \times 4.15) + (2 \times 2.46) + 2.25 = 20.27 \text{ m.}$					<u>4</u>			
		it en n o	Particulars of item	No	L m	B m	H/D m	Qty m ³		
		1	Earth work in foundation	1	20.27	0.90	0.90	16.42	<u>5</u>	<u>9</u>
VI	(b)	ITEMS		NO	L	B	H/D	QTY	<u>2</u>	<u>6</u>
					m	m	m	m ³		
		Earthwork in Excavation		1	1.90	0.95	0.15	0.27		
		Concrete in foundation		1	1.90	0.95	0.10	0.18		
		Brickwork 1 st step		1	1.80	0.90	0.20	0.324		
		2 nd step		1	1.80	0.60	0.15	0.162		
		3 rd step		1	1.80	0.30	0.15	0.081		
		Total						0.567		
		ITEMS		NO	L	B	H/D	QTY		
					m	m	m	m ³		
(i) Concrete in foundation		1	20.27	0.90	0.30	5.47				
(ii) Brickwor k in foundation & plinth in 1:6 cement mortar		1	20.27	0.70	0.20	2.84				
1 st footing		1	20.27	0.60	0.20	2.43				
2 nd footing		1	20.27	0.50	0.20	2.03				
3 rd footing		1	20.27	0.40	0.60	4.86				
Plinth wall										
Total						12.16				
(iii) 2 cm Damp proof course		1	20.27	0.40	-	8.11				
Deduct Door sill		1	1.20	0.40	-	0.48				
Net total						7.63 m ²				
VII	(a)	ITEMS		NO	L	B	H/D	QTY		
					m	m	m	m ²		
		(i) Finishing 20 mm Cement								

	plastered							
	Treads	3	1.80	0.30	-	1.62		
	Risers	4	1.80	-	0.15	1.08		
	Ends	2	0.90	-	0.15	0.27		
		2	0.60	-	0.15	0.18		
		2	0.30	-	0.15	0.09		
	Total					3.24 m ²		

15

15

VIII (a) Quantity of cement concrete = $1 \times 1000 \times 3.70 \times 0.08 = 296 \text{ cu m}$
 Cost per kilometre of road = $296 \times 375.00 = \text{Rs. } 1,11,000.00/-$

4

(b) **CENTRE LINE METHOD**
 This method is suitable for walls of similar cross sections. Here the total Centre line length is multiplied by breadth and depth of respective item to get the total quantity at a time. When cross walls or partitions or verandah walls join with main all, the centre line length gets reduced by half of breadth for each junction. Such junction or joints are studied carefully while calculating total centreline length. The estimates prepared by this method are most accurate and quick.

5

(c) Normally earthwork is estimated for 30 m lead for distance and 1.5 m lift for height or depth, and this distance of 30 m and the height of 1.5 m are known as normal lead and lift. For greater lead or lift the rates will be different (higher) for every unit of 30 m lead and for every unit of 1.5 m lift. The earthwork is therefore estimated separately for every 30 m lead and for every 1.5 m lift.

3+3

6

15

IX

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
(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
(iii) Conveyance					
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

5

5

X							15
	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	<u>5</u>
	(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	<u>5</u>
	Scaffolding	LS		250.00	LS	250.00	
	Sundries (Tools & Plants)etc.	LS		100.00	LS	100.00	
	Total					52,375.00	
	Total of (i) + (ii)					89,214.50	
	Add 10 % Contractor's Profit					8921.45	<u>5</u>
	Grand Total					98,135.95 / 10 cu m.	
	Rate per cu. m = Rs. 98135.95 / 10 = Rs.9813.59 /-						
