

TED (15) – 4013

Reg. No. ....

(REVISION — 2015)

Signature .....

THIRD SEMESTER DIPLOMA EXAMINATION IN CIVIL  
ENGINEERING — APRIL, 2017

QUANTITY SURVEYING - I

[Time : 3 hours

(Maximum marks : 100)

- [Note :— 1. Missing data may be suitably assumed.  
2. Drawings attached.]

PART — A

(Maximum marks : 10)

Marks

I Answer the following questions in one or two sentences. Each question carries 2 marks.

1. List any four duties of quantity surveyor.
2. Reproduce the prismoidal formula for earth work computation.
3. List the unit of measurements for the following items of work.
  - (a) Earth filling in plinth
  - (b) Wood work for door and window
  - (c) Steel reinforcement bars in RCC work
  - (d) Pointing
4. Define sundries.
5. Define out turn of the labour.

(5×2=10)

PART — B

(Maximum marks : 30)

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

1. Illustrate detailed estimate and relate to abstract of estimated cost.
2. Illustrate centre line method for computing detailed estimate.
3. Show the rules for deduction for openings in internal and external plastering.
4. Compute the quantity of fully glazed window shutters for the given drawing.  
(fig.1)

5. Compute the quantity of materials, stone grit and binder required for first coat of painting for two kilometre length of a bituminous road, 3.75m wide from the following data.

(i) Stone grit 20mm gauge @ 1.35 cum/100 sq.m.

(ii) Binder road tar No.3 @ 220 kg/100 sq.m.

6. Assess the quantity of cement, fine aggregate and coarse aggregate required for an R.C.C. slab over a room of size 3.30m x 4.20m.

Thickness of the slab is 100mm and a projection of 100mm on all sides of the wall.

Mix proportion : 1:1 $\frac{1}{2}$ :3

Materials for 1 cum of concrete

Cement @ 403 kg.	Fine aggregate @ 0.42 cum	Coarse aggregate @ 0.84cum
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7. Illustrate a typical conveyance statement.

(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) (i) Summarise the cube rate estimate for building. 4  
 (ii) Compute a preliminary estimate for a building project with a total plinth area of all building 1500 sq.m.

Plinth area rate - Rs. 1000/sq.m.

Water supply and sanitary - 5% of the building cost.

Internal electrification - 12% of the building cost. 4

- (b) Compute the quantity of earth work for a portion of road from the following data.

Chainage	0	1	2	3	4	5	6	7	8	9
RL	7.50	7.70	7.50	7.25	6.85	6.95	6.70	6.45	6.30	5.95

The formation level at chainage 0 is 8.0 and having falling gradient of 1 in 100. The top width is 12m and side slopes 1 $\frac{1}{2}$  horizontal to 1 Vertical assuming the transverse direction is in level calculate the quantity of earth work. Take 1 chain = 20m by using trapezoidal formula. 7

OR

- IV (a) The plinth area of an apartment is  $500 \text{ m}^2$ . Compute the total cost of building from the following data :
- (i) Rate of construction = Rs. 1230 per  $\text{m}^3$ .
  - (ii) The height of apartment = 16.25m.
  - (iii) Water Supply, Sanitary and Electrical installations each at 6% of building cost.
  - (iv) Architectural appearance @ 1% of building cost.
  - (v) Unforeseen item @ 2% of Building cost.
  - (vi) P.S. and contingencies @ 4% of building
- (b) The following are the details of a road embankment. Width of road embankment is 10m. The side slopes are 2:1. The depth along the centre line road at 50m intervals are 1.25, 1.10, 1.50, 1.20, 1.0, 1.10, 1.15m. Compute the quantity of earth work by Mid sectional rule.

## UNIT — II

- V (a) Assess the quantity of earth work in excavation in foundation in ordinary soil for the given drawing. (fig.1)
- (b) Compute the quantity of brick masonry for super structure in cement mortar 1:6 for the given drawing. (fig.1)

OR

- VI (a) Compute the quantity of R.C.C work for roof slab and lintel for the given drawing. (fig.1)
- (b) Compute the quantity of random rubble masonry in cement mortar 1:6 for foundation and basement for the given drawing. (fig.1)

## UNIT — III

- VII (a) Compute the quantity of painting (two coat over a coat of priming) to doors and windows for the given drawing. (fig.1)
- (b) (i) Compute the quantity of earth work excavation in foundation for a ground level water tank. (fig.2)
- (ii) Compute the quantity of cement pointing (inside and out side) walls of the well using cement mortar 1:2 (fig.4).

OR

- VIII (a) Compute the quantity of white washing to internal and external walls for the given drawing (fig.1)
- (b) Assess the quantities of the following items for a state highway for 2 km from the given drawing. (fig.3)
- (i) Land acquisition
  - (ii) Plantation of grass on the side slopes

## UNIT — IV

IX (a) Conclude the following :

- (i) Conveyance charge
- (ii) Contractors profit
- (iii) Lump sum item

6

(b) Assess the rate of brick masonry for super structure in 1:6 cement mortar.  
Unit 1 cum.MaterialsLabour

Country bricks - 500 Nos.

Mason - 1.4 @ Rs. 850/head/day

Cement - 105 kg @ Rs.8,000/ton

Men mazdoor - 0.7 @ Rs.750/head/day

Sand - 0.42 cum @ Rs.1,200/cum

Women mazdoor - 2.1 @ Rs.700/head/day

Conveyance statement

Sl. No.	Materials	Cost at source Rs.	per	Lead in km	Conveyance charges per km Rs.
1	Brick	9000	1000 Nos.	18	12

Add contractors profit 10%.

9

OR

X (a) Compare cost of material at source and cost of material at site.

6

(b) Assess the rate of Cement Concrete in (1:5:10) - Unit 1cum.

MaterialsLabour

40mm metal - 0.92 cum

Mason - 0.2 @ Rs.850/head/day

Cement - 0.092 cum  
@ Rs.8000/ton

Men mazdoor - 1.8 @ Rs.750/head/day

Sand - 0.46 cum

Women mazdoor - 1.4 @ Rs.700/head/day

Conveyance statement

Sl. No.	Materials	Cost at source Rs.	per	Lead in km	Conveyance charges per km Rs.
1	cement	...	...	...	...
2	40mm metal	700	cum	12	12
3	sand	1000	cum	14	15

9

3



(15) 4013

Scoring indicators

Code- 4013

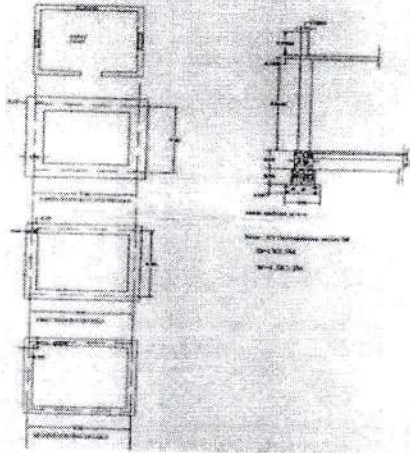
Version - D

# QUANTITY SURVEYING-I

In.NO	Scoring indicators	Split score	Total Score																												
	<b>PART -A</b>																														
I	<p>1.</p> <ul style="list-style-type: none"> <li>▪ managing the finances for any kind of construction project, whether it's a house, a high-rise, a bridge, or a tunnel</li> <li>▪ working to keep the project on time</li> <li>▪ working to keep the project within the budget</li> <li>▪ making sure that construction costs and production are managed as efficiently as possible</li> <li>▪ resolving disputes between contracting parties.</li> <li>▪ preparing insurance replacement estimates for all kinds of buildings, including houses.</li> </ul> <p>2.</p> $V = \frac{L}{3} [(A_1 + A_n) + 4(A_2 + A_4 + A_6 + \dots + A_{n-1}) + 2(A_3 + A_5 + \dots + A_{n-2})]$ $= \frac{\text{length}}{3} (\text{Sum of first and last areas}) + 4(\text{even areas}) + 2(\text{odd Areas})]$ <p>3.      a) m<sup>3</sup>                  b) m<sup>3</sup>                  c) quintal                  d) m<sup>2</sup></p> <p>4. Miscellaneous small items, usually of no large value and too numerous to mention separately</p> <p>5. quantity of work which can be done by an artisan for trade working of 8 hours</p>	<p>Any four</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p> <p>2</p>	10																												
	<b>PART -B</b>																														
II	<p>1. <b>Detailed Estimate</b>            After getting Administrative approval            -detailed estimates are prepared.            -estimate is divided in to sub-heads            -quantities of various items are calculated individually.            - Technical sanction is given on detailed estimate.</p> <div style="display: flex; justify-content: space-around; margin-top: 10px;"> <table border="1" style="font-size: 8px; border-collapse: collapse;"> <caption>Detail of measurements form</caption> <thead> <tr> <th>S.No.</th> <th>Description of Item</th> <th>Length (L) in</th> <th>Breadth (B) in</th> <th>Depth/Height (H) in</th> <th>Quantity</th> <th>Explanatory Notes</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> <table border="1" style="font-size: 8px; border-collapse: collapse;"> <caption>ABSTRACT OF ESTIMATE FORM</caption> <thead> <tr> <th>Item No.</th> <th>Description/Particulars</th> <th>Quantity</th> <th>Unit</th> <th>Rate</th> <th>Per (Unit)</th> <th>Amount</th> </tr> </thead> <tbody> <tr><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td><td> </td></tr> </tbody> </table> </div> <p style="margin-top: 10px;">In the end of the detailed quantities, an <i>abstract of cost</i> giving quantities of each item and rate of every item according to the sanctioned schedule of rates attached.            Detailed specifications &amp; report should also be attached with the estimate.</p>	S.No.	Description of Item	Length (L) in	Breadth (B) in	Depth/Height (H) in	Quantity	Explanatory Notes								Item No.	Description/Particulars	Quantity	Unit	Rate	Per (Unit)	Amount								3	6
S.No.	Description of Item	Length (L) in	Breadth (B) in	Depth/Height (H) in	Quantity	Explanatory Notes																									
Item No.	Description/Particulars	Quantity	Unit	Rate	Per (Unit)	Amount																									

2. Centre line method

- suitable for walls of similar cross sections.
- 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 wall, the centre line length gets reduced by half of breadth for each junction.
- such junction or joints are studied carefully while calculating total centre line length.
- The estimates prepared by this method are most accurate and quick.



FIG

- 3.I) no deduction is made for ends of beams ,posts, rafters
- ii) up to 0.5 m<sup>2</sup> – no deduction or no addition for jambs
- iii) 0.5 to 3m<sup>2</sup> – one side, other face is allowed for jambs
- iv) above 3m<sup>2</sup> – both faces, addition for jambs, sill, soffits

4)

Sl.No.	description of work	No.	length in m	Breadth in m	Heigh/depth in m	Quantity
1	w1	4	1.29		1.38	1.780
	w2	1	1.88		1.08	2.030
					Total	3.811m <sup>2</sup>

5)

SL NO.	description of work	No.	length in m	Breadth in m	Heigh/depth in m	Quantity
1	painting first coat					
	1.stone grit 20mm	1	2000	3.75x 1.35/100		101.250
	2.binder road tar	1	2000	3.75x220/100		16500.000

stone grit= 101.25 m<sup>3</sup>  
binder road tar= 16500 kg

3

3

6

4x1.5

6

2

2

2

6

2

6

6. Quantity of R.C.C-3.5X4.4X0.10 = 1.54

Cement @403 kg/m<sup>3</sup> = 12.41 bag

Fine aggregate @0.42m<sup>3</sup>/m<sup>3</sup> = 0.6468m<sup>3</sup>

Coarse aggregate@0.84m<sup>3</sup>/m<sup>3</sup> = 1.2936 m<sup>3</sup>

2

2

2

6

7. Form of conveyance statement

S.No.	Materials	Cost at Source Rs. -- Ps.	Per	Lead in Km	Conveyance Charges per km
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3

The distance between the source of availability of material and construction site is expected in Km.

The cost of conveyance of material depends on lead.

This statement will give the total cost of materials per unit item.

It includes first cost, conveyance loading, unloading stacking, charges etc.

3

6

PART -C

Unit-I

a) i) - This method is generally used for multi-storeyed buildings.

- It is more accurate than the other two methods viz., plinth area method and unit base method.

-The cost of a structure is calculated approximately as the total cubical contents (Volume of buildings) multiplied by Local Cubic Rate.

-The volume of building is obtained by Length x breadth x depth or height.

-The length and breadth are measured out to out of walls excluding the plinth off set. --

- The cost of string course, cornice, corbelling etc., is neglected.

- The cost of building= volume of buildings x rate/ unit volume.

4

ii) Plinth area = 1500m<sup>2</sup>

Plinth area rate = Rs. 10000 per m<sup>2</sup>.

Cost of building = 1500 x 10000 = Rs. 1,50,00000

Add the cost of the water supply charges @5%=1,50,00000x5/100  
= 750000

Add the cost of the electrification charges @12%=1,50,00000x12/100  
= 1800000

Total =Rs. 17550000

1

1

1

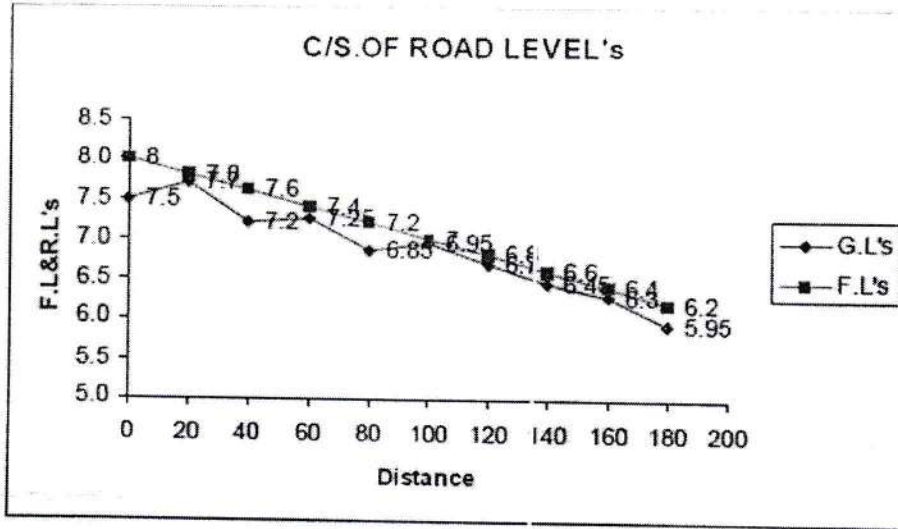
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8

(11)

6

b)



b=12m      n=5

Chainage	Distance	Reduced level	Formation Level	Depth(d) of		Area of	
				Embankment	Cutting	Embankment bd+nd <sup>2</sup>	Cutting
0	0	7.50	8.0	0.50		6.375	
1	20	7.70	7.8	0.10		1.275	
2	40	7.50	7.6	0.10		1.215	
3	60	7.25	7.4	0.15		1.839	
4	80	6.85	7.2	0.35		4.38	
5	100	6.95	7.0	0.05		0.63	
6	120	6.70	6.8	0.10		1.215	
7	140	6.45	6.6	0.15		1.837	
8	160	6.30	6.4	0.10		1.215	
9	180	5.95	6.2	0.25		3.09	

Trapezoidal formula :

$$V = L \left[ \left( \frac{A_1 + A_n}{2} \right) + (A_2 + A_3 + \dots + A_{n-1}) \right]$$

$$= 20 \left[ \left( \frac{6.375 + 3.09}{2} \right) + (1.215 + 1.215 + 1.837 + 4.38 + 0.63 + 1.215 + 1.837 + 1.215) \right]$$

$$= 365.53 \text{m}^3$$

5

1

1

7



3

a)

Sl.No.	description of work		length in m	Breadth in m	Heigh/depth in m	Quantity
1	Earth work excavation	1	36	0.8	0.75	21.600
						21.6 m <sup>3</sup>

b)

Sl.No.	description of work		length in m	Breadth in m	Heigh/depth in m	Quantity
1	brick masnory	1	37.8	0.2	3	22.680
	gable portion	2x.5	6.6	0.3	0.5	0.990
	central wall	1	6.6	0.3	0.5	0.990
						0.000
						24.660
	deduction					
	D1	1	1	0.3	2.1	0.63
	D2	2	0.9	0.3	2.1	1.134
	D3	1	0.8	0.3	2.1	0.504
	W1	4	1.5	0.3	1.5	2.7
	W2	1		1	0.3	1.2
	V1	1	1	0.3	0.5	0.15
						6.318
	lintel	1	37.8	0.3	0.15	1.701

net

7 7  
4  
3  
1 8

notes

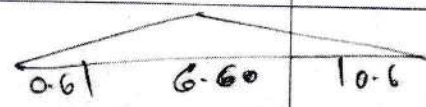
- ① Detailed quantities should be worked out in proper form.
- ② weightage may be given for computing the detailed quantities in proper form.


(9)

## Scoring Indicators

Code : 4013

Version: D

Qn. No.	Scoring Indicators	Split score	Total score
VI	<p>a) RLC work for roof slab</p> <p>Sloping length <math>\sqrt{\left(\frac{7.80}{2}\right)^2 + 0.5^2}</math> </p> <p>Qty - <math>1 \times \frac{1}{2} \times 3.93 \times 7.80 \times 0.12 = 1.839 \text{ m}^3</math></p> <p>Lintel <math>1 \times 37.80 \times 0.30 \times 0.15 = 1.701 \text{ m}^3</math></p> <p style="text-align: right;">Total <math>3.54 \text{ m}^3</math></p>	10.6 15 d/t 3 1/2	3 (2 7)
	<p>b) RR masonry</p> <p>Foundations <math>1 \times 38.40 - \left(\frac{1}{2} \times 6 \times 0.60\right) \times 0.60 \times 0.60</math>  <math>= 13.176 \text{ m}^3</math></p> <p>Basement <math>1 \times 38.40 - \left(\frac{1}{2} \times 6 \times 0.45\right) \times 0.45 \times 0.45</math>  <math>= 7.502 \text{ m}^3</math></p> <p>Total = <math>20.678 \text{ m}^3</math></p>	4 4	8
VII	<p>a) Painting to Doors and windows</p> <p>Doors fully panelled</p> <p>D<sub>1</sub> - <math>1 \times 2.25 \times 1.00 \times 2.10 = 4.725 \text{ m}^2</math></p> <p>D<sub>2</sub> - <math>1 \times 2.25 \times 0.90 \times 2.10 = 4.253 \text{ m}^2</math></p> <p>D<sub>3</sub> - <math>1 \times 2.25 \times 0.80 \times 2.10 = 3.780 \text{ m}^2</math></p> <p style="text-align: right;"><u>12.758 m<sup>2</sup></u></p> <p>Glazed windows</p> <p>W<sub>1</sub> - <math>4 \times 1 \times 1.5 \times 1.5 = 9.00 \text{ m}^2</math></p> <p>W<sub>2</sub> - <math>1 \times 1 \times 1.00 \times 1.20 = 1.20 \text{ m}^2</math></p> <p style="text-align: right;"><u>10.20 m<sup>2</sup></u></p>	1 1 1 1 1 1 1	7
	<p>b) EW for ground level water tank</p> <p>i) <math>1 \times 4.30 \times 2.80 \times 3.10 = 37.324 \text{ m}^3</math></p> <p>ii) Inside wall <math>1 \times \pi \times 2.00 \times 14.20 = 89.17 \text{ m}^2</math></p> <p>But side <math>1 \times \pi \times 2.60 \times 0.45 = 3.67 \text{ m}^2</math></p> <p>Top <math>1 \times \pi \times 2.30 \times 0.30 = 2.17 \text{ m}^2</math></p> <p style="text-align: right;">Total <math>95.01</math></p>	2 1 1 1 2	8

Qn. No.	Scoring Indicators	Split score	Total score
VIII	a) White washing to internal and External walls Internal walls. Hall $1 \times (3 + 4.50) 2 \times 3 = 45.00 \text{ m}^2$ Bed $1 \times (3 + 3.00) 2 \times 3 = 36.00 \text{ m}^2$ Toilet $1 \times (1.50 + 1.50) 2 \times 3 = 18.00 \text{ m}^2$ Kitchen $1 \times (4.50 + 3.00) 2 \times 3 = 45.00 \text{ m}^2$ Grable ends $2 \times 4 \times \frac{1}{2} \times 3 \times 0.38 = 4.56 \text{ m}^2$ Ceatal wall $2 \times 6.00 \times 0.38 = 4.56 \text{ m}^2$ Total = $189.12 \text{ m}^2$	3	
	External plastering $1 \times 26.40 \times 3.00 = 79.20 \text{ m}^2$ Grable ends $2 \times \frac{1}{2} \times 6.15 \times 0.50 = 3.30 \text{ m}^2$ Total = $82.50 \text{ m}^2$	2	
	Grand Total = $271.62 \text{ m}^2$		
	<u>Deductions</u> D <sub>1</sub> - $1 \times 1.00 \times 2.10 = 2.10 \text{ m}^2$ D <sub>2</sub> - $2 \times 0.90 \times 2.10 = 3.78$ D <sub>3</sub> - $1 \times 0.90 \times 2.10 = 1.89$ W <sub>1</sub> - $4 \times 1.50 \times 1.50 = 9.00$ W <sub>2</sub> - $1 \times 1.00 \times 1.20 = 1.20$ V - $1 \times 1.00 \times 0.50 = 0.50$ Total = $18.47 \text{ m}^2$	3	
	Net = $253.15 \text{ m}^2$	3	89
	b) i) <u>Land required</u> Permanent $20000 \times 30 = 60000 \text{ m}^2$ Temporary = Qty. of Earth work Depth of borrow pit $= (10 \times 1 + 2 \times 1^2) \times 2000 = 24000 \text{ m}^2$	2	
	Land required = $\frac{24000}{0.30} = 80000 \text{ m}^2$ = 8 hectre	1	
	ii) <u>Plantation of grass</u>  $2000 \times 18 + \frac{1}{2} \times (2000 + 2000) \times 18 = 8960 \text{ m}^2$	3	6

### Scoring Indicators

Code :

Version:

Qn. No.	Scoring Indicators	Split score	Total score														
X	<p>a) Material at site            Cost of materials for some major projects depends the <sup>location</sup> source to the site            material at site = material at source + Conveyance charges.            A conveyance statement is prepared and cost of material is calculated.</p> <table border="1" data-bbox="245 730 1154 919"> <thead> <tr> <th>Sl. No.</th> <th>Material</th> <th>Cost at source</th> <th>Per</th> <th>Lead in km</th> <th>Conveyance charge</th> <th>Cost at site</th> </tr> </thead> <tbody> <tr> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> <td> </td> </tr> </tbody> </table>	Sl. No.	Material	Cost at source	Per	Lead in km	Conveyance charge	Cost at site								3	6
Sl. No.	Material	Cost at source	Per	Lead in km	Conveyance charge	Cost at site											
	<p>b) Material</p> <p>40 mm metal 0.92 m<sup>3</sup> @ 700/m<sup>3</sup> = 644.00</p> <p>Cement 0.092 m<sup>3</sup> @ 8000/ton = 6064.00</p> <p>Sand 0.46 m<sup>3</sup> @ 1000/m<sup>3</sup> = 460.00</p> <p><u>Labour</u></p> <p>men 1.40 @ Rs 850/day = 1190.00</p> <p>boy 0.70 @ Rs 750/day = 525.00</p> <p>women 2.10 @ Rs 700/day = 1470.00</p> <p style="text-align: right;"><u>5353.00</u></p> <p>Add Conveyance</p> <p>40 mm metal 0.92 x 12 x 12 = 132.48</p> <p>Sand 0.46 x 14 x 15 = 96.60</p> <p style="text-align: right;"><u>5582.08</u></p> <p style="text-align: center;">Total</p> <p style="text-align: center;">Eq Rs <u>5583/m<sup>3</sup></u></p>	1	9														

Scoring Indicators

Code :

Version:

Qn. No.	Scoring Indicators	Split score	Total score
12	<p>a) i) <u>Conveyance charges</u> -                      when the requirement of material is more bulk volume of materials has to purchase.                      - The material has to be transported to site                      - The cost of material at site depends on least                      - The statement given in the table showing the least in km and rate per km gives the conveyance charges</p> <p>ii) <u>Contractor profit</u>                      - profit is the allowances to the contractor to earn their living                      - profit is stated as a percentage of a total cost of the job.</p> <p>iii) <u>Lumpsum items</u> - while preparing an estimate it is not possible to work out in detail in case of petty items. Such items are called L.S.</p>	2  2  2	6
	<p>b) <u>Brick masonry 1:6 Cement mortar</u>  <u>Materials</u></p> <p>Brick 500 nos @ Rs <math>\frac{9000}{1000 \text{ nos}}</math> = 4500.00</p> <p>Cement 105 kg @ Rs <math>\frac{8000}{\text{ton}}</math> = 840.00</p> <p>Sand 0.42 m<sup>3</sup> @ Rs <math>\frac{1200}{\text{m}^3}</math> = 504.00</p> <p><u>Labour</u></p> <p>Mason @ 1.40 @ Rs 850 = 1190.00</p> <p>Man @ 0.70 @ Rs 750 = 525.00</p> <p>Women 2.60 @ Rs 700 = 1470.00</p> <p style="text-align: right;">9029.00</p> <p>Add conveyance of brick  <math>500 \times 18 \times 12 = 108000</math>  <math>\frac{1000}{1000}</math> = 108.00</p> <p style="text-align: right;">9137.00</p> <p>Add CP 0%</p> <p style="text-align: right;">914.00</p> <p style="text-align: right;">10051.00</p>	1 1 1  1 1 1  1 1 1  1 1 1	9