Solution for Internal Assessment Test 1 – Sept. 2018

Sub:	ESTIMATION AND VALUTION	Sub Code:	10CV73	Branch:	CIVIL

Answer PART A Compulsorily any TWO Questions from PART B
Assume any missing data suitably

MARKS | CO | RBT

PART A

1 Work out from first principles the rates per unit for any two items of work from the following: [10] CO2 2
(a) Cement concrete 1:2:4 in foundation
(b) 6 mm thick cement plastering of 1:3 to RCC ceiling
(c) Distempering two coats

Each item 5 marks ; total 10 marks

(a) **(a) Cement concrete 1:2:4 in foundation**

Total volume of dry materials required = 15.2 m^3
Cement = 1/7×15.2 = 2.2 m^3 =2.2×30 = 66 bags
Sand = 2/7×15.2 = 4.3 m^3
Ballast = 4/7×15.2 = 8.7 m^3

Unit cub.m			Take 10 cub.m		
S. N	Particulars	Unit	Rate	Quantity	Total, Rs
Materials					
1	Cement	bag	360	66	23760
2	Sand	cub.m	850	4.3	3655
3	Stone ballast	cub.m	750	8.7	6525
Sum					33940
Labour					
1	Head mason	No	800	0.3	240
2	Mason	No	600	2	1200
3	Mazdoor	No	400	12	4800
4	Boy/Woman coolie	No	300	20	6000
5	Bhishti	No	300	6	1000
	Sundries				1000
Sum					14240
Total					48180
Add 10% contractor's profit					4818
Add 1.5% for water charges					722.7
Grand Total=					53720.7
Rate in Rs./cub.m					5372.07

(b) **6 mm thick cement plastering of 1:3 to RCC ceiling**

Total volume of dry materials required = 1 m^3
Cement = 1/4×1 = 0.25 m^3 =0.25×30 = 7.5 bags
Sand = 3/4×1 = 0.75 m^3

Unit sq.m			Take 100 sq.m		
S.N	Particulars	Unit	Rate	Quantity	Total, Rs
Materials					
1	Cement	bag	360	7.5	2700
2	Sand	cub.m	850	0.75	637.5
Sum					3337.5
Labour					
1	Head mason	No	800	0.25	200

	2	Mason	No	600	12	7200
	3	Mazdoor	No	400	10	4000
	4	Bhishti	No	300	0.75	1000
		Sundries				1000
					Sum	13400
					Total	16737.5
					Add 10% contractor's profit	1673.75
					Add 1.5% for water charges	251.0625
					Grand Total=	18662.31
					Rate in Rs./sq.m	186.6231

(c) **Distempering two coats**

Unit sq.m			Take 100 sq.m		
I coat of distempering					
S.N	Particulars	Unit	Rate	Quantity	Total, Rs
1	Dry distemper	kg	150	6.5	975
2	Expert wite washer	No	600	2	1200
3	Boy coolie	No	400	2	800
4	Sundries				1000
				Sum	3975
				Add 10% contractor's profit	4372.5
II coat of distempering					
S.N	Particulars	Unit	Rate	Quantity	Total, Rs
1	Dry distemper	kg	150	5	750
2	Expert wite washer	No	600	1.5	900
3	Boy coolie	No	400	1.5	600
4	Sundries				1000
				Sum	3250
				Add 10% contractor's profit	3575
				Grand total for 2 coats	7947.5
				Rate in Rs./sq.m	79.48

2 Work out from first principles the rates per unit for any two items of work from the following: [10] CO2 2

(a) Course rubble masonry in superstructure in 1:6 cement mortar

(b) First class brickwork in superstructure with 1:6 cement mortar

(c) Mosaic flooring

Each item 5 marks ; total 10 marks

(a) **(a) Course rubble masonry in superstructure in 1:6 cement mortar**

10 m^3 = 12.5 m^3 of stone

10 m^3 = 25 m^3 of dry mortar

Cement = 1/7×2.5 = 0.36 m^3

Sand = 6/7×2.5 = 2.14 m^3

Unit cub.m			Take 10 cub.m		
S. N	Particulars	Unit	Rate	Quantity	Total, Rs
Materials					
1	Cement	bag	360	10.8	3888
2	Sand	cub.m	850	2.14	1819
3	Stone undressed	cub.m	4500	12.5	56250
			Sum		61957
Labour					

1	Head mason	No	800	0.5	400
2	Mason inlcuding cutter	No	600	28	16800
3	Mazdoor	No	400	20	8000
4	Boy/Woman coolie	No	300	20	6000
5	Bhishti	No	300	1.5	1000
	Scaffolding+Sundries				3500
Sum					35700
Total					97657
Add 10% contractor's profit					9765.7
Add 1.5% for water charges					1464.855
Grand Total=					108887.6
Rate in Rs./cub.m					10888.76

First class brickwork in superstructure with 1:6 cement mortar
10 m3 = 5000 bricks
10 m3 = 3 m3 of dry mortar
Cement = 1/7×3 = 0.43 m3 or 0.45 m3 = 13.5 bags
Sand = 6/7×3 = 2.58 m3 or 2.7 m3

Unit cub.m				Take 10 cub.m	
S.N	Particulars	Unit	Rate	Quantity	Total, Rs
Materials					
1	Cement	bag	360	13.5	4860
2	Sand	cub.m	850	2.7	2295
3	Bricks	No	5000	12.5	62500
Sum					69655
Labour					
1	Head mason	No	800	0.5	400
2	Mason	No	600	10	6000
3	Mazdoor	No	400	7	2800
4	Boy/Woman coolie	No	300	10	3000
5	Bhishti	No	300	2	600
	Scaffolding+Sundries				3500
Sum					16300
Total					85955
Add 10% contractor's profit					8595.5
Add 1.5% for water charges					1289.325
Grand Total=					95839.83
Rate in Rs./cub.m					9583.983

(c) **Mosaic flooring**

$0.02 \times 100 = 2\ m^3$
To account for irregularity in surface, add 10% increase = $2.2\ m^3$
To account for dry volume = $2.2 \times 1.5 = 3.3\ m^3$
Quantity of cement = $1/7 \times 3.3 = 0.47\ m^3 = 14.1$ bags
Quantity of sand = $2/7 \times 3.3 = 0.94\ m^3$
Quantity of aggregates = $1.88\ m^3$
6 mm thick mosaic 1:1.5
$0.006 \times 100 = 0.6$
Add 10% increase = $0.66\ m^3$
For dry batching = $0.66 \times 1.5 = 0.99\ m^3$
Quantity of cement = $2/5 \times 0.99 = 0.4\ m^3$
Quantity of mosaic chips = $1.5 \times 0.4 = 0.6\ m^3$
Quantity of marble dust = $0.1 \times 0.4 = 0.04\ m^3$

Unit sq.m				Take 100 sq.m	
S.N	Particulars	Unit	Rate	Quantity	Total, Rs

Materials					
20 mm cc					
1	Cement	bag	360	14.1	5076
2	Sand	cub.m	850	0.94	799
3	Stone ballast	No	750	1.88	1410
Mosaic flooring					
4	Cement	bag	360	12	4320
5	Mosaic chips	cub.m	1800	0.6	1080
6	Marble chips	No	1500	0.04	60
Sum materials					12745
Labour					
1	Head mason	No	800	0.5	2800
2	Mason	No	600	10	3000
3	Mazdoor	No	400	7	600
4	Boy/Woman coolie	No	300	10	3500
5	Bhishti	No	300	2	22645
	Polishing stone+oxalic acid powder				1500
	Scaffolding+Sundries				1000
Sum labour					35045
Total					47790
Add 10% contractor's profit					4779
Add 1.5% for water charges					716.85
Grand Total=					53285.85
Rate in Rs./cub.m					532.8585

PART B

3 Estimate the quantity of earthwork from chainage 20 to 26 measured with a standard 20 m chain from the following data adopting average end arear formula. The formation at chainage 20 is 88.5 and the road has a rising gradient of 1 in 100. The formation width of the road is 10 m and side slopes in cutting 1:1 and banking 2:1. [15] CO3 L2

Chainage	20	21	22	23	24	25	26
Ground level above datum	88.10	87.74	87.8	88.20 90.40	90.76	90.20	89.98

RL of formation - 1
Height of bank - 3
Mean height -3
Area -3
Quantity -2
Total banking - 1
Total cutting -1
Net quantity - 1

Chainage	20	21	22	23	24	25	26
Ground level above datum	88.1	87.74	87.8	88.2 90.4	90.76	90.2	89.98
Distance,m	0	20	40	460	480	500	520
RL of formation	88.5	88.7	88.9	89.1	89.3	89.5	89.7
Height of bank	0.4	0.96	1.1	0.9 -1.3	-1.46	-0.7	-0.28
Mean height		0.68	1.03	1	1.38	1.08	0.49
Area		7.7248	12.4218	12	15.7044	11.9664	5.1401
Quantity		154.496	248.436	240	314.088	239.328	102.802
Total banking	**642.932**						
Total cutting	**656.218**						
Net quantity	**13.286**						

4 Estimate the quantity of earthwork for a proposed road of formation width 10 m, side slopes 3:1. The longitudinal profile of the ground is as follows. The ground is level transversely. The RL of the formation is 204.00 at change 180 m, the formation has a longitudinal rising gradient of 1 in 60 from 0 chaiange to 300 m chainage. Work out the volume of earthwork using the prismoidal formula. If the rate of earthwork is Rs. 75 per cu.m, what is is the cost? [15] CO3 L2

Chainage	0	30	60	90	120	150	180	210	240	270	3
RL of the ground	198.6	199.7	200.5	201.6	202.4	203.0	204.0	202.5	201.4	201.8	19

RL of formation – 1
Height of bank - 2
Mean height -2

B*(d1+d2)*0.5 -3
2/3*[d1^2+d2^2+d1*d2} - 3
Quantity -1
Total banking - 1
Total cutting -1
Net quantity - 1

Chainage	0.00	30.00	60.00	90.00	120.00	150.00	180.00	210.00	240.00	270.00
RL of the ground	198.60	199.70	200.50	201.60	202.40	203.00	204.00	202.50	201.40	201.80
RL of formation	201.00	201.50	202.00	202.50	203.00	203.50	204.00	204.50	205.00	205.50
height of banking/cutting	2.40	1.80	1.50	0.90	0.60	0.50	0.00	2.00	3.60	3.70
(d1+d2)/2		2.10	1.65	1.20	0.75	0.55	0.25	1.00	2.80	3.65
B*(d1+d2) *0.5		21.00	16.50	12.00	7.50	5.50	2.50	10.00	28.00	36.50
2/3*[d1^2+ d2^2+d1*d 2}		8.88	5.46	2.94	1.14	0.61	0.17	2.67	16.11	26.65
Total area		29.88	21.96	14.94	8.64	6.11	2.67	12.67	44.11	63.15
Sum	308.44									
Cost	23133									

5 Prepare a detailed estimate for earthwork for the portion of a road from the following data: [06] CO3 L2

Formation width of the road is 10 m, Side slope 2:1 in banking and $1\frac{1}{2}$: 1 in cutting. The cost of filling is Rs.

Chainage	0	100	200	300	400	500	600	700	800	900	1000	1100	1200
RL of the ground	114.50	114.75	115.25	115.20	116.10	116.85	118.00	118.25	118.10	117.80	117.75	117.90	119.50
RL of formation in m	115	Upward gradient upto 600 as 1 in 200 and from 600					Downward gradient of 1 in 400						

220/m³ and cutting is Rs. 150/m³.

RL of formation - 1
Height of bank - 3
Cross slope chainage -3
Area -3
Quantity -2
Total banking - 1
Total cutting -1
Net quantity - 1

Chainage	RL of the ground	RL of formation	height of banking/cutting	Area	Average area	length	Quantity	Total Quantity	Cost	Total cost
0	114.5	115	0.5	5.5				5237.764	1152308	1377242
100	114.75	115.5	0.75	8.625	7.0625	100	706.25			
200	115.25	116	0.75	8.625	8.625	100	862.5			
300	115.2	116.5	1.3	16.38	12.5025	100	1250.25			
400	116.1	117	0.9	10.62	13.5	100	1350			
500	116.85	117.5	0.65	7.345	8.9825	100	898.25			
546.43		117.7322	0	0	3.6725	46.43	170.5142			
600	118	117.25	-0.75	-6.65625	-3.32813	53.57	-178.288	-1499.56	224934.4	
700	118.25	117	-1.25	-10.1563	-8.40625	100	-840.625			
800	118.1	116.75	-1.35	-10.7663	-10.4613	100	-1046.13			
900	117.8	116.5	-1.3	-10.465	-10.6156	100	-1061.56			
1000	117.75	116.25	-1.5	-11.625	-11.045	100	-1104.5			
1100	117.9	116	-1.9	-13.585	-12.605	100	-1260.5			
1200	119.5	115.75	-3.75	-16.4063	-14.9956	100	-1499.56			

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