

Internal Assessment Test 3–June-2022
(Academic Year 2021-22-Even)
(Solution and Scheme of Valuation)

Sub:	Quantity Survey and contract Management	SubCode:	17CV81	Branch:	Civil
Date:	17/6/2022	Duration:	90min	MaxMarks:	50
		Sem/Sec:	VIII– C		

1 Write the specification for the following
a. Earthwork in excavation

1. Earthwork excavation:

Excavation:

1. The excavation for the foundation trenches shall be carried out in all sort of soil as per plan approved at site. For that, necessary working of Centre line shall be done.
2. The sides of foundation trenches shall be truly vertical and bottom shall be uniformly leveled.
3. If the soil is not good, sides should be sloped back or timber shoring is provided.
4. The excavated material shall be stacked away from the sides of trench of the excavation by at least 1m.

Finish of the trench:

1. The bed of the trenches shall be lightly watered and will ram.
2. It should be level both longitudinally and transversely.
3. Soft or defective spots shall be dug out and removed and filled with concrete or with stabilized soil.
4. The excavation shall be measured as per exact length and width of lowest footing (as per the drawings).The depths of trench shall be measured vertically.

Finds:

1. The material of valuable things during excavation shall be property of the Government.

Trench filling:

1. The excavated material shall be filled in the plinth in layers of 15cms watered and well-rammed.
2. The excess (surplus) material shall be spread out uniformly up to lead of 100m leveled and dressed..

Water:

1. Water, if any accumulates in the trench, should be pumped out without any extra payment and necessary precautions shall be taken to prevent surface water to enter into the trench.

Excavation in saturated soil

1. Pumping or bailing out of water and removal of slush should also be considered.
2. Any extra support required for trench support should also be accounted for.

Measurement:

1. The rates of excavation include all timbering and other supports, which are necessary for securing the sides of the trenches.
2. Measurement of earthwork is taken in m³.

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CO2

b. Plastering cement mortar or lime mortar

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2. Plastering cement mortar or lime mortar:

Preparation of the surface:

1. The joints of the brickwork shall be raked out to a depth of 18mm (3/4") and the surface of the wall shall be washed and kept for two days before plastering.

Batching and mixing:

1. The materials of mortar, cement and sand or kankar lime shall conform to standard specifications.
2. The materials shall be first dry mixed, by measuring with boxes to have the required proportion, and then water added slowly and gradually and mixed thoroughly.

Process of plastering

1. The thickness of plastering shall be as specified usually 12mm applied in two or three coats. To ensure uniform thickness of plaster, patches of 15cm strips 1m apart or 10cm wide plaster shall be applied first at about 2cm apart to act as a guide.
2. First mortar shall be dashed and pressed over the surface and then brought to a true smooth and uniform surface by means of float and trowel.
3. External plastering shall be started from top and worked down towards floor.
4. Internal plastering shall be started wherever the building frame is ready and centering of the roof slabs has been removed.
5. Ceiling plastering shall be completed before starting of wall plaster. All corners and edges shall be rounded. The plastered surface shall be kept wet for 10 days. The surface should be protected from rain, sun, frost, etc.
6. The second coat shall then be applied on the wetted surface of the second coat and finish smooth to true even surface by float and trowel.

Finishing:

1. The work shall be tested with a straight edge and plumb bob. At the end of the day the plaster shall be left cut clean to line.
2. When the next day's plastering is started the edge of the old work shall be scrapped, cleaned and wetted with cement slurry. At the end of the day the plastering shall be closed on the body of the wall and not nearer than 15cm to any corner.

Curing:

1. Curing shall be started as soon as the plaster has hardened sufficiently not to be damaged when watered. Any defective plaster shall be cut in rectangular shape and replaced.

c. Ist class brickwork in cement mortar

Bricks:

1. Bricks shall be free from cracks and flaws and nodules of free lime.
2. Bricks shall have smooth rectangular faces with sharp corners.
3. Thoroughly burnt, and shall be of deep cherry red or copper colour.
4. Water Absorption Shall not be more than 20% by weight up to class 12.5 and 15% by weight for higher classes.
5. Efflorescence shall not be more than 'moderate' up to class 12.5 and 'slight' for higher class.
6. Compressive Strength Compressive strength of any individual brick shall not be less than the minimum compressive strength for the corresponding class of brick as per 1077 (1992).

Class designation	35	30	25	20	17.5	15	12.5	10	7.5	5	3.5
Avg compressive strength N/mm ²	35	30	25	20	17.5	15	12.5	10	7.5	5	3.5

Mortar:

1. For cement mortar cement shall be fresh Portland cement and confirms IS 12269(1987).
2. Sand shall be clean and free from organic and foreign matters.
3. Proportion of cement sand mortar may be off(1:3 to 1:6 as specified).
4. Materials for mortar shall be measured with measuring box and first mixed dry to have a uniform colour in a clean masonry platform and then mixed thoroughly by turning at least three times.
5. Fresh mixed mortar shall be used, old and stale mortar shall not be used.
6. For lime mortar, lime shall be fresh and slaked and screened at site of work.

Soaking of brick:

1. Soaking of brick- bricks shall be fully soaked in clean water by submerging in a tank for a period of 2 hours immediately before use, otherwise bricks will absorb water from mortar and mortar become weak.

Laying:

1. Bricks shall be well bonded and laid in English bond unless otherwise specified. Vertical joints of consecutive course shall not come directly over one another; vertical joints in alternate course shall come directly over one another.
2. Mortar joints shall not exceed 10 mm.
3. Closers shall be clean cut and best shaped bricks shall be used for face work.
4. Bricks should be laid with frogs upwards except in the top course where frogs shall be placed downward.
5. Brickwork shall not be carried out to more than 1 m height at a time.
6. When one part of the wall has to be delayed, stepping shall be left at an angle of 45°.
7. Projections if made should not be more than ¼ brick projections in one course.
8. All joints should be raked and faces of wall cleaned at the end of each day's work.

Curing:

1. The brickwork shall be kept wet for a period of at least 10 days after laying.

Protection:

1. Protection-The brickwork shall be protected from the effect of sun, rain, frost, etc., during the constructions and until such time it is green and likely to be damaged.

Scaffolding:

1. Scaffolding Scaffolding shall be sound and strong and supports and members sufficiently strong so as to withstand all loads likely to come upon them.

Measurement:

1. Measurement of brickwork is made in m³.The thickness of wall shall be taken as multiple of half brick as half brick 10cm, 1brick 20cm, 1 and 1/2 brick 30cm and so on.

Brickwork in arch:

1. Brickwork in arch-In addition to the above type of arch-rough arch or axed or gauged arch as the case may be, and the centering of the arch should be specified.

d. 2.5 cm cement floor

4. 2.5cm (1") cement concrete floor:

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Materials and proportions:

1. The coarse aggregate shall be hard or tough and free from dust, dirt, etc. the stone ballast shall be of 20mm down size and retained on 4.75 mm square mesh and well graded such that the voids do not exceed 42%. The size of coarse aggregate depends on the nature of the work.
2. The sand shall be coarse of 4.75mm maximum size and down, well graded, clean and free from dust, dirt, and organic matters.
3. Cement shall be fresh ordinary portland cement of standard I.S.I specifications and shall have required tensile and compressive stresses and fineness.
4. Proportion of concrete shall be 1:2:4 as cement: sand: stone ballast or 1:1.5:3. as specified.

Mixing and Laying:

1. Floor shall be leveled and divided into panels of size not exceeding 1 m in its smaller dimension and 2 m in larger dimensions.
 2. Glass or aluminum strips 3 mm thick and depth equal to the thickness of the floor shall be fixed on the base with cement mortar.
 3. Required camber for draining wash water shall be provided.
 4. Mixing of concrete shall be either by hand mixing or by machine mixing.
 2. Initially sand and cement are mixed. After that this mix is placed over aggregate and water is gradually added. Water is added at the rate of 25-30 litres per bag of cement.
 3. The mix shall be mixed thoroughly to give a uniform concrete.
 4. Concrete for one panel shall be mixed in one lot.
 5. Alternate panels shall be laid on alternate days.
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6. The floor shall be laid in two layers. The lower layer being 22mm thick and upper layer 3mm thick.
 7. Concrete shall be placed gently and evenly and compacted by hitting with wooden 'thapies' and then the surface shall be tamped with wooden tampers.
 8. The surface should be smoothened and unevenness if present should be removed using cement mortar.
 9. The whole operation of laying should be complete within 30 minutes.
 10. The surface shall be left undisturbed for 2 hrs and then covered with wet bags and after 24 hrs cured by flooding with water for at least 7 days.
 11. Junctions of floors with walls shall be rounded off neatly.

Coloured floor:

1. For the coloured finish the surface shall be finished with coloured cement or a mixture of ordinary portland cement and coloured pigment in the proportion of 3 cement to 1 colour.
2. For coloured floor the thickness shall be 19 mm and 6 mm.
3. For polished floor the thickness of the surface cement finishing shall be 2.5 mm to allow for grinding and polishing.

Base:

- 1) In ground floor the CC floor is to be laid on a 7.5cm base of lime concrete or weak cement concrete.
- 2) In first floor, the floor is to be laid on the RCC slab, the surface of which has to be made rough with brushes while concrete is green.
- 3) Before laying the CC floor, a neat cement slurry has to be applied to get a good bond.
- 4) The thickness of CC floor for office building, school building and in upper floor should be 4cm.

e. Damp proof course (D.P.C)

5. Damp proof course 2.5 cm in CC 1:1.5:3:

Materials and its proportions

1. D.P.C. consists of cement, coarse sand and stone aggregate of 1:1.5:3 proportions with standard waterproofing compound (1kg per bag of cement).
2. D.P.C shall be applied at the plinth level in a horizontal layer of 2.5cm thickness.
3. Cement shall be fresh ordinary Portland cement of standard I.S.I specifications and shall have required tensile and compressive stresses and fineness.
4. Sand shall be clean, coarse $\leq 4.75\text{mm}$ and stone aggregate shall be hard and tough of 20mm size well graded and should be free from dust.

Mixing

1. It is done in masonry platform or in an iron tray in the proportion of 1:1.5:3.
2. Cement is first mixed thoroughly with water proofing compound to desired quantity and then mixed dry with the sand in the proportion of 1:1.5.
3. This mixture is then mixed dry with the stone aggregate to the required proportion (1:1.5:3).
4. Clean water is then added slowly and gradually and mixed to get a plastic mix of required consistency.
5. The mixing shall be done by turning at least 3 times in order to get uniform and homogeneous concrete.

Laying

1. The plinths surface level must be checked longitudinally and transversely.
2. The top of walls at D.P.C should be laid with frogs of the brick downward.
3. Side strong wooden shuttering of 2.5cm thickness should be fixed properly and firmly to confine the concrete so that the shuttering is not disturbed during compaction and avoid mortar leakage.
4. The inner edges of the shuttering shall be oiled to prevent concrete adhering to it.
5. Plinth top surface must be cleaned and should be wetted before laying the concrete.
6. The concrete should be laid within half an hour of mixing and compacted thoroughly to make dense concrete and levelled both longitudinally and transversely.
7. After 2hrs, the concrete surface shall be made rough so as to form a key with the wall above.
8. D.P.C shall be laid without any joints and in continuation in one day.
9. Unavoidable joints or breaks shall be given at the sills of doors or openings and shall be sloped and should be applied with neat cement wash just before concreting on the following day.
10. Shuttering may be removed after 3 days and on removal the edges should be smooth without any honey combing.

Curing

1. The damp proof course shall be cured by watering and kept wet for 7days, and the construction of wall above may be started. The surface shall be cleaned and wetted before starting masonry.

Reduced level (RL) of ground along the centre line of a proposed road from chainage 10 to chainage 20 are given below. The formation level at the 10th chainage is 107m and the road is in downward gradient of 1 in 150 up to the chainage 14 and then the gradient changes to 1 in 100 downward. Formation width of road is 10m and side slope of banking are 2:1. length of chain is 30m. Prepare an estimate of earthwork at the rate of Rs 275 % cu.m.

Chainage	10	11	12	13	14	15	16	17	18	19	20
RL of Ground	105.00	105.60	105.44	105.90	105.42	104.30	105.00	104.10	104.62	104.00	103.30
RL of Formation	107	Downward gradient of 1 in 150				Downward gradient 1 in 100					

Solution: given data

Formation width of road = B = 10m

Side slope = S = 2

Length of chain = 30m

Calculation for formation level

1. Determination of change in RL of formation from chainage 10 to 14 with downward gradient of 1 in 150

decrease in RL of formation for 30m = $(1/150) \times 30 = 0.20\text{m}$

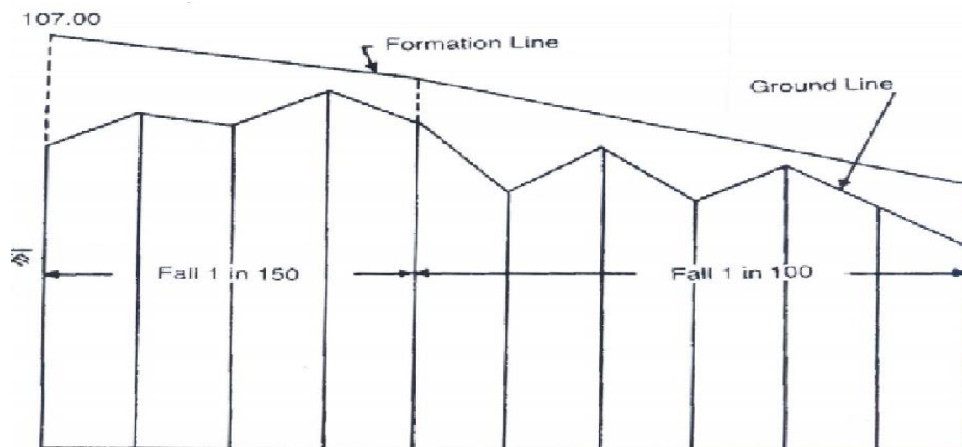
2. Determination of change in RL of formation from chainage 14 to 20 with downward gradient of 1 in 100

decrease in RL of formation for 30m = $(1/100) \times 30 = 0.30\text{m}$

Height of Bank = RL of formation – RL of ground

Chainage	10	11	12	13	14	15	16	17	18	19	20
Distance	30	33	36	39	42	45	48	51	54	57	60
	0	0	0	0	0	0	0	0	0	0	0
RL of Ground	105.00	105.60	105.44	105.90	105.42	104.30	105.00	104.10	104.62	104.00	103.30
RL of Formation	107.00	106.80	106.60	106.40	106.20	105.90	105.60	105.30	105.00	104.70	104.40
Height of bank	2.00	1.20	1.16	0.50	0.78	1.60	0.60	1.20	0.38	0.70	1.10

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Station or chainage	Length	height	Mean height	Total area $BD+sD^2$	Length between sections	quantity	
						Bank	Cut

						ing	ing
10	300	2.00	-	-	-	-	-
11	330	1.20	1.60	21.120	30	633.6	
12	360	1.16	1.18	14.585	30	437.4	
13	390	0.50	0.83	9.678	30	290.4	
14	420	0.78	0.64	7.219	30	216.6	
15	450	1.60	1.19	14.732	30	441.9	
16	480	0.60	1.10	13.420	30	402.6	
17	510	1.20	0.90	10.620	30	318.6	
18	540	0.38	0.79	9.148	30	274.5	
19	570	0.70	0.54	5.983	30	179.4	
20	600	1.10	0.90	10.620	30	318.6	
					Total	3513.6	
						m ³	

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Ite m No.	Particul ars of Item	Quantit y	Unit	Rate	Per	Cost
1	Earth work in banking	3513.6	Cu. m	275.00	% cu.m	9662.40
					Total	9662.40
					Add 5%	483.12
					Grand total	10145.52

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