

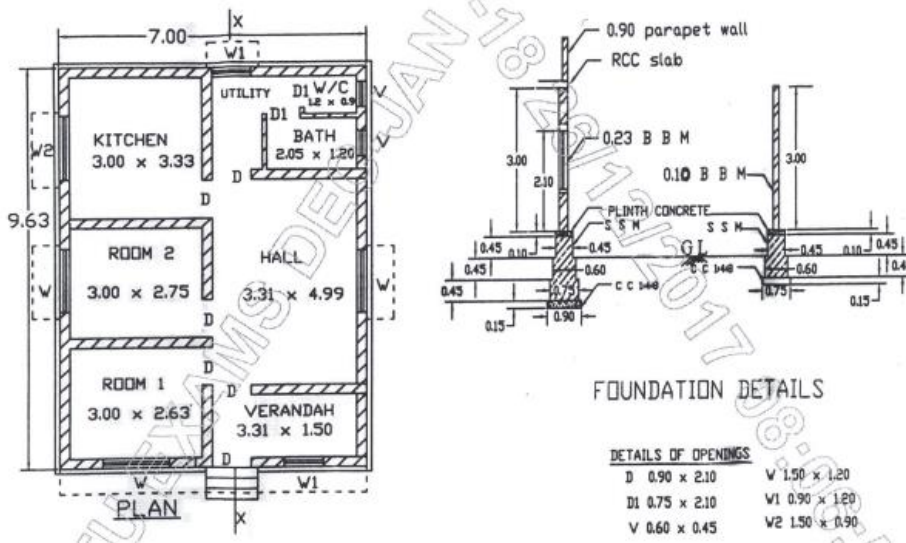
Solution for Internal Assessment Test II

– October. 2018

Sub:	ESTIMATION AND VALUATION	Sub Code:	10CV73	Branch:	CIVIL	
Answer PART A Compulsorily any TWO Questions from PART B				MARKS	CO	RB
Assume any missing data suitably						T

PART A

1	<p>The plan and cross section of walls of residential building are shown in Fig.1.1.. Work out the quantities and prepare the cost abstract of the following items of work by centre line method.</p> <p>(a) Earthwork excavation for foundation in ordinary soil @ Rs. 115/m³</p> <p>(b) Size stone masonry in foundation and basement with cement mortar 1:6 @ Rs. 2800/m³ (foundation) and Rs. 3450/m³(basement).</p> <p>(c) First class brick masonry for super structure in cement mortar 1:6 @ Rs. 3800/m³ (only for main wall).</p>	[30]	CO1	3
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Centre line – 7 marks
 Each item – 7+7+9

Centre line length for 23 cm wall = $(9.63 - 0.23) \times 3 + 3.23 \times 4 + 3.54 \times 4 = 55.28$ m
 Centre line of 10 cm wall = $2.05 + 0.05 + 0.23 \times 0.5 + 1.2 + 0.23 \times 0.5 + 0.05 + 0.9 + 0.05 + 0.23 \times 0.5 = 4.645$ m
 23x10 cm wall junctions = 3
 10x10 cm wall junctions = 1
 23x23 cm wall junctions = 10

S. N	Particulars	No	L	B	H	Qty	Remarks
1	Earthwork excavation						
	23 cm wall	1	46.28	0.9	1.05	43.73	$55.28 - 10 \times 0.9$
	23 cm wall	1	1.195	0.75	0.6	0.54	$4.645 - 3 \times 0.9 - 1 \times 0.75$
						44.27	
2	Stone masonry in foundation and basement						
	23 cm wall, step 1	1	47.78	0.75	0.45	16.13	$55.28 - 10 \times 0.75$
	23 cm wall, step 2	1	49.28	0.60	0.45	13.31	$55.28 - 10 \times 0.60$
	23 cm wall, step 3	1	50.78	0.45	0.45	10.28	$55.28 - 10 \times 0.45$
	10cm wall, step 1	1	2.245	0.60	0.45	0.61	$4.645 - 3 \times 0.6 - 1 \times 0.6$
	10cm wall, step 2	1	2.845	0.45	0.45	0.58	$4.645 - 3 \times 0.45 - 1 \times 0.45$
						40.91	
3	First class brick masonry for super structure in cement mortar 1:6						

	23 cm wall	1	52.98	0.23	3	36.56	55.28-10×0.23
	10 cm wall		3.855	0.1	3	1.16	4.645-3×0.23-1×0.1
	Parapet	1	32.34	0.1	0.9	2.91	(9.4+6.77) ×2
						40.63	
	Deductions						
	Doors, D	6	0.9	2.1	0.23	2.61	
	D1	2	0.7	2.1	0.1	0.29	
	Windows, W	3	1.5	1.2	0.23	1.55	
	W1	2	0.9	1.2	0.23	0.50	
	W2	1	1.5	0.9	0.23	0.31	
	V	2	0.6	0.45	0.23	0.12	
						5.38	
						35.25	

PART B

2	Write specifications for any two of the following: (a) Earthwork excavation (b) Burnt brick masonry in CM 1:6 (c) Painting work	[10]	CO2	2
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Each item 5 marks ; total 10 marks

(a) 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 stocked 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.
- 3.Rates shall be for complete work for 30 m lead and 1.5 m lift including all tools and plants for its excavation.

(b) Burnt brick masonry in CM 1:6

Bricks:

1. Thoroughly burnt, and shall be of deep cherry red or copper colour.
2. Regular in shape and their edges should be sharp and shall emit clear ringing sound on being struck and shall be free from cracks, chips, flaws and lumps of any kind.
3. Not absorb water more than one-sixth of their weight after one hour of soaking by immersing in water. bricks shall have a minimum crushing strength of 105 kg per cm².

Mortar:

1. Mortar- for cement mortar cement shall be fresh portland cement.
2. Sand shall be sharp, clean and free from organic and foreign matters.
3. Proportion of cement sand mortar may be of (1:3 to 1:6 as specified).
4. Materials of mortar shall be measures to have the required proportion 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.
 7. Fresh mixed mortar within 24 hours shall be used, old and stale mortar shall not be used.
- Soaking of brick:**
1. Soaking of brick- bricks shall be fully soaked in clean water by submerging in a tank for a period of 12hours immediately before use.
- 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 6 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 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.
- (c) Painting work
- Preparation of surface**
- 1) Painting should be carried out at the driest season of the year.
 - 2) All wood work shall be seasoned and the surface to be painted shall be dry, rubbed down smooth with medium and fine sand paper and thoroughly cleaned.
 - 3) Knots or holes shall be covered or filled in with a mixture of red lead and glue in equal quantities laid on hot. This is called as 'knotting'.
 - 4) Knots in resinous wood such as deodar, shall be painted over with hot lime and scraped off after 24 hrs and be primed with red or white lead and linseed oil. When dry they shall be rubbed with pumice stone.
 - 5) Nail holes, cracks and other inequities shall be rubbed with putty or with a mixture of glue and plaster of paris and levelled to the surface level known as 'stopping'.
- Application**
- 1) All wood work shall receive at first a coat of priming composed of 1 part of white lead to 8 parts of chalk ground and mixed together with 4 parts of double boiled linseed oil. The stopping for nail holes etc shall then be rubbed down with sand paper before applying paint.
 - 2) Two coats of paint shall be applied over the priming coat if not otherwise specified. The paint shall be applied with brushes, smoothly spread in a direction opposite to that final coat without any visible brush mark. Each coat shall be allowed to dry completely before the application of the succeeding coat. Final coat shall be applied perpendicular to that of first coat.
- Precautions:**
- 1) The paint shall be stirred occassionly to avoid its settling down.
 - 2) Prepared paint shall be kept covered to prevent its oxidation and drying up.
 - 3) Guards or warning pamphlets shall be provided while the paints are wet to prevent sticking for unmindful visitors.

3	Write specifications for any two of the following: (a) Sized stone masonry for basement in CM 1:6 (b) Providing and laying cement concrete 1:1.5:3 for RCC roof slab (c) External plastering in CM 1:6	[10]	CO2	L2
Each item 5 marks ; total 10 marks				
(a) Sized stone masonry for basement in CM 1:6 Based on the finishing provided, stone sized masonry are further classified as ashlar stone masonry, coursed rubble stone masonry and random rubble stone masonry.				

Materials

1. The stone shall be hard, sound and durable.
2. Stones shall be hammer dressed on the bed, top and also on the sides so that the stones will come to close proximity and each stone can be laid in course.
3. Stones with round surface shall not be used.
4. Each course shall be truly horizontal and each stone shall be laid on its natural bed.
5. All the stones shall be thoroughly wetted before laying.

Laying

1. All joints shall be full of mortar.
2. Outer faces of stones shall be squared to give a good appearance and faces of wall shall be truly in plumb.
3. Interstices if any shall be filled with pieces of spalls or stones embedded in mortar.
4. Not more than 60 cm height of mortar shall be constructed at a time.

Mortar

1. Cement mortar 1:3 to 1:6 or lime mortar 1:2 to 1:3 may be used.
2. Mortar shall be first dry mixed to have the required proportion and add water slowly and gradually and mixed thoroughly to get a uniform mortar.
3. Fresh mixed mortar is used.

Curing:

1. The masonry shall be flooded with 2.5cm water at the upper surface.
2. The masonry should be kept moist for a period of 10 days and to be protected from sun, rain, and frost.

(b) Providing and laying cement concrete 1:1.5:3 for RCC roof slab

Materials:

1. The coarse aggregate shall be hard or tough and free from dust, dirt, etc. The stone ballast shall be of 20 mm size or down and retained on 5 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 5mm (3/6") 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. Water shall be clean and free from alkaline and acid matters.

Proportion:

1. Proportion of concrete shall be 1:2:4 as cement: sand: stone ballast by volume with boxes.
2. Minimum compressive strength of concrete shall be 140 kg per sq cm on 7 days.
3. Stone aggregate and sand shall be measured by volume with boxes. Cement is measured in bags of 50 kg each.
4. All materials shall be dry. If moist sand is used additional weight has to be taken to account for bulking of sand.

Mixing:

1. Mixing of concrete shall be either by hand mixing or by mechanical mixer.
2. Hand mixing is generally done in a masonry platform or an iron tray.
3. 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.
4. The mix shall be mixed thoroughly to give a uniform concrete.
5. In a mechanical mixer, the cement, fine aggregate and stone aggregate are mixed in dry condition. After dry mixing water is added gradually at the rate of 25-30 litres per bag of cement.

Slump

1. To ensure workability slump test is performed. A slump of 7.5-10 cm is allowed for building work and 4-3 cm is allowed for road work.

Formwork:

- 1) Formwork centering and shuttering shall be provided to support or to keep concrete in position.
- 2) Inner surface should be oiled to prevent concrete sticking to it
- 3) Base of formwork over which concrete is laid shall be sprinkled with water before concrete is laid.
- 4) Forms should not be removed before 14 days, however side forms may be removed after 3 days of concreting.
- 5) Formwork should be removed carefully without actual disturbance of concrete.

Laying:

2. Concrete shall be placed gently in layers not exceeding 15 cm and compacted with pinning rods and tamping with wooden tampers or with mechanical vibrators till a dense concrete is obtained.
3. Concrete should be laid continuously, if laying is suspended for rest or for the following day, the end shall be sloped at an angle of 30° and made rough for further jointing.
4. Before pursuing with the work on the next day, the previous sloped portion is roughened, cleaned and watered and a grout of neat cement shall be applied before fresh concrete is laid.
5. For successive layer, the upper layer shall be placed before the lower layer is set.

Curing:

1. Once the concrete gets hardened, it has to be covered with wet gunny bags or wet sand for 24 hrs and then cured by flooding with water by making mud walls high or by covering with wet sand or earth and kept damp continuously for 15 days.

(c) External plastering in CM 1:6

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. For ideal work, the plastering should be applied in 3 coats- the rendering or first coat of 10mm, the floating or second coat of 10mm to 6mm and finishing coat of 5 to 6mm, having a total minimum thickness of 20mm. The first coat shall be applied under prepared raked, cleaned and wetted surface by dashing the mortar and floated roughly with wooden float. It shall be kept damp for at least 2 days. When the first coat has sufficiently set, the surface shall be wetted and a second coat of plaster shall be applied and brought to true even surface and then lightly roughened with a wooden float to provide bond for the finish coat.

7. 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.

Signature of CI

Signature of CCI

Signature of HoD