

CBGS SCHEME

USN

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17CV81

Eighth Semester B.E. Degree Examination, July/August 2022 Quantity Surveying and Contracts Management

Time: 3 hrs.

Max. Marks: 100

Note: Answer any FIVE full questions, choosing ONE full question from each module.

Module-1

- 1 The details of Residential building is as shown in Fig. Q1. Estimate and cost of each item of work.
- i) Earth work excavation for foundation in ordinary soil at Rs. 300/m³
 - ii) Cement concrete bed 1 : 4 : 8 for wall foundations at Rs. 2500/m³
 - iii) S.S.M [Size Stone Masonry] 1:8 for footings and basement foundations Rs. 2000/m³
 - iv) First class BBM (Burnt Brick Masonry) work for super structure in cm 1 : 6 at Rs. 2000/m³.

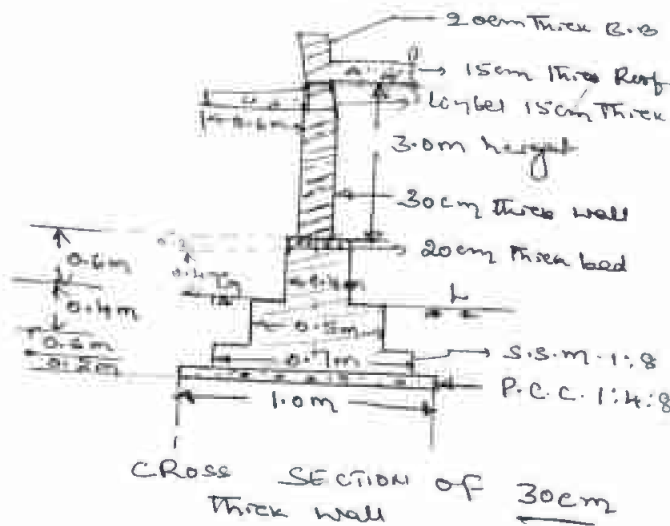
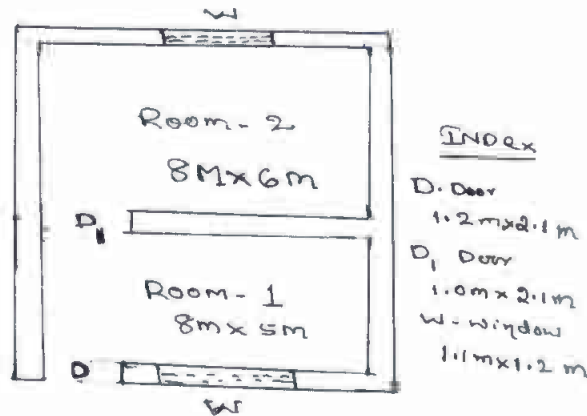


Fig. Q1

(20 Marks)

OR

- 2 a. What are the different types of estimates? Explain any two types of estimation. (10 Marks)
- b. What is meant by Estimation? List the purpose of Estimation (10 Marks)

Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, 42+8 = 50, will be treated as malpractice.

Module-2

- 3 The details of a septic tank is as shown in Fig.Q3. Estimate the quantities for the following items of work.
- a. Earth work excavation in foundation (05 Marks)
 - b. Cement concrete 1:3:6 floor and foundation. (05 Marks)
 - c. First class brick work with cement mortar 1:4 (05 Marks)
 - d. 12mm Thick cement plaster. (05 Marks)

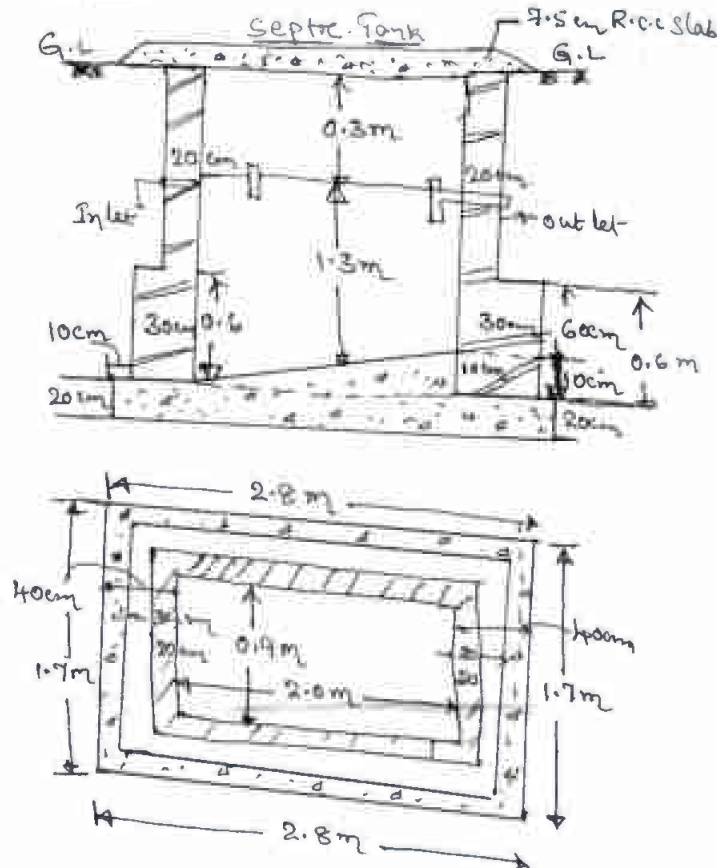


Fig.Q3

OR

- 4 Estimate the cost of Earth work embankment for the portion of road 300m long from the following data. Cost of earth work Rs. 80.00/m³.

| | | | | | | | |
|-------------------|--------|----------------------------|-------|-----|-------|-----|-------|
| Formation Levels | 106.8 | ← Down gradient 1 in 100 → | | | | | |
| RL of Ground | 105.42 | 104.3 | 104.8 | 104 | 102.9 | 102 | 102.6 |
| Distance in meter | 0 | 50 | 100 | 150 | 200 | 250 | 300 |

Formation width : 10 m

Side slopes in Embankment : 2:1

(20 Marks)

Module-3

- 5 Write the detailed technical specification for the following :
- a. Earth work excavation for foundation
 - b. Burnt Brick Masonry in CM 1:6
 - c. Plastering in CM 1:6 to interior surfaces
 - d. Painting for inside walls.

(20 Marks)

OR

- 6 Carry out the rate analysis of the following items:
- First class brick work in C.M 1:4 for super structure
 - Cement concrete for foundation 1:4:8 bedding
 - 2.5 cm thick cement concrete 1:2:4 for floor
 - 12mm thick cement plastering 1:6 on new brick work.

(20 Marks)

Module-4

- 7 a. What is tender? How tenders are invited?
b. Explain briefly types of contract.

(06 Marks)

(14 Marks)

OR

- 8 a. What are the terms and conditions of contract?
b. Explain briefly :
(i) Administrative Approval
(ii) Technical Sanction

(10 Marks)

(10 Marks)

Module-5

- 9 a. What is valuation? What are the purpose of valuation?
b. What is Depreciation? What are the methods of calculating depreciation?

(10 Marks)

(10 Marks)

OR

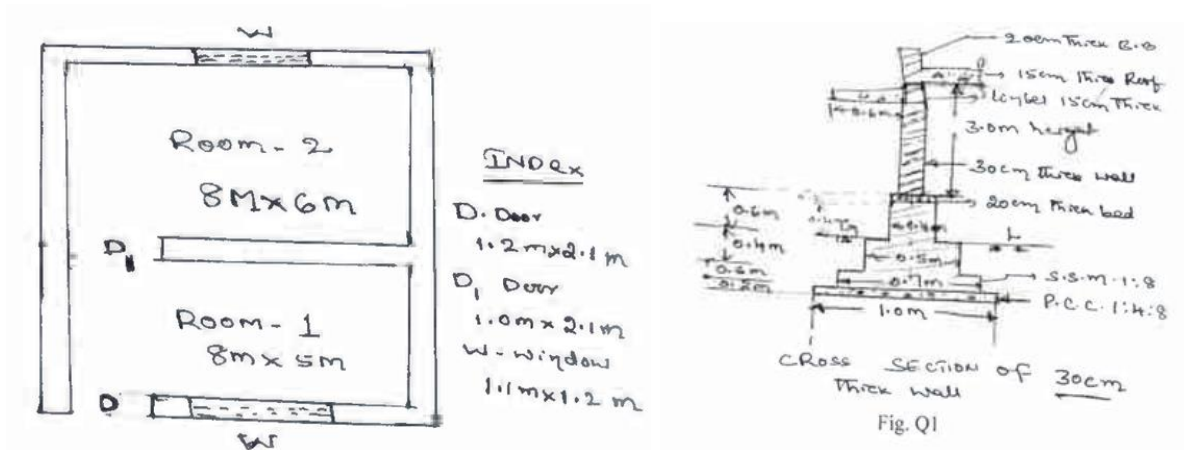
- 10 a. Explain the methods of valuation.
b. Explain the following :
i) Gross income
ii) Net income
iii) Capitalized value
iv) Sinking Fund

(10 Marks)

(10 Marks)

SOLUTION

1. The details of Residential building are as shown in Fig Q1. Estimate the quantity and cost of each item of work.
 - i. Earth work excavation for foundation in ordinary soil at Rs 300/m³
 - ii. Cement concrete bed 1:4:8 for wall foundation at Rs 2500/m³
 - iii. S.S.M [Size Stone Masonry] 1:8 for footings and basement foundations Rs 2000/m³
 - iv. First class BBM(Burnt Brick Massonry) work for super structure in cm 1:6 at Rs 2000/m³.



Solution: Centre line method: Total centre line length = $2 \times 11.6 + 3 \times 8.3 = 48.1\text{m}$

No. of Junctions = 2

| S.No. | Particulars of Item | No. | L | B | H | Q | Remarks |
|-------|---|-----|------|-----|-------|----------------------------|---------------------------|
| 1. | Earthwork in excavation | 1 | 47.1 | 1.0 | 1.2 | 56.52 m³ | $L=48.1 - 2 \times 1.0/2$ |
| 2. | Cement Concrete Bed | 1 | 47.1 | 1.0 | 0.2 | 9.42 m³ | $L=48.1 - 2 \times 1.0/2$ |
| 3. | Size Stone Masonry | | | | | | |
| | 1 st footing | 1 | 47.4 | 0.7 | 0.6 | 19.90 | $L=48.1 - 2 \times 0.7/2$ |
| | 2 nd footing | 1 | 47.6 | 0.5 | 0.4 | 9.52 | $L=48.1 - 2 \times 0.5/2$ |
| | basement | 1 | 47.7 | 0.4 | 0.4 | 7.63 | $L=48.1 - 2 \times 0.4/2$ |
| | | | | | total | 37.05m³ | |
| 4 | First class Brick work for superstructure | 1 | 47.8 | 0.3 | 3 | 43.02 | $L=48.1 - 2 \times 0.3/2$ |
| | deductions | | | | | | |
| | D1 | 1 | 1.2 | 0.3 | 2.1 | -0.756 | |
| | D2 | 1 | 1.0 | 0.3 | 2.1 | -0.63 | |
| | W1 | 2 | 1.1 | 0.3 | 1.2 | -0.79 | |
| | Lintel over Door1 | 1 | 1.5 | 0.3 | 0.15 | -0.065 | |
| | Lintel over Door2 | 1 | 1.3 | 0.3 | 0.15 | -0.055 | |
| | Lintel over window | 2 | 1.4 | 0.3 | 0.15 | -0.126 | |
| | | | | | total | 40.59m³ | |

Abstract

| S.No. | Particulars of Item | Quantity | unit | rate | per | amount |
|-------|---|----------|----------------|--------|-------|-------------|
| 1 | Earthwork in excavation | 56.52 | M ³ | 300.00 | cum | 16956.00 |
| 2 | Cement Concrete Bed | 9.42 | M ³ | 2500 | cum | 23550.00 |
| 3 | Size Stone Masonry | 37.05 | M ³ | 2000 | cum | 74100.00 |
| 4 | First class Brick work for superstructure | 40.59 | M ³ | 2000 | cum | 81180.00 |
| | | | | | total | 1,95,786.00 |

Add 3% for contingencies = 5873.00

Add 2% for establishment = 3915.72

Grand total = Rs 205574.72

2. A. What are the different types of estimates? Explain any two types of estimate.

1. Preliminary estimate
2. Plinth area estimate
3. Cube rate estimate
4. Approximate quantity estimate
5. Detailed or item rate estimate
6. Revised estimate
7. Supplementary estimate
8. Annual repair estimate

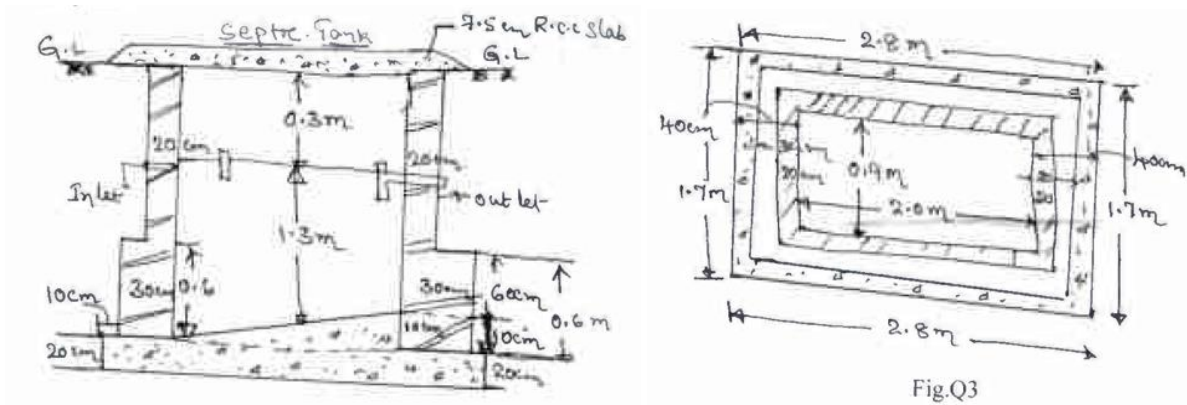
b. What is meant by estimation? List the purpose of estimation.

Estimation: determination of quantity and cost of project before its commencement is called Estimation.

Purpose:

1. To determine cost of project in advance.
2. To obtain administrative approval.
3. To predict the quantity of material required.
4. To know the Labour requirement.
5. To find number of Tools and plants required.
6. Fixing construction schedule
7. To find cost rates.
8. Inviting tender
9. To manage the project at site.
10. To estimate the time of completion of project.

3. The details of a septic tank is as shown in Fig Q3. Estimate the quantities for the following items of work.
- Earthwork excavation in foundation
 - Cement concrete 1:3:6 floor and foundation
 - First class brick work with cement mortar 1:4
 - 12mm thick cement plaster



Solution

| Septic tank. | | | | | | | |
|--------------|----------------------------|----|------|-----|------|---------------------|--|
| Sl. No | Particulars of items | No | L | B | H/D | Quantity | Remarks |
| 1 a) | Earth work excavation | 1 | 2.8 | 1.7 | 1.85 | 8.80 | H = 1.3 + 0.3 + 0.2 + 0.25 = 1.85 m |
| b) | Cement concrete foundation | 1 | 2.8 | 1.7 | 0.2 | 0.95 | |
| | Sloping floor | 1 | 2.00 | 0.9 | 0.05 | 0.09 | |
| | | | | | | 1.04 m ³ | |

Subject Title: Quantity Surveying of Contract Management Subject Code: 17CV81

| Question Number | Solution | | | | | | Marks Allocated | |
|-----------------|---------------------------------|-----|-----|------|-------|----------|----------------------|--|
| Slno | Particulars/Items | NO | L | B | H/D | Quantity | Remarks | |
| c | First class brick work. | | | | | | | |
| | <u>Long wall</u> | | | | | | | |
| | 1st step | 2 | 2.6 | 0.3 | 0.6 | 0.936 | 02 | |
| | 2nd step | 2 | 2.4 | 0.2 | 1.05 | 1.008 | | |
| | <u>Short wall</u> | | | | | | | |
| | 1st step | 2 | 0.9 | 0.3 | 0.6 | 0.324 | 05 | |
| 2nd step | 2 | 0.9 | 0.2 | 1.05 | 0.378 | | | |
| d | 12mm thick plastering long wall | 2 | 2 | - | 1.6 | 6.4 | 2.646 m ² | |
| | Short wall | 2 | 0.9 | - | 1.6 | 2.88 | | |
| | | | | | | | 05 | |
| H | <u>Road Estimate</u> | | | | | | 9.22 m ² | |

RL of formation at 0 distance
— 106.80
Down ward gradient every 100m
— 1m drop
Every 50m = $\frac{1}{100} \times 50$
= 0.50m

20 marks

Subject Title: Quantity surveying of foundation Subject Code: 17CV81

| Question Number | Solution | | | | | | | Marks Allocated |
|-----------------|------------------------------|--------|-------|-------|-------|-------|-------|-----------------|
| | Formation level | 106.8 | 106.3 | 105.8 | 105.3 | 104.8 | 104.3 | 103.8 |
| | RL of Ground | 105.42 | 104.3 | 104.8 | 104.0 | 102.9 | 102 | 102.6 |
| | Depth on meter embankment | 1.38 | 2.0 | 1.0 | 1.3 | 1.9 | 2.3 | 1.2 |

Earth work Calculation

| Slno | Distance | Depth | B = 10m S = 2 for Embankment | | | | L | Quantity |
|------|----------|-------|------------------------------|------|-----------------|--------------------|----|----------|
| | | | mean | Bd | sd ² | Bd+sd ² | | |
| 1 | 0 | 1.38 | - | - | - | - | - | |
| 2 | SD | 2 | 1.69 | 16.9 | 5.71 | 22.61 | SD | |
| 3 | 100 | 1 | 1.5 | 15.0 | 4.5 | 19.5 | SD | |
| 4 | 150 | 1.3 | 1.15 | 11.5 | 2.65 | 14.15 | SD | |
| 5 | 200 | 1.9 | 1.6 | 16.0 | 5.12 | 21.12 | SD | |
| 6 | 250 | 2.3 | 2.1 | 21.0 | 8.82 | 29.82 | SD | |
| 7 | 300 | 1.2 | 1.75 | 17.5 | 6.13 | 23.63 | SD | |
| | | | | | | | SD | |

Total Quantity of Earth work
in Embankment = 6541.5 m³

Cost of Earth Work = 6541.5×80
= Rs 523320

Module - 3

Specification

Explanation with important points

05 + 05 + 05 + 05 = 20

20

03
20/4

20

5

| | | |
|--------|--|---|
| 6 a | <p style="text-align: center;"><u>Rate analysis</u></p> <p><u>First class brick work.</u></p> $\text{No. of bricks} = \frac{10}{0.1 \times 0.1 \times 0.2} = 5000 \text{ N}$ <p><u>Cement and Sand 1:4 mortar</u></p> $\text{Cement} = \frac{3.5}{1+4} = 0.7 \text{ cum} = 21 \text{ bags}$ $\text{Sand} = 0.7 \times 0.4 = 2.8 \text{ m}^3$ | 2 |
| b | <p style="text-align: center;"><u>Labour</u></p> <p><u>Cement concrete</u></p> <p style="text-align: right;">10 m³.</p> $\text{Sum of proportion} = 1+2+4 = 7$ $\text{Cement} = \frac{1.5 \times 4}{7} = 2.2 \text{ m}^3$ $\text{Sand} = 2.2 \times 2 = 4.4 \text{ m}^3$ $\text{Coarse aggregate} = 2.2 \times 4 = 8.8 \text{ m}^3$ | 2 |
| c | <p style="text-align: center;"><u>Labour</u></p> <p><u>Cement concrete flooring</u></p> $\text{Volume} = 0.025 \times 100 = 2.5 \text{ m}^3$ $\text{Cement} = \frac{1.125}{1+2+4} = 0.59 \text{ m}^3 = 17 \text{ bags}$ $\text{Sand} = 0.59 \times 2 = 1.18 \text{ m}^3$ $\text{C-A} = 0.59 \times 4 = 2.36 \text{ m}^3$ | 3 |
| | <p style="text-align: center;"><u>Labour</u></p> | 2 |

d) Plastering $\text{Area} = 100\text{m}^2$

$\text{Cement} = \frac{1.92}{1+6} = 0.274 = 8.2\text{bags}$

$\text{Sand } 0.274 \times 6 = 1.64\text{m}^3$

Labour

e) ~~First coat~~ 0.2

~~second coat~~ 0.2

Module - 4

Cancelled

7a) Definition of tender — 2 marks

Tenders are invited in any one of the forms

- 1) Negotiated tender
- 2) Limited competitions — 04
- 3) open competitions — 06

b) Types of contract system

- 1) Price work contract
- 2) Item rate contract
- 3) Lump sum contract
- 4) Cost plus percentage contract
- 5) schedule rate contract
- 6) Labour contract
- 7) material supply contract

7x2 (14)

7

| | | | |
|--------|---|------|----|
| 8 a | <u>Terms and conditions of Contract</u> 1) Amount of EMD 2) Time for completion of work. 3) Penalty 4) Time for completion of work 5) mode of payment 6) Rules for termination of contract 7) Execution of work 8) Extension of time limit 9) Extra items. 10) change in design | 10x1 | 10 |
| b | <u>Administrative approval</u> Explication — 05 | | 05 |
| | <u>Technical Sanction</u> Explication — 05 | | 05 |
| 9 a | Definition of Valuation — 02 <u>Purpose of Valuation</u> 1) Buying or Selling Property 2) Taxation 3) Rent fixation 4) security of loans 5) Compulsory acquisition | 05x2 | 10 |
| | | (8) | 20 |

Department of Civil Engineering

b)

Depreciation Definition

02

Methods of Depreciation Calculation

- 1) Straight line method
- 2) Constant percentage method
- 3) Sinking fund method
- 4) Quantity Survey method

4x2 = 08

10

10/09

Methods of Valuation

- 1) Rental method
- 2) Direct comparison with Capital Value
- 3) Valuation based on profit
- 4) Valuation based on cost
- 5) Development method of value

5x2 = 10

b)

- 1) Gross income = Net income + outgoings
- 2) Net income = Gross income - outgoings
- 3) Capitalized Value = $\frac{\text{Net income}}{\text{prevaling rate of Interest}}$
- 4) The fund which is gradually accumulated by annual deposit for the replacing buildings & structures

03

02

02

02

02

10