KATHMANDU UNIVERSITY
End Semester Examination
May/June, 2022

Marks scored:

Level : B.Tech.
Year : III

Course : ENVE 311
Semester : II

Exam Roll No. :

Time: 30 mins.

F. M. : 20

Registration No.:

Date :

SECTION "A"
[20Q × 1 = 20 marks]

Mark [×] in the most appropriate option.

1. Formwork is measured in
   [ ] m [ ] sq m [ ] cu m [ ] r m

2. The brick work is **NOT** measured in sq m, in case of
   [ ] honey comb brick work [ ] brick flat soling
   [ ] half brick walls [ ] Reinforced brick work

3. In case of earthwork, the unit of rate for payment is
   [ ] per % cu m [ ] per cu m [ ] per sq m [ ] per 1000 cu m

4. Thickness of slab and beams must be measured to the nearest _____ m.
   [ ] 0.001 [ ] 0.01 [ ] 0.005 [ ] 0.05

5. Due to change in price level, a revised estimate is prepared if the sanctioned estimate exceeds
   [ ] 2% [ ] 2.5% [ ] 4% [ ] 5%

6. In long wall and short wall method of estimation, the length of long wall is the center to center space between walls plus
   [ ] width of wall
   [ ] half of the width of wall on each side
   [ ] one fourth of the width of wall on each side
   [ ] twice the width of wall on each side

7. Which of the following is **NOT TRUE** for cubical rate method for approximate estimate?
   [ ] Plinth Area × Height × cubical rate
   [ ] more accurate than plinth area estimate
   [ ] plinth offset is included while measuring Length and Breadth
   [ ] height is taken from top of the ground floor to the top of the flat room

8. Which is **NOT** considered in the calculation of plinth area?
   [ ] cantilever beam projection [ ] Toilet and bathroom
   [ ] below staircase [ ] passage

9. The greater accuracy is not required in measurement, if the unit of rate of payment is in
   [ ] per sq m [ ] per cu m [ ] per r m [ ] per %

10. Number of bricks required for 1 cubic meter of brick masonry are
    [ ] 436 [ ] 232 [ ] 342 [ ] 560

11. The amount of cement required in 1 cubic meter concrete having 1:2:3 ratio is ____ bags.
[ ] 5 [ ] 8 [ ] 10 [ ] 12

12. The covered area of a proposed building is 110 sq m with central courtyard measuring 10 sq m. If plinth area rate of constructions of similar building in the locality is NRs. 3200 per sq ft, the estimated cost of the proposed building is NRs. _____ lakhs.
[ ] 34.4 [ ] 41.4 [ ] 37.9 [ ] 32

13. If rate of mild steel per tonne is NRs. 1.3 lakhs, what is the length of a 20 mm bar does a customer get by paying NRs. 2.6 lakhs?
[ ] 203 m [ ] 1999 m [ ] 811 m [ ] 500 m

14. The plan of a building is in the form of rectangle with center line dimension of outer walls as 9.7m × 14.7m. If the thickness of the wall in super structure is 0.3m, then its carpet area is ____ sq m.
[ ] 150.00 [ ] 141.00 [ ] 145.50 [ ] 135.36

15. The overheads and profit claimed by the contractor to client is
[ ] separate item [ ] included in materials only
[ ] included in labors only [ ] included in rate analysis

16. The expenses of items which do not come under any regular head of items and the cost of unforeseen items are called
[ ] Lump sum [ ] Extra cost [ ] Contingencies [ ] Scrap value

17. The annual periodic payments made for the repayment of the capital invested is known as
[ ] annuity [ ] depreciation [ ] sinking fund [ ] salvation

18. If the net income is calculated with the rental method of valuation, the net income is a
[ ] difference of gross income with all outgoing expenses
[ ] product of actual cost and depreciation
[ ] addition of original cost and annual depreciation
[ ] difference of original cost and scrap

19. The sinking fund is
[ ] a part of the proceed in reserve for additional structure and modification
[ ] the sum of money to be paid to authorities by the tenants
[ ] the fund for rebuilding structure after its economic life is over
[ ] raised to meet the maintenance costs of the structure before dismantling

20. The rate of depreciation (rd) for structures with 60 years life is
[ ] 1 [ ] 1.3 [ ] 2 [ ] 4

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Time : 2 hrs. 30 mins.

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F. M. : 55

SECTION "B"
[8Q. × 5 = 40 marks]

Attempt *ANY EIGHT* questions.

1. What are the major objectives of estimating and costing? How will you implement the knowledge of estimating and costing in your career as an Environmental Engineer?

2. Differentiate between:
   a. Actual cost and Estimated cost
   b. Depreciation and Obsolescence

3. For 96 $m^3$ of brickwork in cement sand mortar (1:6), find the quantity of required materials:
   - Bricks (in Numbers)
   - Sand (in $m^3$)
   - Cement (Number of bags)
   - Water (in $m^3$)

   *Assume Brick Size = 230 mm × 110 mm × 55 mm and Mortar thickness = 10 mm*

4. Calculate the quantity of cement (in bags), water (in L), Reinforcement bar (in quintal) and Binding wire (in kg) required for a RCC slab to be laid on a room measuring 7 m × 4.5 m with duct 600 mm × 400 mm. The thickness of brick wall in the room is 1 and ½ brick and thickness of slab is 120mm. Assume missing data (if any).

5. What is Valuation? Explain its purposes.

6. Explain the factors affecting rate analysis.

7. Prepare an appropriate estimate of a residential building having a carpet area of 1600 $m^2$, 35% of the built up area will be taken by corridors, staircase, etc. and 10% of the built up area will be occupied by walls. Assume plinth area rate to be NRs. 25,000 per $m^2$. Include water supply cost (10%), sanitary cost (10%), and electrification cost (8%). Also add 1.5% for architectural treatment and 1% of deeper foundation. Also assume, 5% of contingencies and 15% of supervision charge.

8. A building is situated by the side of main road of Baneshwor, Kathmandu on a land of 1 ropani. The built up portion is 5 aana. The building is first class type and provided with water supply, sanitary and electrical fittings. The age of the building is 15 years. Work out on the valuation of the property considering the following:
   - The present rate of construction of similar building as NRs. 35,000 per $m^2$ including water supply, sanitary and electrical fittings.
   - Prevaling rate of land at Baneshwor area = NRs. 90 lakhs per aana
   - Consider the life of the building = 60 years (Take rd = 1.3)
   - (1 ropani = 16 aana = 508.74 $m^2$)

9. A three storied building is standing on a plot of land measuring 800 $m^2$. The plinth area of each storey is 400 $m^2$. The building is of RCC framed structure and the future life may be taken as 70 years. The building fetches a gross rent of Rs. 15,000.00 per month. Workout the capitalized value of the property on the basis of 6% net yield. For sinking fund 3% compound interest may be assumed. Cost of land may be taken as NRs. 400/$m^2$. Other data required may be assumed suitably.

10. Write short notes on:
    a. Lump Sum
    b. Overhead cost

## SECTION "C"

[1Q. × 15 = 15 marks]

Attempt *ANY ONE* question.

11. Estimate the quantity of earthwork for a portion of a proposed road from the following data:

| Chainage (Ch) *(in m)* | 0+00 | 0+30 | 0+60 | 0+90 | 0+120 |
|---|---|---|---|---|---|
| Ground Level (GL) *(in m)* | 248.50 | 246.25 | 249.15 | 250.25 | 247.95 |

Proposed formation width of the road is 8 m, side slope is 1.5:1 in banking and 1:1 in cutting. Downward grade 1 in 120 from distance 0 to 30m white it remains in level from distance 30m to 90m and have upward grade of 1 in 90m from distance 90 to 120 m. The formation level at Ch 0+60 m is 247.35 m.

12. A sedimentation tank given in the Figure 1 is to be constructed an a Water Treatment unit with the following specifications:
    - Foundation – Lime Concrete
    - Masonry – 1st class brickwork in cement mortar (1:6)
    - Wall finishing – Inside and outside 12mm cement plastered 1:2 with coarse sand
    - Flooring – 5cm Cement Concrete 1:1.5:3 over 20cm Lime Concrete with neat cement finishing

    You are asked to estimate the following quantities:
    a. Earthwork in excavation
    b. Lime concrete
    c. 1st class brickwork (1:6)
    d. 12 mm plaster work
    e. Cement concrete (1:1.5:3)

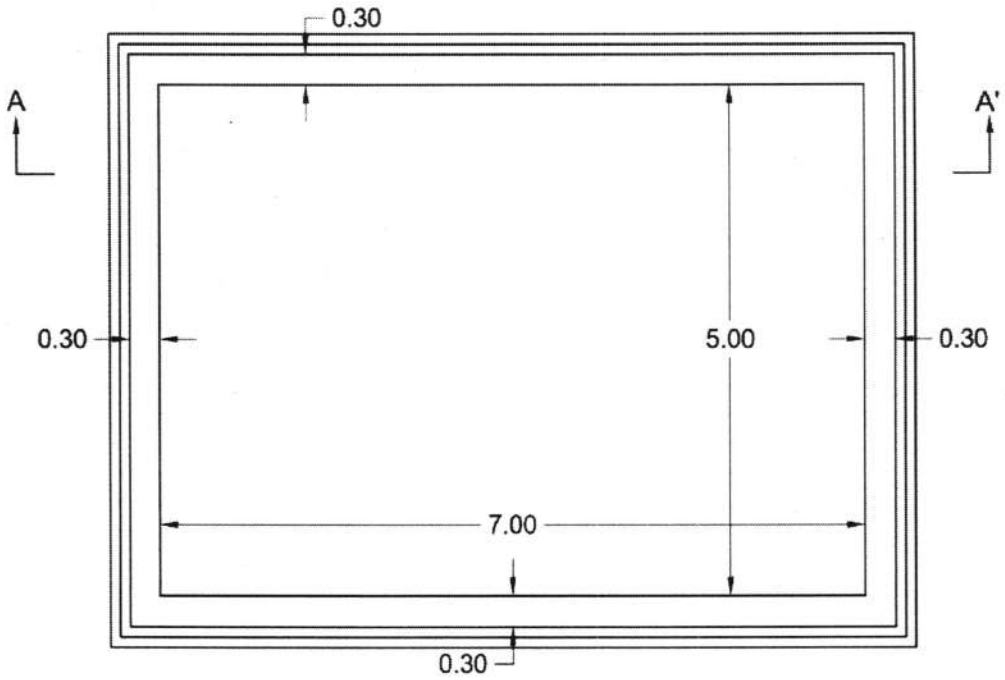


Figure: Plan of Masonry Water Tank

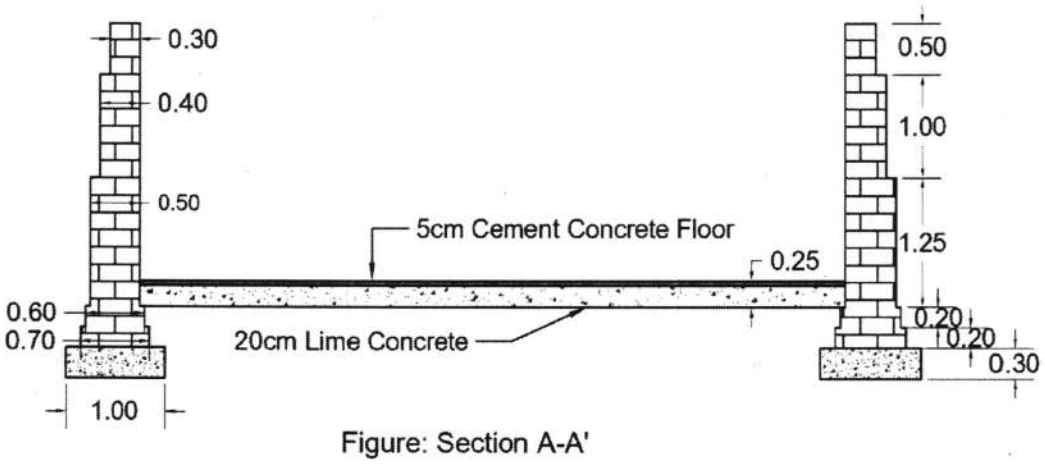


Figure: Section A-A'

All dimensions are in meters (m) unless otherwise stated.

Figure 1