

KATHMANDU UNIVERSITY
End Semester Examination
January 2025

Marks Scored:

Level : B.Tech.

Year : IV

Exam Roll No. :

Time: 30 mins.

Course : ENVE 451

Semester : I

F. M. : 10

Registration No.:

Date

31 JAN 2025

SECTION "A"

[20Q. × 0.5 = 10 marks]

Choose the most appropriate answer from the given alternatives and encircle.

1. The earthwork is measured in
a. m^3 b. m^2 c. running meters d. kg
2. Painting work is measured in
a. m^3 b. m^2 c. running meters d. litres
3. "BoQ" are prepared by _____
a. Quantity Surveyors b. Vendors
c. Geodetic Surveyors d. Suppliers
4. The document in which quality of work or materials is mentioned is called.....
a. Bill of Quantities b. Detailed Estimate c. Specifications d. Norms
5. The order of booking dimension is :
a. Breadth, Length and Height b. Breadth, Height and Length
c. Length, Breadth and Height d. Breadth, thickness and Length
6. _____ kg/m^3 and _____ kg/m^3 is density of cement and steel rebars.
a. 1440,6000 b. 7850,1440 c. 7850,1600 d. 1440,7850
7. The most reliable estimate is
a. Detailed estimate b. Preliminary estimate
c. plinth area estimate d. Cubic rate estimate
8. _____ is not included in plinth area estimate
a. wall thickness b. room area c. Verandah area d. Courtyard area
9. In the analysis of rates, Contractor's profit is generally taken as
a. 5% b. 10% c. 15% d. 20%
10. Number of standard bricks in one cubic meter is
a. 400 b. 500 c. 600 d. 650

11. Estimate is
a. the actual cost of construction of structure
b. the probable cost arrived at commencement of construction of structure
c. Random guess of the cost of structures
d. guidelines to determine cost of structure
12. DPC is measured in
a. running metre b. m^3 c. m^2 d. kg
13. Working stress method do not have factor of safety in
a. material strength b. stress c. both a and b d. loads
14. The maximum area of tension reinforcement in beam.
a. 1% b. 2% c. 3% d. 4%
15. Minimum number of longitudinal reinforcement bars in rectangular column.
a. 4 b. 6 c. 8 d. 10
16. The maximum depth of neutral axis for beam section having steel of grade Fe415 is
a. 0.46d b. 0.53d c. 0.48d d. 0.43d
17. For long column L_{eff}/d is
a. less than 12 b. greater than 12 c. less than 18 d. greater than 18
18. Slab is
a. doubly reinforced b. provided with shear reinforcement
c. generally thicker than beam section d. designed as 1m wide beam
19. Under reinforced section failure occurs when
a. concrete fails first
b. steel fails first
c. steel and concrete fails simultaneously
d. neither steel and concrete fails
20. The minimum diameter of longitudinal bar in column is
a. 8 mm b. 10mm c. 12 mm d. 16 mm

KATHMANDU UNIVERSITY
End Semester Examination

January 2025

31 JAN 2025

Level : B.Tech.
Year : IV
Time : 2 hrs. 30mins.

Course : ENVE 451
Semester : I
F. M. : 40

SECTION "B"

[4Q. × 6 = 24 marks]

Attempt *ALL* questions.

1. What are the differences between working stress method and limit state method of design? Derive the strength of concrete of steel and concrete with necessary curves. [3+3]

OR

Describe under-reinforced, over-reinforced and balanced section failure with necessary strain diagrams. [6]

2. What is Bill of Quantities (BoQ)? Show the format of BoQ in tabulated form. Explain Preliminary or rough estimate and benefit of it. [1.5+1.5+3]

OR

What are the factors affecting rate analysis? Prepare the preliminary estimate of a multistoried building having total carpet area of 2500sq.m. Take circulation area 25% of built-up area. Area covered by walls is 10% of built-up area. Assume the plinth area rate for civil work is NRs. 27000.00 per sq.m.
Cost of water supply and sanitation = 8% of civil cost, Cost of electrical work = 10% of civil cost, Cost for architectural treatment = 1.5% of civil cost and Contingencies and supervision charges are 5.5% of total cost [2+4]

3. What is specification? List the general principles or guidelines of specification writing. Calculate the quantities of material require for 20m³ RCC work (1:1.5:3). Assume the reinforcement to be 1%. [1+2+3]

OR

What is rate analysis? Calculate the materials required for 15m³ of brickwork in cement mortar (1:4). Size of brick is 230mmX110mmX55mm with mortar joint 10mm. [1+5]

4. Prepare the detailed estimate for following item of septic tank and soak pit for 25 users from the given drawing (Figure1): -
a. The earthwork in excavation for septic tank and soak pit
b. Cement concrete (1:3:6) in septic tank
c. First class brick work in 1:4 cement mortar in septic tank [2+2+2]

P.T.O.

SECTION "C"

[2Q. × 8 = 16 marks]

Attempt *ALL* questions.

5. A rectangular RCC beam is to be simply supported on two walls 230mm thick width with clear span of 5m. The beam carries UDL of 30kN/m and grade of concrete is M25. The grade of steel is Fe415. Design the beam for longitudinal and shear reinforcement along with sketch or reinforcement details. [8]

OR

Design a slab having room of clear dimension 3.6m*7.4m supported on 230mm wall. The superimposed load is 4kN/m² and floor finish load is 1 kN/m². Use M20 concrete and Fe 500 steel. Sketch the details (section and plan). [8]

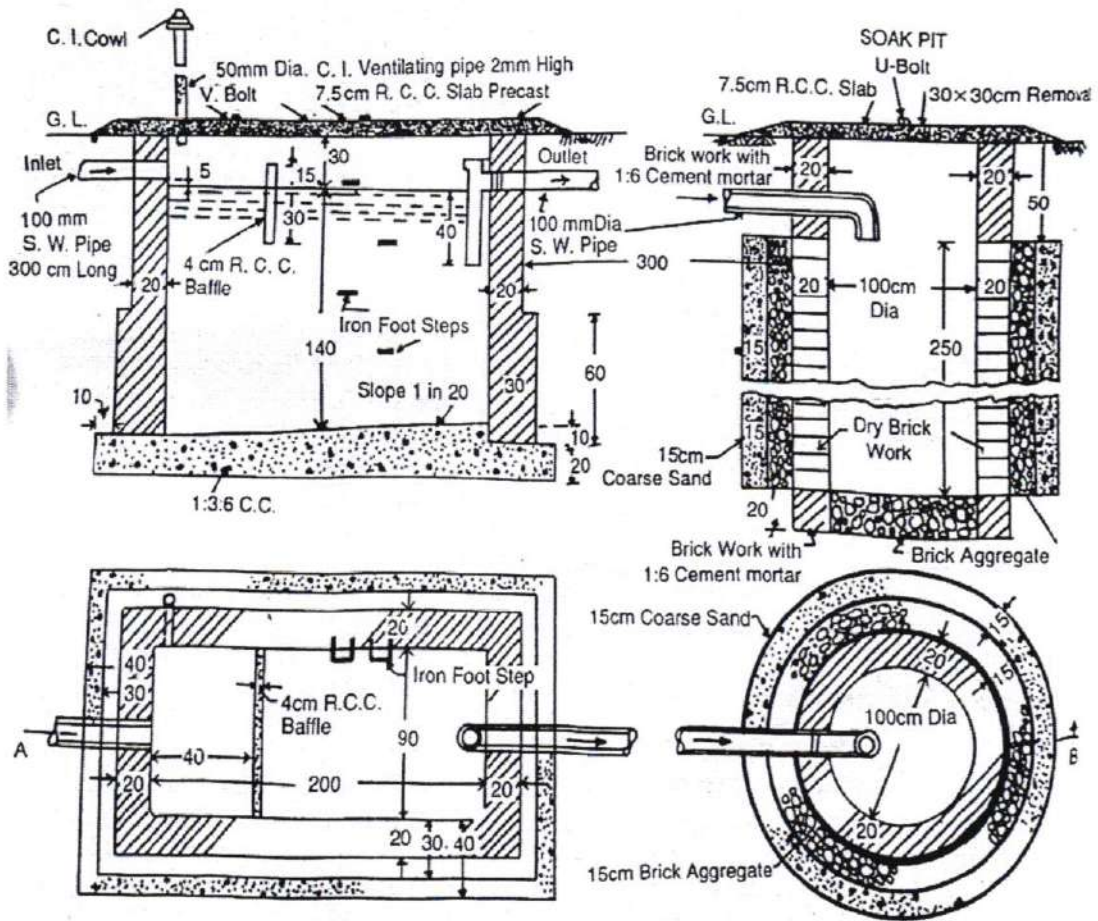
6. Design a short column to carry an axial load of 1700 KN using M25 mix concrete and Fe 415 steel. The unsupported length of column is 4m with rigidly fixed and effectively held in position at both ends. Sketch the reinforcement details (longitudinal and cross-section). [8]

OR

Design an isolated footing for a rectangular column 450mm*450mm carrying a service load of 1600kN. Assume safe bearing capacity as 250kN/m². Use M20 concrete and Fe500 steel. Sketch of details of the reinforcement. [8]

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SEPTIC TANK FOR 25 USERS



PLAN

All Dimensions in Centimetre unless otherwise Specified,

Figure 1: Septic tank and soak pit (plan and section.)

