KATHMANDU UNIVERSITY
End semester Examination
May/June, 2022

Level : B.E./B.Tech.
Year : III
Time : 2 hrs. 30 mins.

Course : CIEG 310
Semester : II
F.M. : 40

SECTION "B"

Attempt *ALL* Questions.

- ✓ *Use of **IS456:2000, IS 1343** (for prestressed concrete), and **IS456-SP16** is allowed to use.*
- ✓ *Assume suitable data if necessary.*

1. A beam supported in 300 mm thick wall with clear span 6.7 m has to carry dead load of 25 KN/m (excluding self-weight) and live load 20 KN/m. Depth (effective) of the beam is limited to 500 mm. Find the steel reinforcement required. Also perform necessary checks. Take M20 concrete and Fe 415 steel. [9]

2. Find the ultimate moment resistance capacity of T-Beam with width and depth of flange as 2250 mm and 150 mm respectively. Effective depth of beam is 450 mm with 250 mm width of web. Beam has 4-25 mm dia. bars in tension. Take M20 concrete and Fe 415 steel. [5]

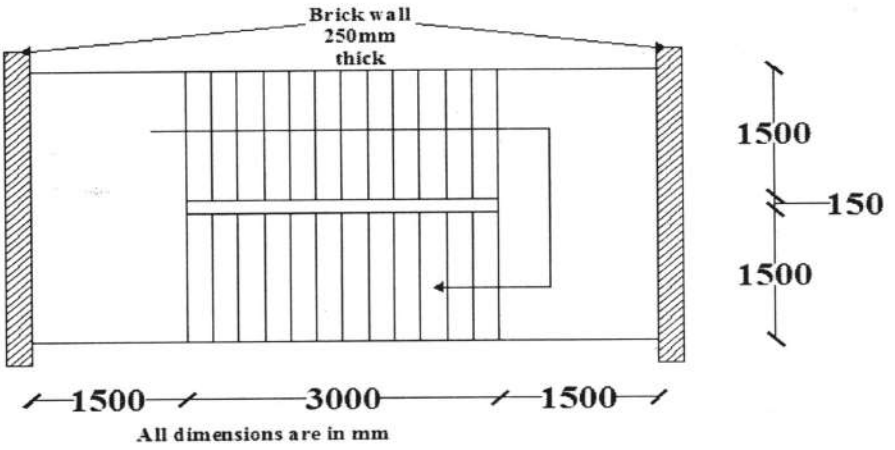
OR

Design shear reinforcement for the beam which is designed in question 1. Also perform necessary checks. Take M20 concrete and Fe 415 steel. [5]

3. A rectangular slab panel with its dimension (Clear span) 4 m × 5 m is continuous over three edges and one long edge is discontinuous. It carries a Dead load of 2 KN/m^2 and floor finish load of 1 KN/m^2 (excluding self-weight) with live load 2 KN/m^2. Design the slab with necessary checks and details with reinforcements in both sides. Take M20 concrete and Fe 415 steel. [10]

OR

A dog legged staircase is to be provided for a building. Calculate the loadings, Bending moment and depth of the section. Take riser = 150 mm. Also find the floor height. Provide main reinforcement with development length. Use live load of 3 KN/m^2. Use M20 grade concrete and Fe500 steel. [10]



4. A column carries a factored axial compressive load of 1800 KN located at an eccentricity of 100 mm and 60 mm at X and Y axis respectively from the centroid of the column. Overall length of column is 4 m with both ends restrained against rotation and translation. Design a short biaxially loaded columns with necessary reinforcements and perform regular checks. Take M25 concrete and Fe 500 steel. [9]

5.

a. Describe the necessary points that have to be considered while adopting the depth of isolated footing. [3]

b. A simply supported beam 350 mm × 440 mm of span 12 m carrying an UDL of 10 KN/m throughout the span is pre tensioned with a pre-stressing force 1500 KN, at an eccentricity of 110 mm below the CG of beam. Determine extreme stress at top and bottom in the mid span of the beam and at the level of cable at same location. [4]