Ref. No.: Ex/CON/PC/B/T/312/2024

B. Construction Engineering 3rd Year 1st Semester Examination 2024

DESIGN OF STRUCTURE - II (Concrete)

Time : Three hours | Full Marks : 100

(50 Marks for each Part)

Use separate answer script for each Part

Part I

Answer any two question. Mention the Part on the top of your answer script.

Use of **IS: 456, 2000** is allowed. Assume any suitable data not provided.
Design should be explained with neat sketches.

1. a) Derive the moment of resistance for the **balanced section** adopting working stress method of design using **M25 grade of concrete & Fe 500D** and Calculate the Moment of Resistance for a rectangular beam of size 250 mm X 500 mm with 3 - 20 mm diameter TMT bar as tensile main reinforcement with adequate shear reinforcement. 10 [CO1]

   b) Design a **corner roof slab** of a residential building of clear size of 4000 mm x 5000 mm supported on 250 mm wide beams. Use M25 grade of concrete & Fe500D grade steel reinforcement. Show reinforcement details in plan and at important sections. 15 [CO2]

2. (a) Design a **Circular column** having diameter of 300 mm subjected to an axial load of **800 KN**. The effective length of column is 4.5 m, Use M25 grade of concrete and Fe500D grade of steel. Draw neat sketch of cross section with reinforcement details. 15 [CO3]

   (b) Find the safety of the same column if it is subjected to **500 KN** load but with an **uni-axial eccentricity** of 100 mm. 10 [CO3]

3. Design a **propped cantilever beam** having a span of 5.0 m subjected to a udl. of 20 KN/m. The grade of concrete is M25 and Fe 500D grade of steel is used. Calculate and design the beam adopting by working stress method. Draw **neat sketches** of longitudinal & cross sections at important location. 25 [CO2]

[Turn over

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Subject: Design of Structure -II(Concrete)

Total Time: Three hours
Full Marks: 100

PART-II(Full Marks-50)
Use Separate answer sheet for each part.
IS456:2000 is allowed in the exam hall. Apply Limit state method of design.

	Answer all questions
1.	Design the RCC Slab of 4×4meter with two edge discontinuous. [15] Use the following data- LL= 2.5 KN/m^2 M25 grade concrete & FE-500 HYSD Bar Size of beam is 250X450 MM Size of column 400X400 mm Use Limit state method for design and sketch the drawing also.
2.	Design a beam with both end continuous & clear length 9 meter with the following data Live load on beam = 20 KN/m^2,.M25 grade concrete & FE-500 HYSD Bar, Size of column 600X400 mm, Depth of beam should be restricted 450 mm. Use Limit state method for design. Shown also reinforcement details. [15]
3.	Design a column of 4-meter length with cross section 500X500. The axial load of the column is 1500KN. Assume M25 Grade concrete and Fe-500 HYSD Bar used, if safe bearing capacity of Soil is 10 T/M^2 then design a suitable footing. Check the one way and two-way shear and show also the details of reinforcement of footing and column. [7+13=20]