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

B. Construction Engg 3rd Year 1st Sem Supplementary Examination 2024

DESIGN OF STRUCTURE - II (Concrete)

Time : 3 Hours **Full Marks: 100**

Part I

Answer any two question. Mention the Part on the top of your answer script.
50 marks for each part.

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 **M20 grade of concrete & Fe 500** and Calculate the Moment of Resistance for a rectangular beam of size 300 mm X 500 mm with 2 - 25 mm diameter TMT bar as tensile main reinforcement with adequate shear reinforcement. 10
[CO1]

b) Design a **intermediate continuous floor slab** of a residential building of clear size of 3000 mm x 3500 mm supported on 300 mm wide beams. Use M20 grade of concrete & Fe500 grade steel reinforcement. Show reinforcement details in plan and sections. 15
[CO2]

2. Design a **cantilever beam** having a span of 3.5 m subjected to a total udl. of 15 KN/m. The grade of concrete is M20 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]

3. (a) Design a **square column** of size 300 mm subjected to an axial load of **750 KN**. The effective length of column is 3.5 m, Use M20 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 **450 KN** load but with an **bi-axial eccentricity** of 80 mm in each axis. 10
[CO3]

[Turn over

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B. Construction Engineering 3rd year 2nd semester Supplementary Examination – 2024

Subject: Design of Structure -II

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.

CO1 [05]	Answer a) in this block[5] [1] (a) Distinguished between Limit State method and working stress method. [5]
CO2 [15]	[2]Design the RCC Slab of 5X5 meter with two adjacent edge continuous and sketch the drawing also. Use the following data [15] LL= 3.0 KN/m^2 M25 grade concrete & FE-500 HYSD Bar Size of beam is 250×450 MM Size of column 500×400 mm Use Limit state method for design.
CO3 [15]	*[3]Answer any one* from **(a), (b)** *in this block:* (a) Design a beam with both end continuous & Clear length 8m with the following data[15 Live load on beam = 25 KN/m^2 M25 grade concrete & FE-500 HYSD Bar Size of column 500×400 mm, Depth of beam should be restricted 450 mm. Use Limit state method for design. Shown also reinforcement details. (b) Design a beam of both end continuous & 7m clear length with LL on the beam is 30 KN/m^2 & beam is supporting on a Column of 500×400 mm. If M25 Grade concrete with Fe-500HYSD Bar were used then show also the reinforcement details. [15]
CO4 [10]	[4] A column of 4 meter length with cross section 500×300. The axial load of the column is 2000KN. 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. Show also the details of reinforcement of footing. [10]
CO5 [5]	[5] Write the names of different type of retaining wall along with sketches [5]

CO1: Understand the design philosophy of different methods of Concrete Structures (K2).

CO2: Analyse & Design of Reinforced Slab, Beams and Columns (K4)

CO3: Demonstrate, application & Design of Beam-Column Problems (K3)

CO4: Analyse & Design of Footings (K4)

CO5: Calculate forces and Design of Retaining structures (K2)

CO6: Describe Flat Slab Design Consideration, Concentrated Load on slab & Elementary Bridge Design (K1)