PRN:		Course Code:	PSE 102

First Year M. **Tech** End Semester Examination Winter 2024

Advanced Design of Concrete Structures

Day and Date: Wed - 4 DEC 2024 Max Marks: **50** 000414

Time: 10:30AM To 12:30PM Duration: **02** hrs

Instructions: 1) All questions are compulsory.
2) assume suitable data wherever necessary.
3) Figures to the right indicate full marks.
4) Use of IS:456, IS:1343 IS: 1893 and Sp:16 allowed

		Marks	Bloom's Level	CO
Q.1	**Attempt any one from the following**			
a)	R.C. column 400 mm x 400 mm in cross-section has to Carry an Ultimate axial load of 900 KN & Ultimate bending moment of 30 kN.m & 35 kN-m about the major axis bisecting the depth at it ends the Unsupported length of column is 4.50m Column ends are fixed but column is Unbraced in both the principal directions determine the area of reinforcement required assuming M25 & Fe415.	12	L4	CO1
b)	A concrete column of 400 mm diameter, reinforced with 8 bars of 16 mm dia., is braced and hinged at both ends, 5 m apart. Check the safety of the column if it carries a factored axial load of 1000 kN. Take M20 concrete and Fe415 steel, effective cover is 50 mm. Take additional moment due to slenderness is 30 kN-m	12	L4	CO1
Q.2	**Attempt any one from the following**			
a)	A two-way slab 6 m x 6 m size with ribs at 1.5m intervals is to be designed to support a live load of 3kN/m². Adopting M-20 grade concrete & Fe 500 HYSD bars design a suitable grid floor and sketch details of reinforcement in ribs.	13	L5	CO2
b)	Design an interior of panel of grid slab of size 8.0mx 8.0m. Assume the rib spacing of 1m in both directions. The floor is subjected to live load of 3 kN/m². Floor finish load is 1kN/m². The material to be used M25 and Fe415steel. Sketch the reinforcement details.	13	L5	CO2
Q.3	**Attempt the following (Any One)**			
a)	Design an interior panel of a flat slab of size 6m x 6m without providing drop and column head. Size of columns is 600 x 600 mm and live load on the panel is 4 kN/m². Take floor finishing load as 0.75 kN/m². Use M25 concrete and Fe 415 steel.	13	L6	CO3
b)	A flat plate panel of dimensions 6 m × 5 m supported by columns of size 400 mm × 400 mm has a slab thickness of 150 mm and is designed for a working (total) load of 10 kN/m².	13	L6	CO3

Backlog

Check the safety of the slab in punching shear and provide shear reinforcement, if required. Assume M 20 Concrete and Fe 500 steel.

Q.4 **Attempt the following (Any One)**

a)	Design the reinforcement details of a simply supported deep beam for a span of 4.5m subjected to UDL of 28kN/m. The width of beam is 0.5 m while the depth of beam is 2.5m. Use M20 grade of concrete & Fe415 steel	12	L4	CO4
b)	Design a typical interior span of a continuous deep beam using the following data – span of beam= 5m overall depth = 3.2 m width of supports = 0.5 m width of beam = 0.4 m uniformly distributed load including self-weight = 175 kN/m Use M20 concrete and Fe 500 steel. Sketch the details of reinforcement at center of span and support sections.	12	L4	CO4

*****

Backlog