Seat No.	

Total No. of Pages : 2

B.Tech. (Civil) (Semester - VII) Examination, November - 2023

DESIGN OF CONCRETE STRUCTURES - I

Sub. Code : 83732

Day and Date : Wednesday, 29 - 11 - 2023 **Total Marks : 70**

Time : 10.30 a.m. to 01.00 p.m.

Instructions :
1) **Attempt all questions from section I and II.**
2) **Figures to right indicate full marks.**
3) **Assume suitable data wherever necessary and mention it clearly.**
4) **Use of non-programmable calculator is allowed.**
5) **Use of relevant IS Codes are allowed.**

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SECTION - I

Q1) a) Find X_{max}, $P_{t,lim}$ and $M_{u,lim}$ for Fe250 and M20 grade concrete. **[6]**

b) Explain the following : **[6]**

i) Characteristic Strength

ii) Partial Safety Factors.

Q2) a) Explain the various modes failure of RC beam. **[4]**

b) Find MR of singly reinforced beam of 200mm width and 400mm effective depth, reinforced with 3-16 mmΦ of Fe415 steel & M20 grade concrete. **[8]**

OR

b) A doubly reinforced section is 250mm wide and 450mm deep to the centre of tensile reinforcement. It is reinforced with 2-16mmΦ as compression reinforcement at an effective cover of 50mm and 4-25mmΦ as tensile steel. Using M 15 concrete & Fe250 steel. Calculate the MR of beam section. **[8]**

P.T.O.

Q3) Design the shear reinforcement in a rectangular beam section 400 × 600mm deep(overall depth) subjected to an ultimate shear of 500kN. The tension reinforcement available is 4-25mmΦ. Use M25 concrete and Fe415 grade steel. Assume mils exposure condition. Sketch reinforcement details. **[11]**

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SECTION - II

Q4) Design the simply supports one way slab for veranda having width of support 300 mm ,clear span 3.30m, live load 4 KN/m^2, Floor finish 0.80 KN/m^2 . Use M20 and Fe415. **[12]**

OR

Design dog legged staircase for building in the vertical distance between floor to floor is 3.75m. The hall measure 2.5m × 5m. Live load on stair is 3KN/m^2, Take M20 concrete and Fe415. Draw reinforcement details.

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Q5) Design RC Column using M20 and Fe415 steel to carry service load of 1300 KN. The column having unsupported length 4rn with both ends hinged. **[12]**

Q6) Design Isolated rectangular RCC constant depth footing for column size 230 mm × 450 mm carrying axial load of 800 KN. Assume SBC of soil 200 KN/m^2 Use M20 and Fe415. Draw reinforcement details. **[11]**

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