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Roll No.....

FIFTH SEMESTER

B.Tech. (Civil Engg)

SUPPLEMENTARY EXAMINATION

FEB-2019

PAPER CODE: CE303

TITLE OF PAPER: DESIGN OF R.C.C STRUCTURE

Time: 3:00 Hours

Max. Marks: 40

**Note : Answer Any Four Question
IS: 456-2000 are allowed
All questions carry equal marks.
Assume suitable missing data, if any.**

Q.1 [a] Design reinforced column of 450x600 mm subjected to an axial load of 2000 kN under service load condition. Unsupported length of column is 3m, use M 25 and Fe 415 grade of steel. Assume column is braced?

[b] A T- beam having an effective flange width of 2500 mm is required to resist an ultimate moment of 1200 kNm. Thickness of flange is 150 mm, width of the beam is 300 mm and the effective depth is 900 mm. using M 15 grade of concrete and Fe 250 grade of steel. Determine the area of reinforcement requirement.

Q.2 [a] A doubly reinforced section beam of overall dimension 250 x 450 mm is reinforced with 4 bars of 25 diameter on the tension side and with 4 bars of 18 mm diameter on the compression side. Effective cover to centre of reinforcement is 50 mm. If the grade of concrete is M 20 and grade of steel is Fe 250. Calculate the ultimate moment capacity of the section.

[b] A simply supported beam is 300 mm wide and 600 mm overall depth is has 2 number of 20 mm Fe 415 grade of steel bar going into support. If the shear force at the centre of support is 120 kN at working loads check safety for bond in this beam assume M 25 grade of concrete and Fe 415 grade of steel.

P.T.O

Q.3 [a] A simply supported normal Tee beam of 5.0 m clear span is loaded with characteristic load of 40 kN/m. It is reinforced with 4 number 25 mm diameter bars at support. The section of the beam is 250 mm wide and 550 mm effective depth. Design the Shear Reinforcement at the support. The materials are M 25 grade concrete and HYSD reinforcement of grade Fe 415.

[b] Design a beam for following moment, Shear force and Torsional moment acting at certain location. B.M = 200 kN-m, S.F = 120 kN and Torsional Moment = 48 kN-m. Use M 25 grade of concrete and Fe 415 grade of steel, width of beam is 400 mm, effective cover is 50 mm.

Q.4 [a] Design a short circular column of diameter 700 mm for a load 5000 kN use helical reinforcement. Using M 25 grade of concrete and Fe 415 grade of steel. Calculate area of steel require and spacing of helical reinforcement. Use clear cover to ties equal to 40 mm.

[b] A simply supported beam of 5 m effective span is subjected to 24 kN/m live load. Use M 20 grade of concrete and Fe 415 grade of steel. The overall depth of the beam is 400 mm and width is 250 mm. Design the reinforcement of the beam if $K = 0.138$, $J = 0.80$.

d'/d	0.55	0.10	0.15	0.20
f_{sc} (N/mm ²)	355	353	342	329

Q.5 Design a simply supported roof slab for a room 8 m x 3.5 m clear in size if the superimposed load is 5 kN/m². Use M 20 mix and Fe 415 grade steel. (Slab is supported on wall of size 230 mm thick)

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