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Seat No.	

B.E. (Civil Engg.) (Semester - VII) Examination, Nov. - 2013

DESIGN OF CONCRETE STRUCTURE - I (New)

Sub. Code : 47901

Day and Date : Tuesday, 26 - 11 - 2013 **Total Marks : 100**

Time : 2.30 p.m. to 5.30 p.m.

Instructions : 1) Attempt any Three Questions from each Section.

2) Figures to the right indicate full marks.

3) Assume any suitable data wherever necessary.

4) Use of non-programmable calculator and relevant I.S. 456 : 2000 are allowed.

SECTION - I

Q1) a) What is Stress block as per the Limit state method? Derive the stress block parameters from first principles. **[6]**

b) Design flexural reinforcement for an RC beam of size 300 mm wide and 500 mm deep to resist an ultimate moment of 245 kNm. Assume moderate exposure condition. Use M25 concrete and Fe 500 grade steel. **[11]**

Q2) A floor system consists of a slab 100 mm thick, cast integrally on beams spaced at 4.5 m centre to centre and spanning over 6 m. The beam has a width of 300 mm and the total depth of the beam including the thickness of slab is 550mm. The floor is to be designed for a service load of 3 kN/m^2 and 0.8 kN/m^2 for finishes excluding the self weight of the floor system. Design flexural and shear reinforcement for one intermediate T-beam using Limit State method. Use M25 concrete and Fe415 steel. **[17]**

Q3) a) Explain the concept of 'bond' in RC structures, with a sketch. **[4]**

b) Design the shear reinforcement in a rectangular beam section 360 × 780 mm deep (overall depth) subjected to an ultimate shear of 370 kN. Use M30 concrete and Fe 500 steel. Assume mild exposure condition. Sketch the reinforcement details. **[12]**

P.T.O.

Q4) a) Explain significance of deflection and IS recommendations for the same. **[4]**

b) A doubly reinforced beam of 300 mm X 600 mm effective depth is reinforced with 3-16 mm dia. bars as compression reinforcement and 5-25 mm dia. bars as tensile reinforcement. Effective cover on both sides is 50 mm. Calculate the moment of resistance of the beam. Consider M-20 grade of concrete and Fe-415 steel bars is used **[12]**

SECTION-II

Q5) Design a R.C. slab for a room measuring 4.5 m × 6 m. The slab carries a live load of 3 kN/m^2. The slab is simply supported at all the 4 edges with corners free to lift. The width of the supporting walls is 300 mm. Use M 30 grade concrete and Fe 415 grade steel. Sketch the reinforcement details. Assume mild exposure condition. **[17]**

Q6) The clear dimensions of a staircase hall are 2.8 m × 4.4 m. The floor to floor height is 3.6 m. The landing slabs span in the same direction as the stair and are supported by the walls at the ends. The stair is used in a residential building. Design a dog-legged staircase. Use M 30 concrete and Fe 500 steel. Sketch the reinforcement details. Sketch the reinforcement details. Assume moderate exposure condition. **[17]**

Q7) Design a short helically reinforced column of unsupported length 3.8 m to carry an axial service load of 1200 kN. Use M 25 concrete and Fe 250 grade steel. Sketch the reinforcement details. Assume moderate exposure condition. **[16]**

Q8) Design a rectangular isolated sloped footing for a column of size 360 mm × 660 mm carrying an axial load of 2500 kN. The S.B.C. of the soil is 280 kN/ m^2. Use M 30 grade concrete and Fe 500 grade steel. Sketch the reinforcement details. Assume moderate exposure condition. **[16]**

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