S - 2029

Seat No.	

Total No. of Pages : 2

B.E. (Civil Engineering) (Semester- VIII) Examination, December - 2015

DESIGN OF CONCRETE STRUCTURE - II (New)

Sub. Code : 49175

Day and Date : Wednesday,02- 12 - 2015 **Total Marks : 100**

Time : 10.00 a.m. to 01.00 p.m.

Instructions :
1) **Attempt any three questions form each section.**
2) **Figures to the right indicates full marks.**
3) **Assume any suitable data whenever necessary**
4) **Use of non-programmable calculator and relevant I.S. 456: 2000, IS 1343:2012 are allowed.**

SECTION-I

Q1) A reinforced concrete beam of cross section of size 250 x 500 mm effective is subjected to a factored shear force of 50 kN, a factored moment of 50 kNm and a factored torsional moment of 20 kNm. Design the reinforcement to be provided in the beam. Use M15 grade concrete and Fe 415 grade steel. **[17]**

Q2) A continuous beam PQRS is simply supported at P and S and is continuous over supports Q and R. Beam support a superimposed live load of 15 kN/m and a dead load of 25 kN/m. Use IS code provisions to design beams. Use M25 grade concrete and Fe 415 grade steel. L(PQ) = L(QR) = 5.0 m, L(RS) = 6.0m. Draw longitudinal section of beam showing reinforcement details. **[17]**

Q3) a) Derive expressions for the position of neutral axis of rectangular section? **[4]**

b) A reinforced concrete beam of size 250 x 550 mm overall depth is reinforced with 3 bars of 20 mmϕ at an effective cover of 50 mm. Determine the moment of resistance and the uniformed distributed superimposed load the beam can support over effective span of 6 m. Use M20 grade concrete and Fe 415 grade steel. The unit weight of concrete is 25 kN/m^2. **[12]**

P.T.O.

Q4) Design a circular tank with flexible base for capacity of 350000 liters. The depth of water is to be 4.0 m, including a free board of 500 mm. Use M25 grade concrete Fe 415 steel. **[16]**

SECTION - II

Q5) a) What are post tensioning anchorages? **[4]**

b) Explain the principle of post tensioning? **[4]**

c) Explain in brief various concepts with neat sketch in prestrssed concrete? **[8]**

Q6) A simply supported prestrssed concrete beam of rectangular cross section 400 x 600 mm, is loaded with a total uniformly distributed load of 256 kN over a span of 6m. Sketch the distribution of stresses at mid span and end sections if the prestressing force is 1920 kN and tendon is

a) concentric,

b) eccentric, located at 200 mm above the bottom fibre. **[17]**

Q7) A post tensioned prestress concrete beam of 30 m span is subjected to a transfer prestress force of 2500 kN at 28 days strength. The profile of the cable is parabolic with maximum eccentricity of 200 mm at midspan. Determine the loss of prestress. The beam has a cross section of 500 x 800 mm, and is prestressed with 9 cables, each cable consisting 12 wires of 5 mm ϕ. Take Es = 210 kN/mm^2 and E_c = 35 kN/mm^2. One cable is tensioned at a time. **[16]**

Q8) A rectangular beam of prestressed concrete is required to support a dead load moment 10 x 10^6 N — mm (inclusive of its own weight) and live load moment 24 x 10^6 N mm at its mid section, Determine the initial prestressing force and its eccentricity at the mid section. Allowable initial compressive stress = 15 N/mm^2 Allowable final compressive stress = 12 N/mm^2 Allowable final tensile stress = 1 N/mm^2 Ulitmate tensile stress in steel = 1500.0 N/mm^2 Losses in prestreeing = 18 % **[17]**

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