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Seat No.	

Total No. of Pages : 3

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

November - 2014

DESIGN OF CONCRETE STRUCTURES - II (New)

Sub. Code : 49175

Day and Date : Friday, 28 - 11 - 2014 **Total Marks : 100**

Time : 10.00 a.m. to 1.00 p.m.

Instructions :
1) **Attempt any three questions from each section.**
2) **Figure 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 are allowed.**

SECTION - I

Q1) A reinforced concrete beam section of size 300 × 400 mm effective is subjected to a factored torsion of 40 kN-m in addition to a factored moment and a factored shear force of 60 kN-m and 100 kN, respectively. Design the torsion reinforcement, if the grade concrete and grade steel are M20 and Fe 415 respectively. **[17]**

Q2) A continuous beam ABC is simply supported at A and C and is continuous over support B. Beam support a superimposed live load of 10 kN/m and a dead load of 20 kN/m. Use IS code provisions to design beams. Use M20 grade concrete and Fe 415 grade steel. L(AB) = 10.0m and L (BC) = 5.0 m. Draw longitudinal section of beam showing reinforcement details. **[17]**

P.T.O.

Q3) a) State the assumptions made in theory of bending as applied to the design of reinforced concrete structure? **[4]**

b) Design a rectangular section for a simply supported reinforced concrete beam of effective span of 5m carrying a concentrated load of 60 kN at mid span. Use M20 grade concrete and Fe 415 grade steel. **[12]**

Q4) Design a circular tank with flexible base for capacity of 200000 liters. The depth of water is to be 4.0 m, including a free board of 200 mm. Use M20 grade concrete Fe 415 steel. **[16]**

SECTION - II

Q5) a) List the various types of tensioning devices used in prestressed concrete. **[4]**

b) Distinguished between pre-tensioned and post-tensioned members. **[4]**

c) Explain the various post-tensioning system based on wedge action with sketches. **[8]**

Q6) A prestressed concrete beam supports a live load of 4 kN/m over a simply supported span of 8m. The beam is to be prestressed by effective prestressing force of 235 kN at a suitable eccentricity such that the resultant stress at the soffit of beam at the center of the span is zero. The beam has an 'I' - section with an overall depth of 400 mm, width of flange is 200 mm and the thickness of the flange and web are 60 and 80 mm respectively. **[17]**

a) Find eccentricity required for the force

b) If the tendons is concentric, what should be the magnitude of prestressing force for the resultant stress to be zero at the bottom fiber of the central span section?

Q7) A prestressed concrete beam of 6.0 m span has section 200 × 300 mm and is prestressed to 400 kN at transfer. The cable has cross sectional area 400 mm^2 with maximum eccentricity of 70 mm. Determine the loss of prestress. Assuming $E_s = 210$ kN/mm^2 and $E_c = 33.33$ kN/mm^2, anchor slip = 1.5 mm, Creep coefficient = 1.0, shrinkage of concrete = 0.0002 and creep loss in steel = 2%. **[16]**

Q8) A post tensioned prestressed beam of rectangular section 250 mm wide is to be designed for an imposed load of 10 kN/m, uniformly distributed on span of 10 m. The stress in the concrete must not be exceed 15 N/mm^2 in compression and 1.2 N/mm^2 in tension at any time and the loss of prestress may be assumed to be 15%. Calculate : **[17]**

a) Minimum possible depth

b) Prestressing force and corresponding eccentricity.