SP-191

Seat No.	

Total No. of Pages : 2

Final Year B.Tech. (CBCS) (Civil) (Part - IV)
(Semester - VIII) Examination, November - 2023
DESIGN OF CONCRETE STRUCTURES - II
Sub. Code : 84745

8618

Day and Date : Monday, 20 - 11 - 2023 **Total Marks : 70**

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

Instructions :
1) **All questions are compulsory.**
2) **Figure to right indicate full marks.**
3) **Assume any suitable data whenever necessary and mention it clearly.**
4) **Use of non programmable calculator is allowed.**
5) **Use of relevant I.S. Codes are allowed.**

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SECTION - I

Q1) Determine the reinforcement required for a rectangular beam section with the following data- Width of the section = 250 mm. Depth of the section = 500 mm.Factored bending moment = 80 kNm.Factored torsional moment = 40 kNm. Factored shear force = 70 kN. Use M20 grade concrete and Fe 415 grade steel. **[11]**

Q2) A three span R.C.C. continuous rectangular beam ABCD is simply supported at A and D and continuous over supports B and C. The beam carries a 230 mm thick & 3 m high brick wall and superimposed load of 10 kN/m. Design the beam using I.S. Code coefficient method. AB = BC = CD = 6 m. Unit weight of brick wall 20 kN/m^3. Use M20 grade concrete and Fe 415 grade steel. Show reinforcement details. **[12]**

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Q3) Design a circular water tank with flexible base for 7 lakh liter capacity. Use M25 grade concrete and Fe 415 grade steel. Adopt depth of water excluding free board as 4 m. Use concrete grade M20 and steel of grade Fe 415. **[12]**

OR

Design an open square R.C.C. water tank 4.5m × 4.5m × 3m deep resting on firm ground. Use M20 grade concrete and Fe 415 grade steel. **[12]**

P.T.O.

SECTION - II

Q4) A prestressed concrete beam section of 450 mm × 500 mm is used as simply supported beam over an effective span of 10 m. The prestressing force of 750 KN is applied with an eccentricity of 80 mm at mid span section. If the permissible stress in the concrete are 15 N/mm^2 in compression and 1 N/mm^2 in tension, estimate the udl that beam can carry in addition to its self weight. **[12]**

OR

Solve any Two of the following : **[12]**

a) Explain in detail different systems of prestressing

b) Draw different cable profiles and explain their suitability for different loading conditions.

c) Explain loss of prestress due to friction in post tensioned prestressed concrete

Q5) A pretensioned prestress concrete beam of 9 m span as a cross section of 400 mm × 800 mm and is prestressed with 2400 KN at transfer. The cable has cross sectional area of 2000 mm^2 and has a parabolic profile with maximum eccentricity of 120 mm at the middle of span and Zero at end. Determine the total percentage loss of prestrss in the tendon. **[12]**

Take - i) Es = 2.1 × 10^5 N/mm^2 and Ec = 0.31 × 10^5 N/mm^2, ii) Shrinkage strain = 0.0003 iii) Creep coefficient = 1.6, iv) Relaxation of steel = 5%, v) Anchorage slip = 2 mm. **[12]**

Q6) A post tensioned pre-stressed beam of rectangular section 250 mm wide is to be designed for an imposed load of 15 KN/m UdI on span of 15 m. The stress in the concrete must not exceed 17 N/mm^2 in compression and 1.4 N/mm^2 in tension. The loss of prestress is 15%. Calculate the depth of beam required, pre-stressing force and corresponding eccentricity. **[11]**

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