

F 3423

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Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, NOVEMBER 2014

Seventh Semester

Branch : Civil Engineering

DESIGN OF CONCRETE STRUCTURES—II (C)

(Old Scheme—Prior to 2010 Admissions)

[Supplementary/Merchance Chance]



Time : Four Hours

Maximum : 100 Marks

Use of IS Codes Permitted, Missing Data may be Assumed Suitably.

Answer all questions.

Each question carries 20 marks.

1. A simply supported prestressed concrete beam of rectangular cross section 300 mm × 500 mm is loaded with a total udl of 200 kN over a span of 5m. Sketch the distribution of stresses at the mid-span and end sections if the prestressing force is 1500 kN and the tendon is eccentric, located at 150 mm above the bottom fiber.

(20 marks)

Or

2. Design a rectangular prestressed concrete beam for the following data :—

Load intensity = 8 kN/m ; Effective span = 10 m, Characteristics strength of concrete = 45 MPa ; Compressive strength at transfer = 35 MPa ; Losses = 20%, Characteristic strength of tendons = 1600 MPa.

(20 marks)

3. Determine suitable dimensions of a cantilever retaining wall, which is required to support a bank of earth 4 m high above the ground level on the toe side of the wall. Consider the backfill surface to be inclined at an angle of 15° with the horizontal. Assume good soil for foundation at a depth of 1.25m below the ground level with a safe bearing capacity of 160 kN/m². Further assume the backfill to comprise granular soil with a unit weight of 16 kN/m³ and an angle of shearing resistance of 30°. Take coefficient of friction = 0.6. Also design the wall using M₂₀ and Fe₄₁₅.

(20 marks)

Or

4. Design a suitable counterfort retaining wall to support a level backfill, 7.5 m high above the ground level on the toe side. SBC = 170 kN/m² with good soil at a depth of 1.5 m below GL. Unit out of soil = 16 kN/m³, Angle of shearing resistance = 30°. Coefficient of friction = 0.5. Use M₂₅ and Fe₄₁₅ steel.

(20 marks)

Turn over

5. A continuous beam of three equal spans $AB = BC = CD = 8\text{m}$ is simply supported at the ends A and D. The beam carries a super imposed load of 15 kN/m . Design the beam and sketch the reinforcement. Use M_{25} and Fe_{415} .

(20 marks)

Or

6. A circular beam of diameter 10 m is supported continuously on sin columns. It carries a udl of 12 kN/m . Determine the bending moment, twisting moment and shear force at salient points and plot.

(20 marks)

Or

7. Design a spherical dome over a circular room, for the following data :—

- (i) Inside diameter of room = 12m
- (ii) Rise of dome = 4m
- (iii) LL due to wind, ice, snow etc = 1.5 kN/m^2 .

The done has an opening of 1.6 m diameter at its crown. A lantern is provided at its top, which causes a dead load of 22kN acting along the circumference of the opening.

(20 marks)

Or

8. Design a conical roof for a hall having a diameter of 20 m . The rise of the dome has to be 4m . Assume the live and other loads as 1500 N/m^2 .

(20 marks)

9. Design a circular water tank resting on ground with flexible base of capacity of $200,000$ liters. The depth of storage including freeboard is 3.0 m . Use M_{25} and Fe_{415} . Sketch the reinforcement details.

(20 marks)

Or

10. Design a rectangular water tank open at top, resting on ground having a size of $10\text{m} \times 4.8\text{ m} \times 4.0\text{ m}$. Use M_{25} and Fe_{415} . Sketch the reinforcement details.

(20 marks)

(5 × 20 = 100 marks)

