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(Pages : 4)

Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2016

Seventh Semester

Branch : Civil Engineering

CE 010 703—DESIGN OF CONCRETE STRUCTURES II (CE)

(New Scheme—2010 Admission onwards)

[Supplementary/Improvement]

Time : Three Hours

Maximum : 100 Marks

Use of Is codes permitted

Missing data may be assumed suitably.

Part A

Answer **all** *questions.*

Each question carries 3 *marks.*

1. Write any *three* advantages of pre-stressed concrete ?
2. What are the main components of Counter fort Retaining wall ?
3. Define continuous beam ?
4. What are Domes ?
5. What are flexible joints in water tanks ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*

Each question carries 5 *marks.*

6. Explain in detail about pre-tensioning system ?
7. Explain in detail about Cantilever Retaining valve ?
8. Explain three moment theory in continuous beams ?
9. Explain about spherical domes.
10. How is the bending moment for the base slab of elevated water tank calculated ?

(5 × 5 = 25 marks)

Turn over

Part C

Answer **all** *questions.*

Each full questions carries 12 *marks.*

11. A pre-stressed concrete beam 400 *mm* × 600 *mm* in section has a span of 6 m and is subjected to a uniformly distributed load of 16 kN/metre including the self weight of the beam. The prestressing tendons are located at the lower third point and provide an effective pre-stressing force of 960 kN. Determine the extreme fibre stresses in concrete at the mid span section.

Or

12. A pre-tensioned beam 250 *mm* wide and 360 *mm* deep is pre-stressed by 10 wires of 8 *mm* diameter initially stressed to 1000 N/mm^2. The centroid of the steel wires is located at 105 *mm* from the soffit. Determine the maximum stress in concrete immediately after transfer allowing elastic shortening of concrete only at the level of the centroid of steel.

    If, however, the concrete is subjected to additional shortening due to creep and shrinkage and the steel is subjected to a relaxation of stress of 5 percent find the percentage loss of stress in the steel wires.

    Take E_s = 210 kN/mm^2, E_c = 36.85 kN/mm^2, creep coefficient ϕ = 1.60. Total residual shrinkage strain = 3×10^{-4}.

13. A cantilever type retaining wall has a 5.5 metre tall stem. It retains earth level with its top. The soil weighs 19000 newtons per cubic metre and has an angle of repose of 30°. The bearing capacity of the soil is 200 kilo-newtons per square metre. Design the wall assuming suitable working stress. Use M 20 concrete and grade 1 mild steel bars.

Or

14. Design a counterfort type retaining wall to the following particulars :

    (i) Height of the wall above G.L. = 5.5 metre.

    (ii) Safe bearing capacity of soil = 16 tonnes / sq.m.

    (iii) Angle of repose = 30°.

    (iv) Weight of soil = 1600 kg/m^3.

    (v) Spacing of counterforts = 3 metres centres.

    (vi) Concrete weighs 2500 kg/m^3

    (vii) Adopt the following stresses c = 50 kg/cm^2, t = 1400 kg/cm^2 and m = 18.67

15. Explain the design procedure of a three span continuous beam symmetrically supported and carrying UDL. Design as per IS specifications.

Or

16. A beam curved in plan in the form of segment of a circle of radius 4.25 m and central angle of 90° fixed at the ends as shown in figure 1. supports a uniformly distributed service load 20 kN/m. For preliminary analysis consider rectangular section of size 300 × 600 mm overall for the beam. Design the curved beam using concrete of grade M25 and HYSD steel bars of grade Fe 415.

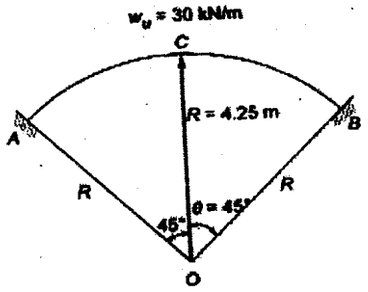

Figure 1

17. Design a conical roof for a hall having a diameter of 20 *m*. The rise of the dome has to be 4 *m*. Assume the live and other loads as 1500 N/m2.

Or

18. **Design a spherical dome over a circular room for the following data:**

(i) Inside diameter of room = 12 *m*

(ii) Rise of dome = 4 *m*

(iii) Live load due to wind, ice, snow etc. = 1.5 kN/m^2.

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

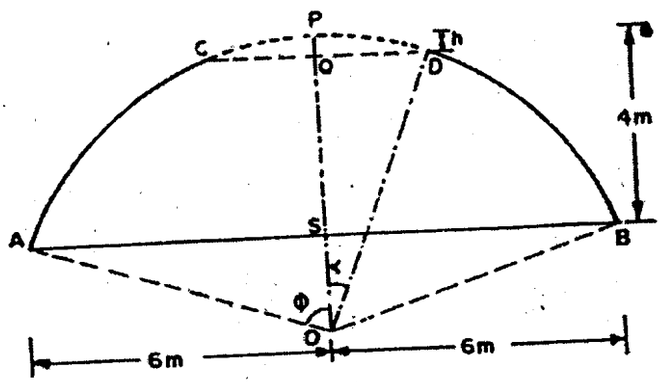

Figure 2

19. Design a circular tank to the following requirements:

(i) Diameter of tank = 6 metres.

(ii) Depth of water = 3.75 metres.

(iii) The tank rests on ground.

(iv) The walls and base slab are not monolithic.

Use M 20 concrete and Fe 415 steel.

Or

20. A reinforced concrete tank is 6 metres × 3 metres with a maximum depth of 2.50 metres of water. The tank rests on ground. 150 *mm* × 150 *mm* splays are provided at the junction of-walls and base slab. Design the tank. Use M 20 concrete and mild steel reinforcement.

(5 × 12 = 60 marks)