G 1060 (Pages : 4) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2015

Seventh Semester

Branch : Civil Engineering

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

(New Scheme—2010 Admission onwards)

[Improvement/Supplementary]

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. Explain basic concept of pre-stressing.
2. What is Cantilever Retaining wall ?
3. What are circular beams ?
4. What are conical domes ?
5. What are rigid joints in water tanks ?

(5 × 3 = 15 marks)

Part B

Answer **all** *questions.*
Each question carries 5 *marks.*

6. Explain the principle of post tensioning.
7. Explain in detail about counter fort Retaining wall.
8. Give load calculation for circular beam with UDL when symmetrically supported as per IS codes.
9. Explain about membrane stresses in 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 question carries 12 *marks.*

11. A pre-stressed concrete beam 400 mm. × 600 mm. in section has a span of 6 metre and is subjected to a uniformly distributed load of 16 kN/metre including the self-weight of the beam. The pre-stressing tendons which are located along the longitudinal centroidal axis 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-stressed concrete pile is 300 mm. × 300 mm. in section and is provided with 40 wires of 3 mm. diameter distributed uniformly over the section. Initially the wires are tensioned in the prestressing beds with a total pull of 450 kN. Determine the final stress in concrete and the percentage loss of stress in the wires. Take $E_s = 2.08 \times 10^5$ N/mm^2., $E_c = 3.20 \times 10^4$ N/mm^2.

Creep shortening = 32×10^{-6} mm. / mm. per N /mm.^{2} of stress

Total shrinkage strain = 200×10^{-6}

Relaxation loss of stress in steel = 4.50 % of the initial stress.

13. Design a reinforced concrete cantilever type retaining wall having a 5 m. tall stem. The wall retains soil level with its top. The soil weighs 18000 N/m.^{3} and has an angle of repose of 30°. The safe bearing capacity of the soil is 200 kN/m^2. Use M20 concrete and Fe 415 steel.

Or

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

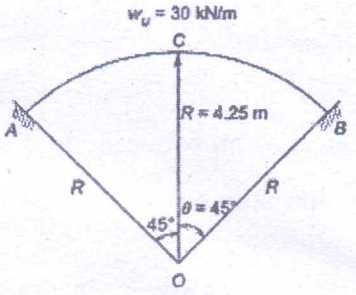
(a) Height of wall above G.L. = 5.50 metre.
(b) Safe bearing capacity of the soil = 160 kN/metre^2.
(c) Angle of repose = 30°
(d) Weight of soil = 16000 N/metre^3.
(e) Spacing of counter forts = 3 metres centres.
(d) Weight of R.C.C. = 25000 N/metre^3.

Use M 20 concrete and Fe 415 steel.

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 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.



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/m^2.

Or

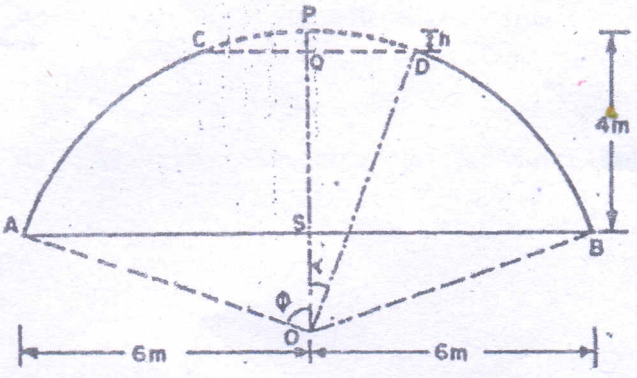
18. Design a spherical dome over a circular room for the following data :

(a) Inside diameter of room = 12 m.

(b) Rise of dome = 4 m.

(c) 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.



19. Design a circular tank to the following particulars :

(a) Diameter of tank = 3.50 metre

(b) Depth of water = 3 metre

(c) The tank rests on ground.

(d) The walls and base slab are not monolithic with each other.

(e) Specific weight of water = 9810 N/metre^3.

Use M 20 concrete and Grade 1 Mild steel

Or

20. An open tank 4 m. × 3 m. × 2.5 m. deep rests on firm ground. Design the tank. Use M 200 concrete and mild steel reinforcement.

(5 × 12 = 60 marks)