G 726 (Pages : 3) Reg. No.....

Name.....

B.TECH. DEGREE EXAMINATION, MAY 2014

Seventh Semester

Branch : Civil Engineering

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

(2010 Admissions)

[Improvement/Supplementary]

Time : Three Hours Maximum : 100 Marks

Relevant IS codes are permitted.
IS 456, 875, 1343 *and* 3370 *Part* 2 *and SP* 16.

Part A

Answer **all** *questions.*
Each question carries 3 *marks.*

1. Distinguish between RCC and pre-stressed concrete.
2. Define Angle of repose of soil and its importance in earth retaining wall design.
3. Distinguish between Singly reinforced and Doubly reinforced slabs.
4. List the advantages of dome construction.
5. A circular water tank is to be designed for a storage capacity of 5000 litres. Sketch the internal dimensions of the tank required.

(5 × 3 = 15 marks)

Part B

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

6. Explain methods of pre-stressing.
7. Explain Earth pressure diagram and sketch an earth pressure diagram for an earth retaining wall.
8. Explain with examples, the application of circular beams over uniformly loaded and supported on symmetrically placed columns.

Turn over

9. Explain the classification of concrete dome.

10. List and discuss different types of water tank.

(5 × 5 = 25 marks)

Part C

Answer **all** *questions.*

Each question carries 12 *marks.*

11. A pre-tensioned pre-stress concrete beam 9 M span has a cross-section of 400 mm × 800 mm, and is pre-stressed with 2400 KN at transfer. The cable has a cross-sectional area of 2000 sq.mm. of steel and has a parabolic profile with maximum eccentricity of 120 mm at middle of span. Determine the loss of pre-stress.

Given Es = 2.1×10^5N per sq.mm, Mix M30.

Minimum ultimate tensile strength of pre-stressing steel assume 1500 N per sq.mm.

Or

12. A rectangular concrete beam b × d, 100 mm × 300 mm having span 10 m is pre-stressed by a straight cable carrying an effective pre-stress force of 300 kN located at an eccentricity of 30 mm. The beam supports a live load of 1.5 kN per m. Calculate the resultant stress distribution for the central cross-section of the beam. Also determine the magnitude of the pre-stress force with an eccentricity of 30 mm which can balance the stress due to dead and live loads at the bottom fibre of the central section of the beam. Given density of RCC 25 kN per cum.

13. Design a cantilever retaining wall for the following data :

Height of earth to be retained above base level	=	6 m.
Surcharge load	=	20 kN per sq.m.
Angle of repose of soil	=	30°.
Bearing capacity of soil	=	150 kN per sq.m.
Coefficient of friction between soil and base slab	=	0.50.
Concrete grade M 30 and steel F 415.		
Length of retaining wall	=	62 m.

Or

14. Design a counter fort retaining wall for the following data :

Height of earth retained above basement level	=	6 m.
Density of earth	=	16 kN per cum.
Angle of repose of soil	=	30°.
Bearing capacity of soil	=	120 kN per sq.m.
Length of retaining wall	=	50 m.
Use M20 Concrete and F415 steel.		

15. A school building 6 m wide 18 m length as inner dimensions is designed as Brick column supported RCC beam and roof structure. The brick column 50 cm × 40 cm, 8 numbers support the continues beam on length direction and tie beams connecting them. Sketch the column and beam alignment and design the beams. Assume data required suitably.

Or

16. A rectangular beam 400 mm wide is subjected to the following at a section :

Bending moment = 45 kN-m, shear force = 30 kN, Torsional moment = 20 kN-m.

Design the section and torsional reinforcement. Given C = 5 N per sq.mm., T = 140 N per sq.mm, m = 18., FY 250 N per sq.mm and concrete M15.

17. Briefly explain the membrane analysis for the dome roof of a circular water tank. State the assumptions and limitations.

Or

18. Design a dome for the following particulars for a circular water tank.

Diameter of the water tank (inner)	=	12 m.
Rise of the water tank	=	2 m
Thickness	=	100 mm
Live load	=	**1400 N per sqm.**

Assume any other data required suitably. Sketch the reinforcement details.

19. Design the dimensions of a circular water tank to store 500,000 litres of water. Assuming the structural dimensions of the tank, design the side wall and sketch the reinforcement details. Explain the necessity of free board and water cushion.

Or

20. Design a ground water tank to store 600,000 litres of water. The tank must be rectangular in size such that depth and width are double the length. Also design the side walls. Use M20 concrete and F415 steel. Discuss the uplift pressure at action at the contact between ground and base slab. List the necessity of free board above full tank level.

(5 × 12 = 60 marks)