



P.E.S. College of Engineering, Mandya - 571 401

(An Autonomous Institution affiliated to VTU, Belgaum)

Seventh Semester, B.E. – Civil Engineering Semester End Examination; Dec. - 2015 Advanced Design of R.C. Structures

Time: 3 hrs Max. Marks: 100

Note: i) Answer any TWO full questions from each part.

ii) Assume any missing data suitably, use of IS codes permitted.

PART - A

- 1. Design a flat bottom circular elevated water tank of diameter 10 m and total height 4 m which is to be supported by ring beam of 7.5 m diameter, the ring beam is to be supported by six columns equally placed. Use M25 concrete and Fe 415 steel. Design the following components of water tank: i) Top Dome ii) Top Ring Beam iii) Cylindrical Wall.
- 2. A silo with internal diameter 5.5 m, height of cylindrical portion 18 m and central opening with 0.5 m is to be built to store wheat, design the silo using M20 grade concrete and Fe 415 steel, Given:

Unit weight of wheat = 8.5 kN/m², Angle of Internal friction = 28°

Angle of wall friction = 0.75ϕ while filling

 0.60ϕ while emptying

Pressure ratio = $\frac{\rho_h}{\rho_v}$ = K = 0.5 while filling.

- 3 a. What is folded plate? Explain with the help of suitable sketches the structural action of a folded plate.
 - b. How do you classify the shells? Explain with suitable sketches.
 - c. Explain the design process for the cylindrical shell roof.
 - d. Draw typical reinforcement details for cylindrical shell with edge beam.

PART - B

- 4 a. Design a simply supported square slab of side 3.6 m to carry a service load of 4 kN/m². Use M20 grade concrete and Fe 415 grade steel.
 - b. A hexagonal slab of side 3.6 m is simply supported along edges and is isotropically reinforced with 10 mm bars at 150 mm c/c. The effective depth is 125 mm and overall depth of slab is 150 mm. If M20 concrete and Fe 415 steel are used. Determine its load carrying capacity.
- 5. A R.C. grid floor is to be designed to cover a floor area 12 m x 18 m. The spacing of the ribs in mutually perpendicular directions is 1.5 m c/c. Live load on floor is 3 kN/m². Adopt M20 grade concrete and Fe 415 grade HYSD bars. Assume ends are simply supported and design suitable reinforcement in the grid floor.
- 6. Design an interior panel of a flat slab of size 5 m x 5 m without providing drop and column head. Size of columns is 500×500 mm and live load on the panel is 4 kN/m^2 . Take floor finishing load as 1 kN/m^2 . Use M20 concrete and Fe 415 steel.

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