



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

(An Autonomous Institution affiliated to VTU, Belagavi)

Seventh Semester, B.E. - Civil Engineering

Semester End Examination; Dec - 2017 / Jan - 2018

Advanced Design of RC Structures

Time: 3 hrs

Max. Marks: 100

*Note: Answer **FOUR** full questions, selecting **ONE** full question from each unit.*

UNIT - I

1. A RC grid floor for a hall has a size 9 m x 12 m. The ribs are spaced 1.5 m c/c in mutually perpendicular directions. Live load on the floor is 2 kN/m². Use M20 and Fe415. Analyze the grid floor by Rankine Grashoff method for moments and shears. Design the floor completely. Sketch the details of the reinforcement along the central rib in the shorter direction. 25
- 2 a. Mention the assumptions of yield line. 5
- b. Derive an expression for yield line moment along the yield line of Isotropically reinforced polygonal slab subjected to UDL over entire slab with fixed edges. 10
- c. A square size 6 m x 6 m is reinforced with 10 mm bars at 180 mm in both directions at an average effective depth 120 mm and overall depth as 150 mm. Determine permissible service load. Use M20 and Fe415. 10

UNIT - II

3. Design an interior panel of flat slabs of size 5 m x 5 m without providing drop and column Head. The size of column 500 x 500 mm and live load on the panel is 4 kN/m² and the floor finish 1 kN/m². Use M20 concrete and Fe415 steel. 25
4. An interior panel of a flat slab with panel size 6 m x 6 m supported by columns of size 500 x 500 mm. Provide suitable drop and sketches the details along the column and middle strips. Adopt M20 and Fe415. 25

UNIT - III

5. 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 6 columns equally placed. Use M25 concrete and Fe415 steel. Design the following components of; 25
 - (i) Top dome
 - (ii) Top ring beam
 - (iii) Cylindrical wall.

And sketch the reinforcement details.
- 6 a. Mention the advantage and disadvantages of folded plates. 5

- b. Design a reinforced concrete circular shell with the following particulars:
Radius $R = 3$ m, Span $L = 15$ m, Semi central angle $\phi_k = 60^\circ$ and thickness of shell $h = 75$ mm. Sketch the reinforcement details. 20

UNIT - IV

7. A silo with internal diameter 5.5 m, height of cylindrical portion 18 m and central opening 0.5 m to store wheat. Design the silo use Janssen's theory of pressure. Sketch the details of M20 concrete and Fe415 steel. 25
- 8 a. Explain the Airy's theory of plane of rupture cuts the top horizontal surface. 10
- b. Distinguish between bunkers and silos with the help of sketches. 5
- c. Derive the Janssen's theory for vertical and Horizontal surface. 10

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