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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 - 2016/Jan - 2017

Advance Design of RC structures

Time: 3 hrs

Max. Marks: 100

- Note:** i) Answer **FOUR** full questions, selecting **ONE** full question from each unit.
 ii) Assume any missing data suitably.
 iii) Use of IS: Codes permitted.

UNIT - I

- 1 a. Design a RCC grid floor to cover an area of 12 m x 18 m. The ribs are spaced at 1.5 m c/c in both directions. The floor carries a total superimposed load of 5 kN/m² at working condition. Analyse the grid floor by Rankine's method and design the grid floor completely. Sketch the details of steel. Use M20 concrete and Fe 415 steel. 25
- 2 a. Mention the characteristics of yield line. 5
- b. Obtain an expression for yield moment along the yield line of an isotropically reinforced square slab carrying udl. The slab is simply supported on all edges. 10
- c. A square slab of side 5 m is simply supported and is isotropically reinforced with 10 mm, bars at 200 mm c/c in both directions at an average effective depth of 90 mm. Overall depth of slab is 120 mm. Calculate the maximum allowable load the slab can resist. Use M20 concrete and Fe 415 steel. 10

UNIT - II

3. Design an interior panel of a flat slab of size 5 m x 5 m supported by square columns 500 x 500 mm. The total imposed load is 5 kN/m² and the floor finish is 1 kN/m². Use M20 concrete and Fe 415 steel. The slab has no drop and columns are without head. Sketch the details of steel along the column and middle strips. Use M20 concrete and Fe 415 steel. 25
4. An interior panel of a flat slab of size 6 m x 6 m is supported by columns 500 mm x 500 mm. Provide suitable drop and capital sketch the details along the column and middle strips. Adopt M20 concrete and Fe 415 steel. 25

UNIT - III

5. Design the top dome, top ring beam, cylindrical wall and tank floor of a flat bottom elevated water tank to store 160 kL of water. The ring beam is supported by 6 columns equally spaced. Adopt M20 concrete and Fe 415 steel sketch the details of steel. 25
- 6 a. Write a note on types of shell roofs. 6
- b. Mention the various advantages and disadvantages of folded plates. 6
- c. Explain the slab action and beam action as applied to the behavior of folded plate roof. 7
- d. Explain the design criteria for cylindrical shell roofs. 6

UNIT - IV

7. Design a silo with diameter 6 m, height of cylindrical portion 20 m and central opening 0.5 m to store coal. Use Jansson's theory for pressure. Sketch the details. Use M20 concrete and Fe 415 steel. Design the wall and hopper only. 25
- 8 a. Explain the concept of Wedge theory used by Airy to find the horizontal pressure exerted by stored material on walls in silo. 10
- b. Distinguish between bunkers and silos with the help of sketches. 5
- c. Write a note on design of edge beam in a silo and its detailing. 10

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