

B.E. (Civil Engineering) Eighth Semester (C.B.S.)
Elective - III : Advanced Reinforced Cement Concrete Design

P. Pages : 2

Time : Three Hours



NIR/KW/18/3626

Max. Marks : 80

- Notes :
1. All questions carry marks as indicated.
 2. Solve Question 1 OR Questions No. 2.
 3. Solve Question 3 OR Questions No. 4.
 4. Solve Question 5 OR Questions No. 6.
 5. Solve Question 7 OR Questions No. 8.
 6. Assume suitable data whenever necessary.
 7. Use of non programmable calculator is permitted.
 8. IS 456 (Revised), IS 3370 (Part-IV) may be consulted.

1. Design a circular water tank to hold 7,80,000 liters of water. Depth of water in tank is to be 4.8m and joint between floor and wall of The tank is to be rigid. Use M20 grade of concrete and Fe415 grade of steel. Design following component of water tank. **20**
- i) Top dome ii) Ring Beam
iii) Circular wall iv) Base slab
- Sketch the reinforcement details.

OR

2. An Intz water tank having 23,00,000 liters and supported by elevated tower consists of 14 no. column. Use M20 concrete and Fe415 steel. Design. **20**
- i) Top dome ii) Top ring beam
iii) Tank cylindrical wall iv) Bottom ring beam
- Sketch the reinforcement Details.

3. Design R.C.C. bridge deck slab for following data:- **20**
- i) Carriage way - 7.5 wide (two lane)
ii) Clear span - 4.5m
iii) Kerbs- 600mm wide
iv) Wearing coat - 80mm
v) Width of Bearing - 350mm
vi) Value of K = 2.85
vii) Loading - Class AA - tracked vehicle
viii) Use M20 concrete and Fe415 steel
ix) Impact factor is 25% up to 3m and decreasing to 10% for 9m span.
- Sketch the reinforcement details.

OR

4. a) Explain in details with neat sketches various types of IRC loading for Design of bridges. **10**
- b) Explain in details design of RCC bridge deck slab and also explain why average intensity of IRC load is not same for calculating max. B.M and max S.F in the design of bridge deck slab spanning in one direction. **10**

5. Portal frame with end hinged is to be analysed for the following data: 20
- i) Spacing of portal frames = 4m
 - ii) Height of columns from hinge base to the centre of beam = 5.2m
 - iii) Distance between column centers = 12m
 - iv) Live load on the roof = 1.5 kN/m^2 .
 - v) RCC slab is provided over the portal frame.
- Analyse and design the portal frame and find design moment and shear force at critical section.

OR

6. A multistory building have two bay's has continuous beam with AB=4.5m, B.C.=2m. The beams are placed equally at an interval of 3m. The thickness of the floor slab is 120mm. 20
- i) Live load = 3 kN/m^2
 - ii) Floor finish = 0.5 kN/m^2 ,
 - iii) Size of beam (230×400) mm size of column = (230×500) mm,
 - iv) Height of floor = 3.5m
 - v) Ibeam = Icolumn
- Analysye the intermediate frame & design the beam. Assume column is hinged based. Use M20 grade concrete & Fe415 grade steel. Draw Reinforcement details.

7. Design an interior panel of a cylindrical shell roof covering plan area of $12 \times 34 \text{ m}$ using beam theory. The semi-central angel is 40° . Make suitable assumptions for size of edge beam, thickness of shell and reinforcement in edge beam. Use M-20 concrete and Fe 415 steel. Sketch the reinforcement details. 20

OR

8. a) Write the assumption and limitation of Beam theory in the design of R.C.C. cylindrical shell. 10
- b) Explain in detail "Membrane theory" for the analysis and design of RCC cylindrical shell. 10
