B.E. Eighth Semester (Civil Engineering) (C.B.S.)

Elective - III : Advanced Reinforced Cement Concrete Design

P. Pages : 2 **KNT/KW/16/7543**

Time : Three Hours Max. Marks : 80

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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. I.S. 456 (Revised) I.S. 3370 (Part - IV) may be consulted.

1. An overhead water tank circular in shape has internal diameter of 6m and height of the wall is 4m. The base slab of tank is supported over its periphery by a circular ring beam. The rise of top dome can be assumed as 800 mm. Design top dome, top ring beam & vertical wall of circular water tank. **20**

Assume M20 grade of concrete & Fe 415grade of steel. Draw the reinforcement details.

OR

2. a) Explain how the earthquake forces are calculated in the design of R.C.C. overhead water tank. **10**

b) Explain in detail, how analysis of staging is carried out for overhead circular water tank subjected to horizontal forces and supported on 6 Nos of columns. **10**

3. Design R.C.C. bridge deck slab for high way using following data. **20**

i) Clear roadway width = 7.2 m (Two Lane)
ii) Clear span = 6m
iii) Kerb = 800 mm
iv) Wearing coat = 80 mm
v) Width of bearing = 500 mm
vi) Loading : IRC class – A vehicle
vii) Assume K = 2.84
viii) M20 concrete & Fe 415 steel is used.

Draw neat Reinforcement sketch.

OR

4. a) Explain in detail with neat sketches various types of IRC loading for design of bridges. **10**

b) Explain in detail design of RCC bridge deck slab and also explain why average intensity of IRC load is not same for calculating Max. B.M. & Max S.F. in the design of bridge deck slab spanning in one direction? **10**

5. A large hall is to be provided with rectangular frame as per given data below. **20**

i) Centre to centre of frame = 4.5m
ii) Height of frame above hinge = 5.2m
iii) Span of beam = 9m
iv) Thickness of slab = 150 mm
v) Size of beam = 300 mm x 750 mm
vi) Imposed bad on slab = 2.5 kN/m^2
vii) $I_{beam} = 2\ I_{column}$
viii) Column are hinged at base
ix) Use M20 grade concrete & Fe 415 grade steel. Analyse an interior frame and design the beam & hinge. Sketch reinforcement details.

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 intervals of 3m. The thickness of the floor slab is 120 mm. Live load = 3 kN/m^2 Floor finish = 0.5 kN/m^2, size of beam (230 x 400)mm size of column = (230 x 500)mm, Height of floor = 3.5m, $I_{beam} = I_{column}$. Analyse the intermediate frame & design the beam. Assume column are hinged based. Use M20 grade concrete & Fe 415 grade steel. Draw Reinforcement details. **20**

7. Design an interior panel of a cylindrical shell roof with edge beams covering the plan area of 10m x 30m (effective) using beam method. The semicentral angle is 38°. Assume Live Load = 2kN/m^2. use M20 grade concrete and Fe 415 grade steel sketch the reinforcement details. Assume suitable size of edge beam. **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**

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