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Total No. of Pages : 02

Total No. of Questions : 09

**B.Tech.(CE) (2011 Onwards) (Sem.-6)**  
**DESIGN OF CONCRETE STRUCTURES-II**  
Subject Code : BTCE-601  
Paper ID : [A2288]

Time : 3 Hrs.

Max. Marks : 60

**INSTRUCTION TO CANDIDATES :**

1. SECTION-A is COMPULSORY consisting of TEN questions carrying TWO marks each.
2. SECTION-B contains FIVE questions carrying FIVE marks each and students have to attempt any FOUR questions.
3. SECTION-C contains THREE questions carrying TEN marks each and students have to attempt any TWO questions.
4. Any missing data may be assumed.

**SECTION-A****1. Write briefly :**

- a) What are the various cases of failures of combined footing?
  - b) What is the factor of safety due to sliding of the retaining wall?
  - c) When a shear key is provided in a reinforced concrete retaining wall?
  - d) In which cases 8-legged stirrups are provided in a combined footing?
  - e) What is the shape of pressure distribution diagram beneath the footing when the footing is the symmetrically loaded?
  - f) In which conditions strap footing are provided?
  - g) What is minimum cover provided in a trapezoidal footing?
  - h) What is the shape of shear stress diagram in a reinforced concrete beam section?
  - i) What is the maximum spacing of vertical stirrups in rectangular beams?
  - j) What are the various forces which are considered for designing domes?
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**SECTION B**

2. Design a combined column footing with a strap beam for two RC columns  $300 \text{ mm} \times 300 \text{ mm}$  size spaced 4 m apart and each supporting a factored axial load of 750 kN. Assume BC of soil as  $225 \text{ kN/sq.m.}$ . Use M20 grade concrete and Fe415 grade steel.
3. Design a footing for a rectangular column  $30 \text{ cm} \times 45 \text{ cm}$  carrying an axial service load of 1000 kN. The net bearing capacity of the soil is  $120 \text{ kN/m}^2$ . Use M20 grade concrete and SAIL-MA350 grade steel.
4. Explain the methods of designing vertical stem, toe slab and heel slab of a T-shaped cantilever retaining wall. What will be the changes in the design if counterforts are provided at rectangular interval towards the side of backfill?
5. Explain the method of designing a shear key for a retaining wall.
6. What are the various structural elements of Intz type tank and what are their design principles?

**SECTION-C**

7. A circular girder of a water tank has a mean diameter of 10 m, and it is supported on six symmetrical placed columns. The uniformly distributed load on the girder is  $20 \text{ kN/m}$ . Design the critical sections of the girder using M20 grade concrete and Fe415 grade Tor Steel, and sketch the details of reinforcements.
8. Design a spherical dome over a circular room of 20 m diameter. The rise of the dome may be taken equal to  $1/5$  of the diameter. The dome carries a lantern load of 30 kN attached at the circumference of an opening of 2 m diameter at the apex. Take live load due to wind etc. as  $1.5 \text{ kN/m}^2$  of the surface area of the dome, Use M20 Concrete and Fe415 steel.
9. Design a semi circular beam supported on three columns equally spaced. The centre of column is on a curve of diameter 8 m. The super imposed load on beam per meter length is 20 kN. Adopt M20 grade and Fe450 T or steel.