

**Max. Marks : 60**

**INSTRUCTION TO CANDIDATES :**

## SECTION-A

### SECTION-B

- Q2. Design a footing for a brick wall 30 cm thick which is transmitting a load of 150 KN/m. The gross bearing capacity of soil is 100 KN/m<sup>2</sup>.
- Q3. Design a circular water tank with flexible base for a capacity of 450 KL. The depth of water is 4.5 m. Allow suitable free board.
- Q4. Derive the expression for meridional thrust is circular domes.
- Q5. Explain the design principles of cantilever retaining wall.
- Q6. Design a column of rectangular section subjected to an axial load of 650KN and uniaxial moment of 265KN-m. Consider concrete of grade M20 and steel of grade Fe415.

### SECTION-C

- Q7. A circular beam has to support a circular tank as its bottom ring beam below side wall and it supported by eight symmetrically spaced circular columns of 400mm diameters. The inner diameter of water tank is 9m and height of side walls is 3m. Design the ring beam. Given thickness of base slab is 200 mm, thickness of vertical wall is 250mm. Use M25 concrete Fe250 steel.
- Q8. A cantilever retaining wall has to retain earth 3.5 m high above ground level. The density of earth is 17 KN/m<sup>3</sup> and its angle of repose is 30°. The earth is horizontal at top. The safe bearing capacity of soil is 180 KN/m<sup>2</sup> and coefficient of friction between soil and concrete is 0.55.
- Q9. Design an underground water tank 4m×10m×3m deep. The sub-soil consists of sand having angle of repose of 30 degree, and saturated unit weight of 17KN/m<sup>3</sup> the water table is likely to rise up to ground level. Use M20 concrete HYSD bars.