

Roll No. ....

Total Pages : 03

**BT-7/M-20**

**37233**

**DESIGN OF CONCRETE STRUCTURE-II**  
**CE-401-N**

Time : Four Hours]

[Maximum Marks : 75

**Note :** Attempt *Five* questions in all, selecting at least *one* question from each Unit. If necessary, assume suitable data and specify the same. Relevant IS codes are allowed.

**Unit I**

1. (a) What are the various losses in prestressing ? **10**  
(b) Merits and demerits of prestressing concrete. **5**
  
2. Draw the bending moment diagram of three span continuous beam carrying a characteristic live and dead load of 30 kN/m and 8 kN/m. The span of beam should be considered as 5 m. The BMD should be drawn for maximum bending moment at the first intermediate support. **15**

## Unit II

3. Design an Interior Panel of a flat slab with panel size  $4\text{ m} \times 4\text{ m}$  supported by column of size  $500 \times 500\text{ mm}$ . Provide suitable drop. Take live load as  $6\text{ kN/m}^2$ . Use M20 concrete and Fe 415 steel. **15**
4. Design a trapezoidal combined footing for two columns which are  $8\text{ m}$  apart between centres carry a load of  $900$  and  $1000\text{ kN}$  respectively. The size of column are  $600 \times 600\text{ mm}$  and  $800 \times 800\text{ mm}$ . Projection beyond the centre of column parallel to the length of foundation are  $0.8$  and  $1.4\text{ m}$  safe bearing capacity of soil  $150\text{ kN/m}^2$ . **15**

## Unit III

5. Design a circular tank with fixed base for capacity of  $40,000$  litres. The depth of water is to be  $4.5\text{ m}$  including a free board of  $0.5\text{ m}$ . Use M20 concrete and mild steel reinforcement. Assume  $\mu = 0$ . The tank is free at the top and rest on the ground. Take unit wt. of water as  $9.8\text{ kN/m}^3$ . **15**
6. Design a bunker to store  $600\text{ kN}$  of coal for the following data, unit wt. of coal  $8340\text{ N/m}^3$ . Angle of repose =  $30^\circ$ . The stored coal is to be surcharged at its angle of repose. Take permissible stress in steel as  $140\text{ N/mm}^2$ . **15**

#### Unit IV

7. (a) A R.C.C. frame consists of beam having span of 5 m c/c. A floor typical inner beam carries a negative bending moment of 500 kN/m and a shear force of 300 kN at the face of beam column joint due to gravity and earthquake loads. Design the beam section for ductility. **10**
- (b) State the assumption used in lateral load analysis method. (Portal and Cantilever method). **5**
8. (a) Describe the characteristic features of yield line theory. **5**
- (b) A square slab of side length 5 m is simply supported at the ends and carries a service live load of 5 kN/m<sup>2</sup>. Design the slab. Use M20 concrete and Fe415 steel bars. **10**