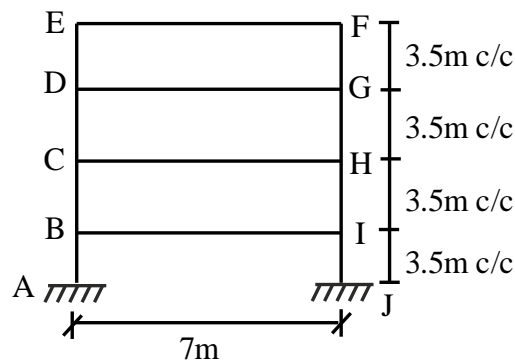




- Notes :
1. All questions carry equal marks.
  2. Due credit will be given to neatness and adequate dimensions.
  3. Assume suitable data wherever necessary.

1. a) Analyze a building frame for earthquake load are shown in figure spacing of frame is 3.5m c/c. Live load intensity on the frame is  $3\text{ kN/m}^2$ , Dead load intensity on all a floor is  $4\text{ kN/m}^2$ . Dead load of wall on the beam is  $17\text{ kN/m}$ . Main beams are  $300 \times 500\text{ mm}$  in size and transverse beam are  $280 \times 400\text{ mm}$  in size. Inner column are  $300 \times 650\text{ mm}$  and outer column are  $250 \times 450\text{ mm}$  in size building lies in earthquake zone III. Draw SFD, BMD. **35**

**OR**

2. Design a circular RCC chimney of height 60 m with external diameter of shaft as 4 m where the wind intensity is  $1.5\text{ kN/m}^2$ . The thickness of fire brick lining is 100 mm. The temperature difference between inside and outside of shaft is  $65^\circ\text{C}$ . Use M25 concrete and Fe 415 steel. **35**
- SBC of soil is  $150\text{ kN/m}^2$ .  
Sketch reinforcement details.
3. Design a RCC box culvert having clear vent way  $4.0\text{ m} \times 4.0\text{ m}$  in size dead load on culvert is  $20\text{ kN/m}^2$  and live load  $50\text{ kN/m}^2$ . **35**
- Density of soil  $= 18\text{ kN/m}^3$ .  $\phi = 30^\circ$   
SBC of soil is  $200\text{ kN/m}^2$ .  
Use M25 concrete. Fe 500 Steel.  
Sketch reinforcement details.

**OR**

4. Design a square bunker  $3.0\text{ m} \times 3.0\text{ m}$  to store 25 tonnes of coal having  $9.0\text{ kN/m}^3$  density and  $30^\circ$  angle of repose. Height of column is 5.0 m from GL. Co-efficient of friction between material are concrete is 0.45. **35**
- SBC of soil is  $180\text{ kN/m}^2$ .  
Use M20 grade concrete Fe 415 steel.  
Sketch reinforcement details in all members.

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