



height of the building and hence nodal forces at each floor level. Use the following data:

Length of building = 48 m

Width of building = 40 m

Height of building = 34 m

Storey height = 3 m

Frame spacing = 4 m in both directions

Location = Chennai

Terrain category = 2

Slope of ground =  $10^\circ$

Height of hill = 900 m

Location from crest = 200 m

Design life period = 55 years.

**Q-3 Attempt all questions**

- (a) Design a circular underground water tank with flexible base for a capacity of 5,00,000 litres below the ground level. Saturated unit weight of soil =  $17 \text{ kN/m}^3$ , density of water =  $10 \text{ kN/m}^3$  and  $\phi = 30^\circ$ . Use M20 grade concrete and Fe415 grade steel. (10)
- (b) Explain the various methods of analysis or structural analysis in R.C. Framed buildings. (04)

**Q-4**

Design an underground tank of size 3 m x 8 m x 3 m for the following data. (14)  
Saturated unit weight of soil =  $16 \text{ kN/m}^3$ , density of water =  $10 \text{ kN/m}^3$  and  $\phi = 30^\circ$ . Water table can raise upto ground level. Use M25 concrete for tank, M20 concrete for roof slab and Fe415 grade steel.

**Q-5 Attempt all questions**

- (a) Design and detail counterfort retaining wall for the following data: (10)  
Angle of repose =  $30^\circ$   
Unit weight of soil =  $18 \text{ kN/m}^3$



Height of wall above ground level = 7m

SBC of soil = 150 kN/m<sup>2</sup>

Coefficient of friction between the base and the soil is 0.60. Use M20 grade of concrete and Fe 415 steel.

- (b) Describe in detail about the stability of cantilever retaining wall. (04)

**Q-6 Attempt all questions**

- (a) Design a welded plate girder for a simply supported bridge deck beam with clear span of 20m, subjected to following, Dead load including self weight = 20 kN/m Imposed Load = 10 kN/m, Two moving loads = 150 kN each spaced 2m apart. Assume that top compression flange of the plate girder is restrained laterally and prevented from rotating. Use mild Steel with  $f_y = 250$  MPa. Design an unstiffened plate girder with thick webs. (10)
- (b) Explain with neat sketches the different types of truss girders. (04)

**Q-7 Attempt all questions**

- (a) Design a foot over bridge for the following data: Type of truss: warren type (10)  
Span of roof truss: 30m  
Width of walk way: 3m  
Panel length: 3m  
Live load: 4 kN/m<sup>2</sup>  
Floor finish : 1 kN/m<sup>2</sup>  
Rcc Slab thickness: 120 mm thick,  $F_y = 250$   
Assume Suitable Data if required.
- (b) List various steps involved in the design of angle purlin and I section purlin. (04)

**Q-8 Attempt all questions**

- (a) Explain various types of transmission line towers. (07)
- (b) Explain lining of chimneys and load acting on a chimney. (07)

