

surcharge will approximate the lateral earth pressure effect. Given: Earth density = 17 kN/m^3 ; angle of internal friction (response) = 35° ; coefficient of friction between concrete and soil = 0.45; bearing capacity = 150 kN/m^2 . Use M-30 mix and Fe 415 grade steel.

3. Design a flat slab for a garage using the following data:

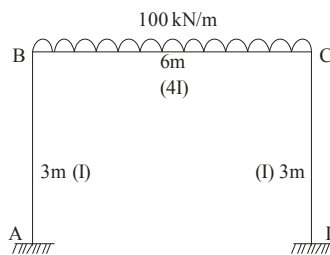
Loading -10 kN/m^2 , Column grid : $8 \text{ m} \times 8 \text{ m}$, Materials : M-20 grade concrete

Fe-415 grade HYSD bars. Design the interior panel of slab with drops. Design the flat slab panel and sketch the reinforcement details.

4. Determine the length of pile required in clay of unconfined compressive strength 0.12 N/mm^2 if the piles are 400mm diameter and the working load on the pile is 150kN. Take FOS = 4 and $m = 0.6$.
5. Design a circular tank 15m dia with 4m depth of water. The walls of the tank are monolithic with the base. The tank rests on the ground. Use M-25 concrete and Fe-415 steel.
6. 'The conditions specified for single span and multi span beams for redistribution of moments are different.' Explain the reason for this. Also discuss advantages of redistribution of moments.

SECTION-C

7. a) Write down advantages and disadvantages of flat slab.
b) Explain Equivalent frame method.
8. Determine the moments at A, B, C, D for the portal frame loaded as shown in diagram



9. Suggest suitable dimensions and draw the pressure distribution diagram for a counterfort retaining wall of height 6m above G.L. Also design the stem portion. The soil is having SBC 160 kN/m^2 with internal friction angle 30° . Density of soil is 16 kN/m^3 . Spacing of counterfort is 3m c/c.

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