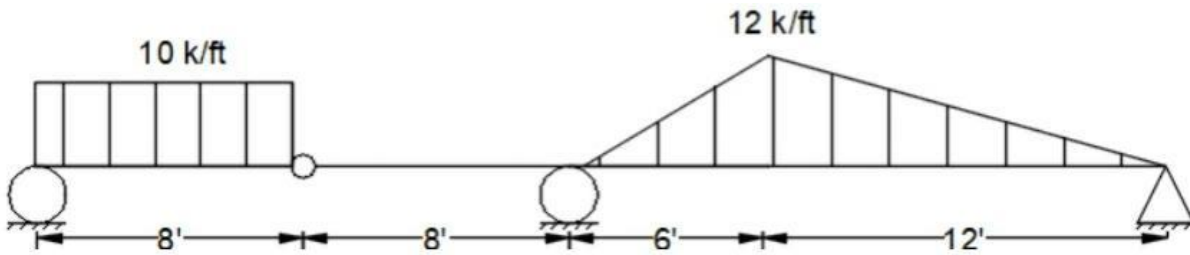


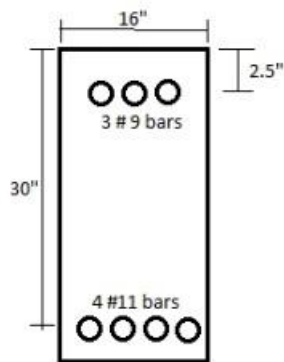
1.

- a. Chainage of a survey line is actual 36990 ft, but it found in practical field is 36995 ft. Find the % of error.
- b. Draw SFD & BMD



2. What is bulking of sand? Advantages of OPC over PPC.

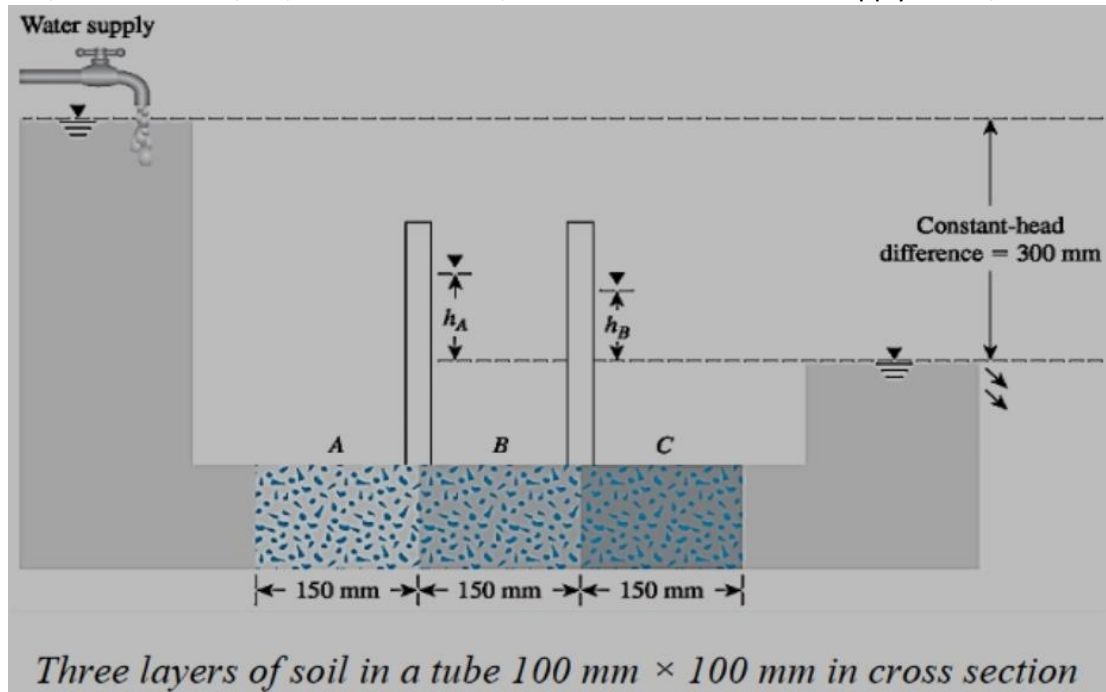
3. Determine the ultimate moment capacity of the beam which clear cover is 1.5 Inch Consider $f'_c = 4 \text{ ksi}$ and $f_y = 60 \text{ ksi}$



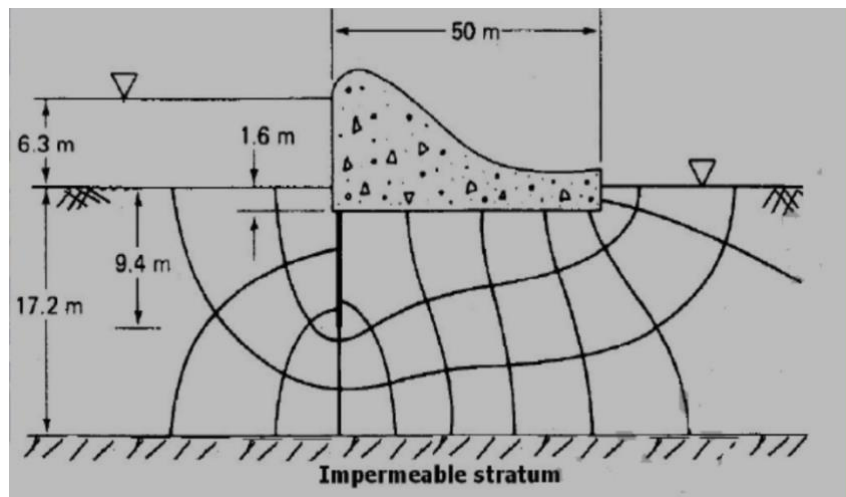
4.

5. A rectangular beam has a width of 12 in an effective depth to the centroid of the reinforcing steel of 17.5 in. It is reinforced with four # 9 bar in one row. If $f'_c = 4 \text{ ksi}$ and $f_y = 60 \text{ ksi}$. What is the ultimate moment capacity of the beam? Also check what would be the ϕ value.

6. The soil layers have a cross section of 100 mm x 100 mm each. Water is supplied at constant head difference 300 mm across the sample the hydraulic conductivity of each soil is: $k_A = 10^{-2}$ cm/sec.; $k_B = 3 \times 10^{-3}$ cm/sec; $k_C = 4.9 \times 10^{-4}$ cm/sec. Find the rate of water supply in cm^3/hr .



7. The flow net constructed for the dam is shown in the figure below. Taking coefficient of permeability as 3.8×10^{-6} m/s, Find the quantity of flow (in cm^3/sec) under the dam per meter of dam .



8. The following are the rates of rainfall for successive 20 min periods of 140 min storm 2.5, 2.5, 10.0, 7.5, 1.25, 1.25, 5.0(cm). Taking the value of ϕ = 0.2. Find out net runoff in cm, total run off, and value of W index.
9. Average rainfall of 16 cm occurs over a catchment during a period of 12 hours with uniform intensity. The unit hydrograph (Unit depth = 1cm & duration = 6 hr.) of the catchment rises linearly from 0 to 30 cumecs in 6 hrs. And then falls linearly from 30 to 0 cumec in next 12 hrs. Base flow of river = 5 cumec.
- What is the peak discharge of resulting direct runoff hydrograph?

- b. What is the area of catchment in hectares?
10. Determining Spot Speed Sample Size As part of a class project, a group of students collected a total of 120 spot speed samples at a location and determined from this data that the standard variation of the speeds was 6 mi/h. If the project required that the confidence level be 95% and the limit of acceptable error was 1.5 mi/h, determine whether these students satisfied the project requirement.
 11. Ascending gradient of 1 in 100 meets a descending gradient of 1 in 120. A summit curve is to be designed for a speed of 80 kmph so as to have an overtaking sight distance of 470 m.
 12. Find the dimension of a settling tank to treat 45 m^3 / hour when the overflow rate is 0.5 metre per hour and the detention time is 3 hours. If the suspended solid content of the water averages 40 ppm what weight of the dry solids will be deposited every 24 hours as you make 75% remover rate in the basins. Also find average velocity of flow.