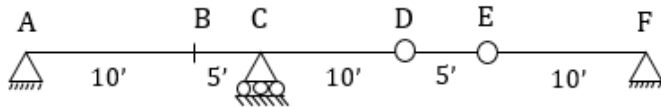
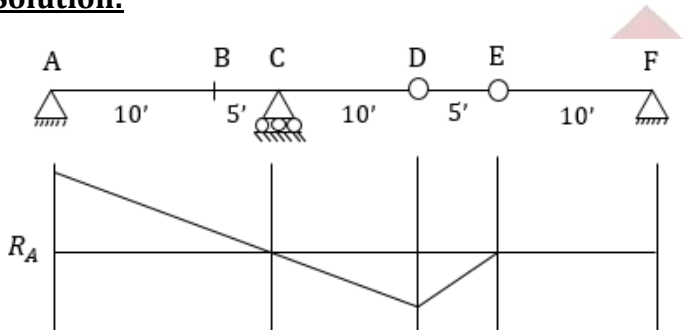


Titas Gas Transmission and Distribution Company Limited
Post: Assistant Director (Civil)
Date: 2021
Exam Taker-BUET

Question 01: Draw the IL for reaction at point A.



Solution:



Question 02: What is BRT? Write four characteristics of BRT?

Solution:

Bus Rapid Transit (BRT) is a high quality bus based transit system that delivers fast, comfortable and cost effective urban mobility through the provision of segregated right of way infrastructure.

Six points of BRT system is given below,

- High capacity vehicles
- Dedicated lanes and alignment
- Quality stations
- Off-board fare collection
- Run buses very frequently
- In tunnels or subterranean structures
- Give buses their own lane

Question 03: An irrigation field has following data: Field capacity = 25%, Permanent wilting point = 15%, Specific weight = 14.03 kN/m³, Root zone depth = 90 cm, Calculate the available moisture holding capacity of soil.

Solution:

$$\text{Maximum storage capacity} = \frac{\gamma_d d (F_c - w_c)}{\gamma_w} = \frac{14.03 \times 0.90 (0.25 - 0.15)}{9.81} = 0.128 \text{ m}$$

Question 04: Find the materials needed for 100 cft fresh concrete with a mix ratio = 1: 2.5: 4.5

Solution:

$$\text{Dry volume} = 100 \times 1.54 = 154 \text{ cft}$$

$$\text{Given, Sum of the mix ratio} = 1: 2.5: 4.5 = 1 + 2.5 + 4.5 = 8$$

$$\text{Cement required} = \frac{1}{8} \times 154 = 19.25 \text{ ft}^3 = 19.25/1.25 = 15.4 \text{ bags}$$

$$\text{Sand required} = \frac{2.5}{8} \times 154 = 48.125 \text{ cft}$$

$$\text{Stone chips required} = \frac{4.5}{8} \times 154 = 86.625 \text{ cft}$$

Question 05: The moist weight of 0.0060 m³ of soil is 10 kg. If moisture content of the soil is 13% and specific gravity of the soil is 2.71, find the porosity of the soil sample.

Solution:

$$\text{Given, } V = 0.006 \text{ m}^3, W = 10 \text{ kg} = 98.1 \text{ N} = 0.0981 \text{ KN}$$

$$\text{Bulk unit weight, } \gamma = \frac{W}{V} = \frac{0.0981}{0.006} = 16.35 \text{ kN/m}^3$$

$$\text{Dry unit weight, } \gamma_d = \frac{\gamma}{1 + w} = \frac{16.35}{1 + 0.13} = 14.46 \text{ kN/m}^3$$

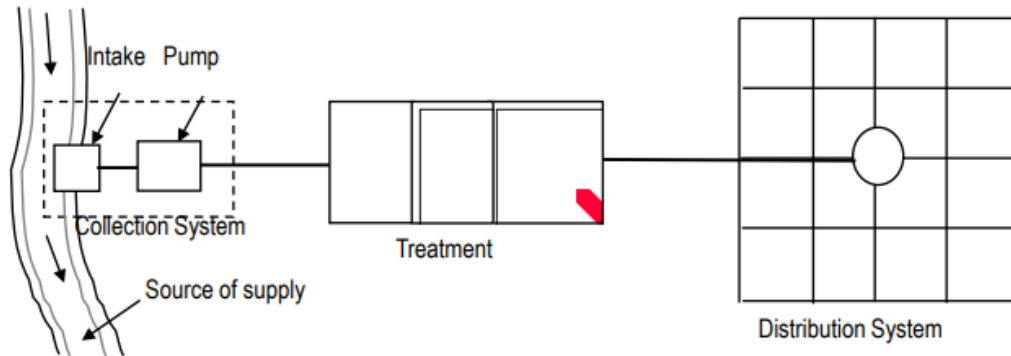
$$\text{Now, } \gamma_d = \frac{G_s \gamma_w}{1 + e}$$

$$\text{Void ratio, } e = \frac{G_s \gamma_w}{\gamma_d} - 1 = \frac{2.71 \times 9.81}{14.46} - 1 = 0.83$$

$$\text{Porosity, } n = \frac{e}{1 + e} = \frac{0.83}{1 + 0.83} = 0.45$$

Question 06: Draw conventional flow diagram of a water supply system.

Solution:



Question 07: The distance between two points measured 1000 m with a 25 m chain, but it was found that the chain is 25.15 m. calculate the actual length.

Solution:

Here, $ML = 1000$ m, $L = 25$ m, $L' = 25.15$ m

$$TL = \frac{L'}{L} \times ML = \frac{25.15}{25} \times 1000 = 1006 \text{ m}$$

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