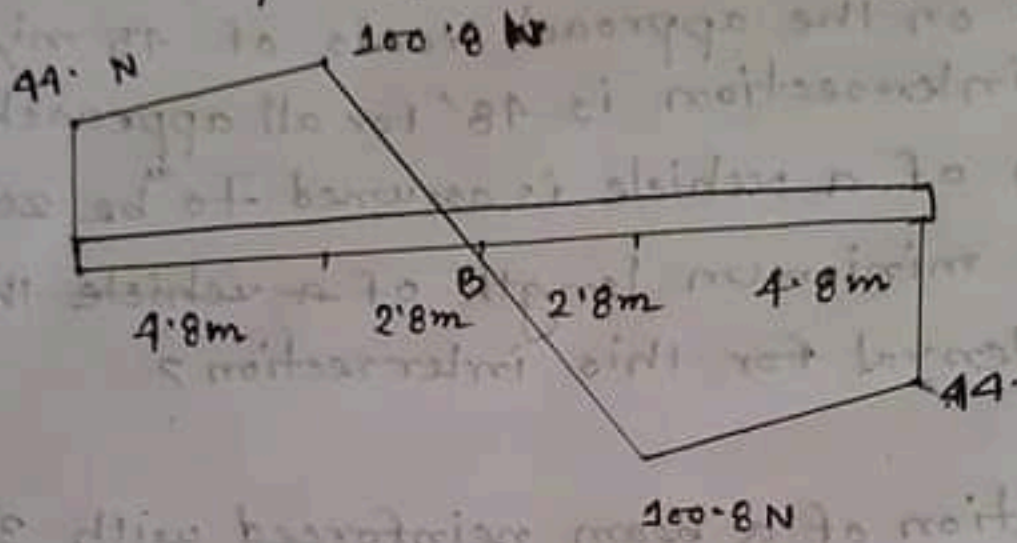


NESCO - 2021 (31st December)

1. An intersection located in an urban area has a maximum allowable speed on the approach roads, of 45 mi/hr. The width of the intersection is 48' for all approaches. The average length of a vehicle is assumed to be 20 ft. What should be the minimum length of a vehicle the red clearance interval for this intersection?
2. The cross section of a beam reinforced with 3 in² of steel. Assume the tension steel yields at maximum moment. What is the area of concrete required to balance the steel force when the steel yields? $f_c = 4 \text{ ksi}$, $f_y = 60 \text{ ksi}$
3. Draw a typical qualitative diagram for Alum dosage versus residual turbidity in a coagulation-flocculation-jar test of surface water sample.
4. Water is flowing in a fire hose with velocity 1 m/s, pressure 200 kPa. At the nozzle, the pressure decreases to atmospheric pressure 101.3 kPa and there is no change in height. Calculate the velocity of water exiting at the end of the nozzle.
5. Draw qualitative diagram of e - $\log p$ curve for consolidation of a soil sample test.
6. given, e , τ , σ
find inter-nation friction angle, ϕ

7. $BOD_5 = 125 \text{ mg/L}$, $k = 0.22/\text{day}$. Find ultimate BOD ?

8. SFD of simply supported beam is given. Find maximum



moment of the beam?