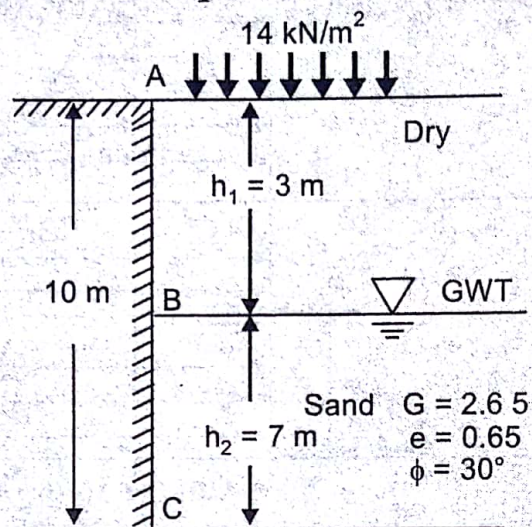7. *A 4 m high vertical wall supports, a saturated cohesive soil ($\phi_u = 0$) with horizontal surface. The top 2.5 m of the backfill has bulk density of 17.6 kN/m³ and apparent cohesion of 15 kN/m². The bulk density and apparent cohesion of the bottom 1.5 m is 19.2 kN/m³ and 20 kN/m³ respectively. If tension cracks develop what would be the total active pressure on the wall? Also draw the pressure distribution diagram.*

3. A retaining wall 6 m high supports earth with its face vertical. The earth is cohesionless with particle specific gravity 2.69, angle of internal friction 35° and porosity 40.5%. The earth surface is horizontal and level with the top of the wall. Determine the earth thrust and its line of action on the wall if the earth is water logged to level 2.5 m below the top surface. Neglect wall friction. Draw the pressure diagrams.

[15 Marks]

5. *A 6.0 m high retaining wall is to support a soil with unit weight $\gamma = 17.4$ kN/m³, $\phi = 26°$ and $c' = 14.36$ kN/m². Determine the Rankine active force per unit length of wall before the tensile crack occurs. Find the critical depth.*

For an earth retaining structure shown in Fig. construct earth pressure diagram for active state and find the total thrust per unit length of the wall.

14 kN/m²

A

Dry

h_1 = 3 m

10 m

B

GWT

Sand   G = 2.65
h_2 = 7 m   e = 0.65
            φ = 30°

C

[15 Marks]