INSTRUCTIONS: ATTEMPT ALL THE QUESTIONS.

1. **In a phreatic aquifer extending over 1 km^2 the watervtable was initially at 25m below ground level. Sometime after irrigation with a depth of 20cm of water, the water table rose to a depth of 24m bgl. Later 3x10^5 m^3 of water was pumped out and the water table dropped to 26.2 m bgl. Determine i) specific yield of the aquifer ii) deficit in soil moisture (below field capacity) before irrigation.**

Solution

Volume of water pumped out = Area of aquifer x drop in g.w.t x specific yield

$3x10^5$ = 10^6x2.2x Sy
Sy = **0.136 or 13.6%**

Volume of irrigation water recharging the aquifer = Area of aquifer xrise in g.w.t x Sy
Considering an area of 1m^2 of aquifer
1xy = 1x1x0.136
Recharge volume in terms of depth (y) = 0.136 m or 136 mm
Soil moisture deficit before irrigation = 200-136 = **64mm**

2. **In an area of 100 ha, the water table dropped by 4.5m. if the porosity is 30% and the specific retension is 10% determine i) the specific yield of the aquifre ii) change in groundwater storage.**

Solution
Porosity= Sy+ Sr
30%= Sy+ 10%
Sy= 20% or b0.2
Change in groundwater storage = area of aquifer x drop in gwtx Sy
= 100x4.5x0.2
= **90 ha-m or 90x10^4 m^3**