

HOMEWORK 2

Due on: Oct 26 Wednesday, 17:40

- 1) A layer of clay 4 m thick lies between two layers of sand each 4 m thick, the top of the upper layer of sand being ground surface. The water table is at 2 m below ground surface. The lower sand layer is under artesian pressure, the piezometric water level being at 4 m above ground surface. The saturated unit weight of the clay is 20 kN/m^3 and that of the sand is 19 kN/m^3 ; and above the water table the unit weight of the sand is 16.5 kN/m^3 . Draw the total stress, effective stress and pore water pressure diagrams.
- 2) In a 10-m-thick deposit of fine sand the water table is at 3.5 m below the surface, but sand to a height of 1 m above the water table is saturated by capillary water (above this height the sand may be assumed to be dry). The saturated and dry unit weights, respectively, are 20 kN/m^3 and 16 kN/m^3 . Draw the total stress, effective stress and pore water pressure diagrams for this sand layer.
- 3) A layer of sand extends from ground level to a depth of 9 m and overlies a layer of clay which is 6 m thick. The water table is 6 m below the surface of the sand. The saturated unit weight of the sand is 19 kN/m^3 and that of the clay is 20 kN/m^3 . The unit weight of the sand above the water table is 16 kN/m^3 . Over a short period of time the water table rises by 3 m and is expected to remain permanently at this new level. Draw the total stress, effective stress and pore water pressure diagrams (a) immediately after the rise of the water table, (b) several years after the rise of the water table.
- 4) A clay layer of 15 m thickness with a saturated unit weight of 20 kN/m^3 overlies a sandstone formation. The ground water table is at the ground surface. Piezometric measurements show that there is artesian pressure in the sandstone amounting to a water level of 2 m above the ground surface. What is the maximum depth (d) to which we can excavate without having heave of bottom of excavation.