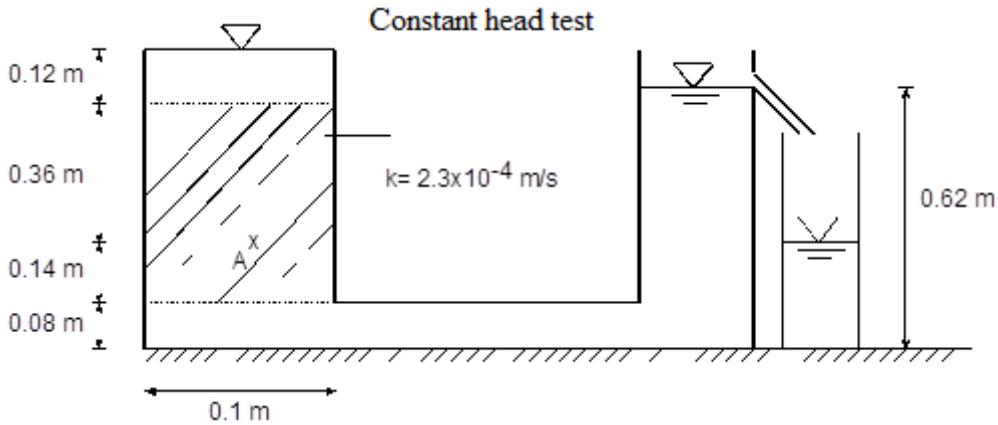
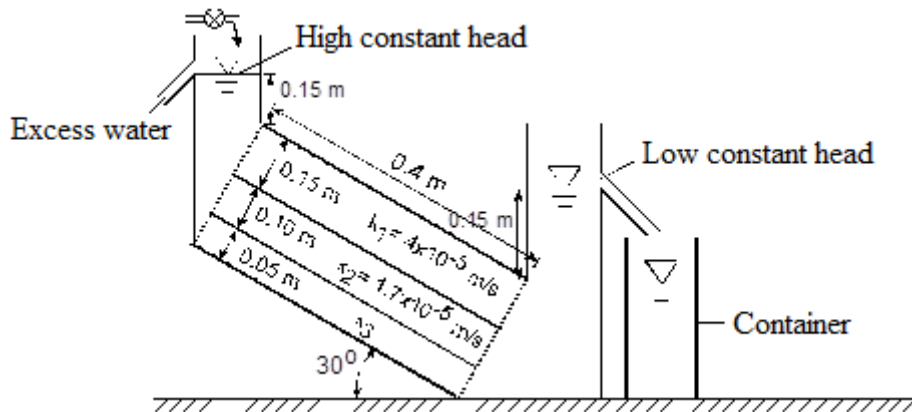


PERMEABILITY

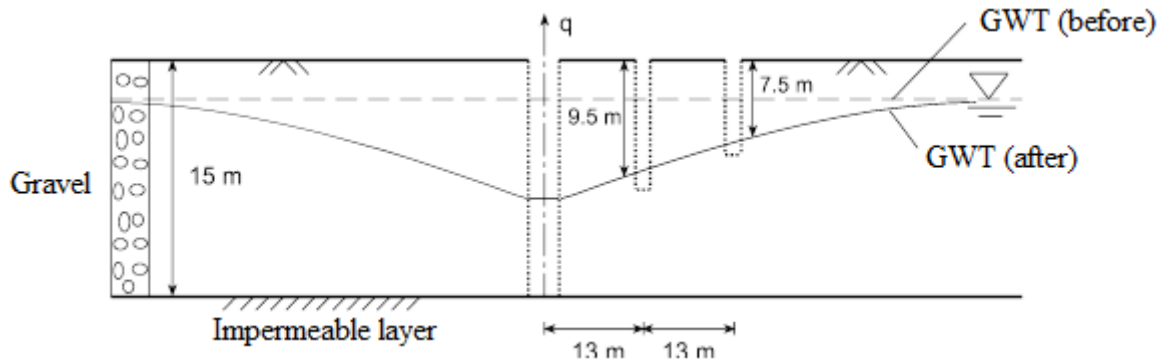
Problem 1: In the constant head test, where other information is given in the figure, water passes through the soil and is collected in a container. What is the height of the water in the pipe immersed at point A? How much water is collected in the container in 5 minutes? The length of the experimental setup perpendicular to the shape plane is fixed and is 0.16 m.



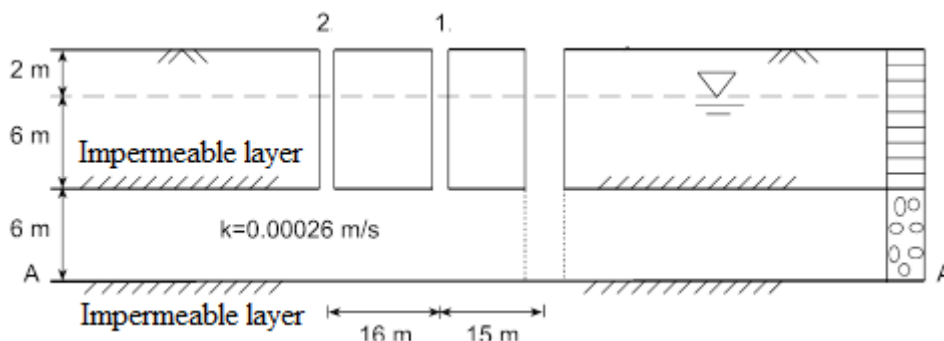
Problem 2: The other information is given in the figure, $624 \times 10^{-6} \text{ m}^3$ of water is collected in the volumetric container in 8 minutes. Find k_3 . The length of the experimental setup perpendicular to the shape plane is fixed and is 0.25 m.



Problem 3: A trench was opened on the soil, the vertical cross-section of which is given in the figure, and the length of this trench perpendicular to the plane of the figure is large. Water was drawn at a constant flow along the trench. In steady state, in two observation wells opened perpendicular to the trench, water levels were measured as 9.5 m below the soil surface in the first well and 7.5 m in the second well. The flow of water drawn from 1 m length of the trench is $0.20 \text{ m}^3/\text{min}$, calculate the permeability coefficient of the soil.



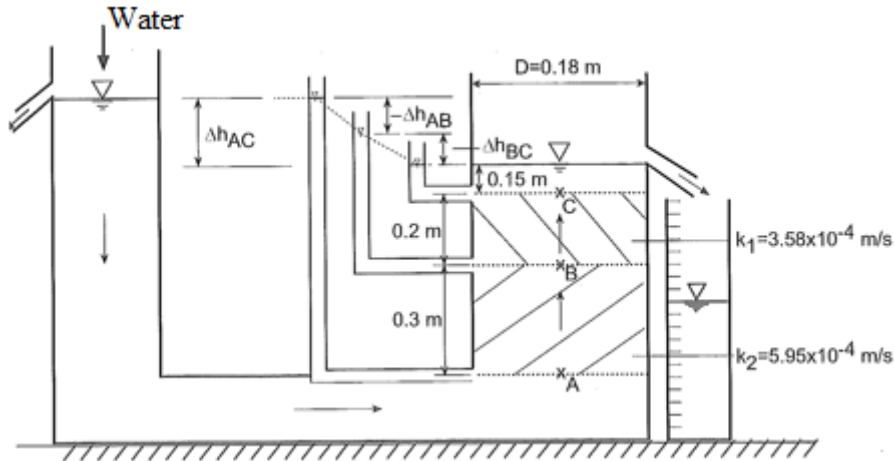
Problem 4: In the case of artesian, where other information is given in the figure, water is drawn from the drilled well with a constant flow of $1.28 \text{ m}^3/\text{min}$. In the case of stable equilibrium, the water level in the 2nd observation well is 9.8 m from level A-A. How far below the surface of the soil is the water level in the 1st well?



The diagram illustrates a vertical section of an unconfined aquifer. On the left, a trench is shown with a water level 10 m above the impermeable base. The aquifer material is sandy gravel. Water flows from the trench towards the right, where two observation wells are located. The discharge rate is constant ($q = \text{Constant}$). The water table profile is shown as a dashed line. The height of the water table at the trench is 10 m. At the first observation well, the height is h_1 and the discharge is q_1 . At the second observation well, the height is h_2 and the discharge is q_2 . The distance between the wells is dx . The water table profile is labeled 'Trench' and 'Observation Wells'. The vertical axis is labeled 'Vertical section'.

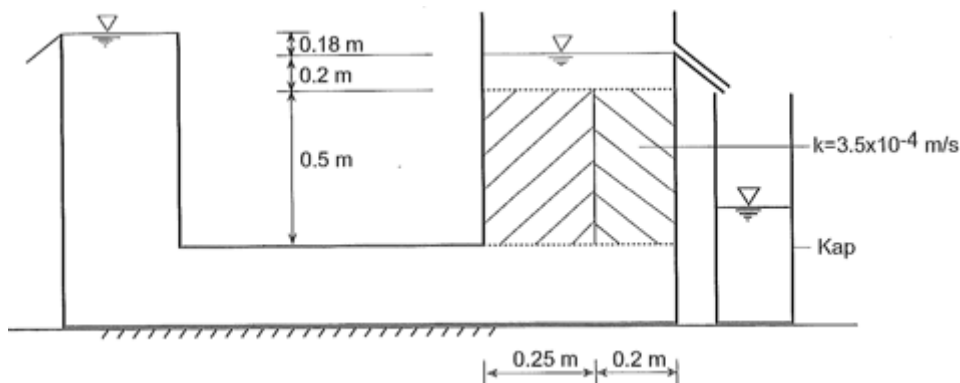
The diagram illustrates a composite dam cross-section. On the left, a water reservoir is maintained at a 'constant head' of 0.15 m above the top of the dam. A 'Valve' is shown on the left side of the dam. The dam consists of a vertical upstream face, a central core of material with permeability $k_1 = 4 \times 10^{-5} \text{ m/s}$, and a downstream face. The core has a height of 0.15 m and a width of 0.2 m. The downstream face is inclined at an angle of 30° to the horizontal. The base of the dam is composed of two materials with permeabilities k_2 and k_1 . The total width of the dam base is 0.4 m. On the right, a 'Container' is shown at a lower water level, also at a 'constant head' of 0.15 m. The dam is shown with a cross-section of 300 units.

Problem 7: In the constant head system, where other information is given in the figure, water is collected in a container by passing through two different soil surfaces. If 2583.4 ml of water is collected in the container in 15 minutes, what is the height of the water in the pipes immersed at points A, B and C?

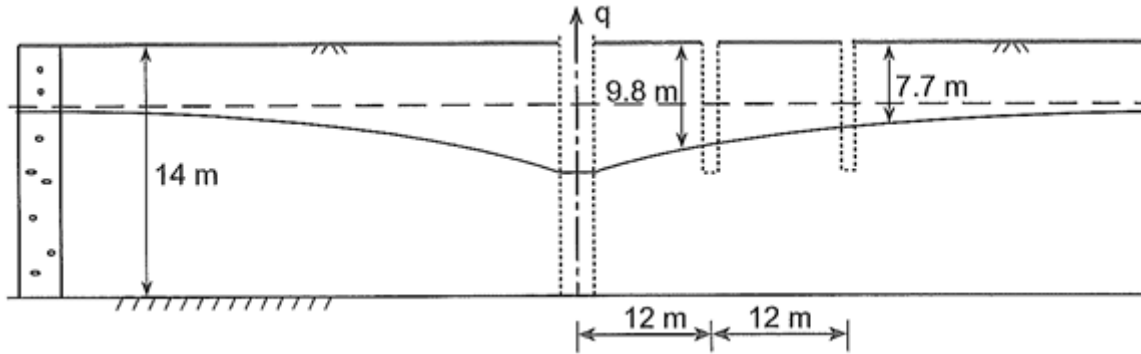


Problem 8: In a falling head test, the diameter of the pipe through which the water level drops is 9 mm, the diameter of the soil sample is 0.11 m and the length is 0.12 m. The water height, which was 1.35 m at the beginning of the test, decreased by 0.15 m after 10 minutes. Calculate the permeability coefficient of the soil.

Problem 9: In the constant head test, where other information is given in the figure, soil with different permeability coefficients was used. Considering that 648 ml of water is collected in the container in 50 s, calculate the permeability coefficient of the other soil. The perpendicular length of the experimental setup to the shape plane is 0.3 m.



Problem 10: In the case where other information is given in the figure, water is drawn from the opened test well with a flow rate of $0.18 \text{ m}^3/\text{min}$. In steady state, the water levels in the two observation wells opened at a distance of 12 m and 24 m from the center of the test well are 9.8 m and 7.7 m below the horizontal soil face, respectively. Calculate the permeability coefficient of the soil.



Problem 11: In the case of artesian, where other information is given in the figure, water is drawn from the drilled well with a constant flow rate of $1.2 \text{ m}^3/\text{min}$. In the case of stable equilibrium, the water level in the 2nd observation well is 10.8 m from level A-A. How far below the surface of the soil is the water level in the 1st well?

