SEDIMENT TRANSPORT

Problem 1: Find the particle diameter to define the limit size of the sediment that seperates suspended and bed load if the mean flow velocity is 1.5 m/s in a river.

Problem 2: Particle size distribution as a result of sieve analysis is shown in Table , find the mean particle diameter and D_{35} ,D_{50} , D_{65}, D_{90} of the river bed material.

Percent passing (%)	0	10	20	30	40	50	60	70	80	90	100
Diameter(mm)	0.1	0.5	0.7	0.9	0.95	1.0	1.05	1.10	1.15	1.25	1.35

Problem 3: Major, medium and minor axes of a sand particle are 0.4 , 0.3 and 0.17 , respectively. Determine the shape factor of the sand particle . Find the fall velocity with the graphical solution if the diameter of sand particle for sieve is 0.3 mm and the water temperature is 20^0C.

Problem 4: The diameter of sphere sand particle is 0.06 mm and spesific weight of the particle is 2.65 t/m^3. Determine the fall velocity of the sand particle for laminar flow condition in 20^0C.

Problem 5: Determine fall velocity of disc sand particle. The mean particle diameter 0.7mm, spesific weight 2.6 t/m^3 and shape factor is 0.7 for disc.

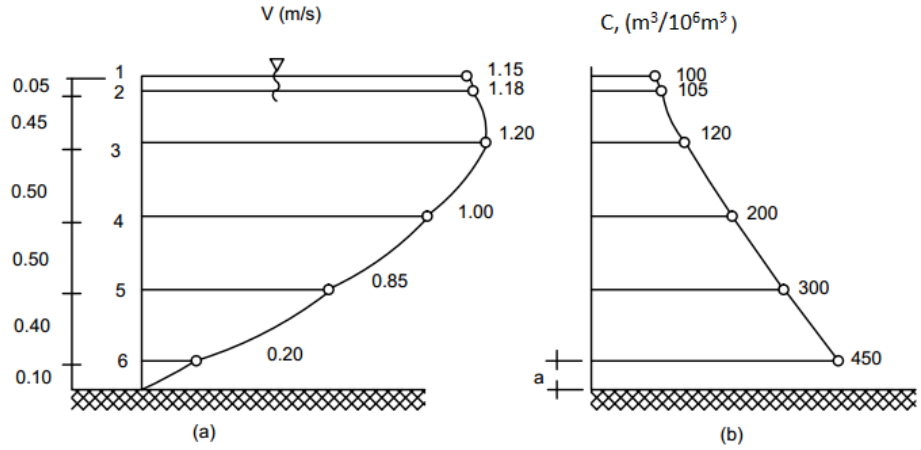
Problem 6: Determine critical shear stress of the 10 mm diameter of particle and the relation between the critical shear stress and particle diameter for rivers. The spesific weight of material is 2.6 t/m^3.

Problem 7: The rectangular channel of base width is 30m, bed slope is 0.004 and manning roughness coefficient is 0.028. The flowrate of channel is 100 m^3/s at the initiation of the sediment transport. Find the critical shear stress and mean particle diameter. The spesific weight is 2.6 t/m^3. Assume that water depth is equal to hydraulic radius.

Problem 8: The base width of trapezoidal channel is 40m, side slopes are 1:3 and water depth is 2 m. Mean velocity and suspended sediment concentrations along vertical dimension of center and sides of channel cross-section are given below. Find the total amount of suspended load in this section.

	Velocity (m/s)	**Concentration (kg/m^3)**
Sides of the bed	0.9	0.4
Center of the bed	1.2	0.6

Problem 9: The profile of velocity and suspended load concentration are given Figure below. Find the total amount of suspended load for per unit width.



Problem 10: A river of base width is 60m is to convey 65 m^3/s discharge which is observed 120 days in a year. The 0.005 bed slope and the 0.95m hydraulic radius are given. The critical shear stress with respect to average diameter is 0.25 kg/m^2 and parameter of bed load is ψ=1.0.Find the discharge of the bed load by using Duboys formula and the amount of bed load for this discharge for a year.

Problem 11: Estimate the amount of total bed load with Schoklitsch, Meyer-Peter Müller and Einstein-Brown formulas. Discharge is 90 m^3/s, depth is 2.5m, width is 40m, bed slope is 0.02, mean particle diameter is $7x10^{-4}$, spesific weight is 2600 kg/m^3.