ASSIGNMENT FOR INDO-SWISS GLACIER TRAINING PROGRAMME
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1. Assume that, in a pumping test getting conducted for 24 hours in the 2nd aquifer on a groundwater system, you are conducting a tracer analysis. The dewatering due to pumping has resulted into fall in groundwater head of 2nd aquifer at a rate of 5 units (of the total 100 units of water head) per hour. After three hours of pumping, intrusion of 3rd aquifer water into 2nd aquifer started compensating and replacing head-loss of 2nd aquifer water at equal rate. After the end of the test, in its natural recovery, the 2nd aquifer water got regained at a uniform rate of 10 units per hour.
   For the conducted experiment, submit your report with schematic figure of the experiment, plots for the observed drawdown, recovery, change in tracer concentration etc. (Assume the initial tracer composition of groundwater in aquifer 2 & 3 as 5 and 20 meq/l). If the maximum allowed tracer concentration for supply of water is 10 meq/l provide desired pumping schedule

2. In a case of hot-water spring, temperature is used as a parameter to estimate the depth of circulation of groundwater (Assume geothermal heat gradient as 3^0C/100m). If the temperature of spring is 62^0C and the average surface temperature of the region is 22^0C, estimate the depth of circulation of the groundwater which is coming out through this spring. The estimated depth can get underestimated if the spring discharge is low. Explain why?

3. An experiment on isotopic mixing of water samples was conducted by mixing waters of two beakers A & B was conducted in different ratios. The composition of water in beakers A & B are given below:

A: 12 TU, 100 pmc, Dissolved Inorganic Carbon (DIC): 10: ppm
B: 0 TU, 10 pmc, DIC: 100 ppm
Find the final composition of water if the water in A & B is mixed at a ratio: (a) 20:80 (b) 50:50
Do the calculation if DIC content is same in A & B

4: Calculate the intake (recharge) temperature for (a) a well with $3{:}2\times10^{-4}$ cc STP Ar/cc, located at 250 masl, with the highest point in the recharge area at 650 masl; (b) a spring with 10×10^{-8} cc STP Kr/cc water, emerging at 1000 masl, the highest point of recharge being 1300 masl; and (c) an artesian well with 12×10^{-9} cc STP Xe/cc water, with an average recharge intake altitude of 850 m.