Indian Institute of science Education and Research Kolkata
Department of Earth Sciences
Hydrology and Geomorphology
Subject No: ES2102   **Total Marks: 20**   **Time: 1 hr**

Instruction: **Answer all questions**

1. Show that $\partial^2 h/\partial x^2 + \partial^2 h/\partial y^2 + \partial^2 h/\partial z^2 = (S/T)\, \partial h/\partial t$ where h=hydraulic head, S=storativity, T=transmissivity   (8)

2. Discuss how to determine the hydraulic conductivity of unconfined aquifer if the flow is radial and in steady state.   (4)

3. Explain the differences between (i) Water table and Piezometric surface (ii) Drawdown and Residual Drawdown.   (2+2)

4. After a soil sample is drained by gravity, the weight of the soil sample is 125 g. After the sample is oven-dried, the sample weighs 100 g. The bulk density of the wet soil is 1.65 g/cm^3, and the density of water is 1 g/cm^3. Calculate the specific yield, specific retention and porosity of the sample. Assume water that was drained by gravity is 20 g.   (4)