

CBCS SCHEME

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15CV742

Seventh Semester B.E. Degree Examination, July/August 2021

Ground Water and Hydraulics

Time: 3 hrs.

Max. Marks: 80

Note: Answer any FIVE full questions.

- 1 a. With a neat sketch, explain vertical distribution of subsurface water. (08 Marks)
b. Differentiate between Confined and Unconfined aquifers. (08 Marks)
- 2 a. Define i) Aquifer ii) Aquifuge iii) Aquitard iv) Aquiclude. Give examples. (08 Marks)
b. Explain the occurrence of groundwater in different geological formations. (08 Marks)
- 3 a. Differentiate between :
i) Specific yield and Specific retention.
ii) Intrinsic permeability and Hydraulic conductivity.
iii) Storage coefficient and porosity. (06 Marks)
b. Derive an expression for discharge for a steady flow in a homogeneous aquifer which is unconfined having one dimensional flow. (10 Marks)
- 4 a. Obtain an expression for equivalent permeability in case of layered strata when the flow is
i) Parallel to strata ii) Normal to strata. (08 Marks)
b. In a phreatic aquifer extending over an area of $1\text{km} \times 1\text{km}$ the water table was initially at 25m below ground level. After irrigation with a depth of 20cm of water the water table rose to a depth of 24m below ground level. Later $3 \times 10^5 \text{ m}^3$ of water was pumped out and the water table dropped to 26.2m below ground level. Determine i) Specific yield of the aquifer and ii) Deficit in soil moisture before irrigation. (08 Marks)
- 5 a. Derive an equation for steady radial flow to a well in a confined aquifer and state the assumptions. (08 Marks)
b. Total thickness of a confined aquifer is 20m and it is assumed that the well penetrates into the full depth of the aquifer. Calculate the coefficient of transmissibility for discharge of $1.5\text{m}^3/\text{minute}$. $h_1 = 58\text{m}$ at $r_1 = 120\text{m}$ and $h_2 = 58.9\text{m}$ at $r_2 = 160\text{m}$.
Take well diameter = 30cm. (08 Marks)
- 6 a. Explain Chow's method to determine aquifer parameters in case of unsteady flow in unconfined aquifer. (08 Marks)
b. Briefly highlight Image well theory, with neat sketches. (08 Marks)
- 7 a. Explain Electrical Resistivity method of ground water exploration. (10 Marks)
b. Give brief description on Radioactive logging. (06 Marks)
- 8 a. Explain Fluid Logging method of exploration of ground water. (08 Marks)
b. Briefly describe Seismic Refraction method. (08 Marks)
- 9 a. What are the criteria to select a pump for a tube well? (06 Marks)
b. Explain the method of drilling deep wells. (10 Marks)
- 10 a. Explain Artificial recharging of ground water. (08 Marks)
b. List the advantages and disadvantages of dug wells. (08 Marks)



Important Note : 1. On completing your answers, compulsorily draw diagonal cross lines on the remaining blank pages.
2. Any revealing of identification, appeal to evaluator and /or equations written eg, $42+8=50$, will be treated as malpractice.