CBCS SCHEME

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Seventh Semester B.E. Degree Examination, July/August 2022
Ground Water and Hydraulics

Time: 3 hrs.   Max. Marks: 80

Note: *Answer any FIVE full questions, choosing ONE full question from each module.*

Module-1

1.   a.   What is an aquifer? Explain in detail confined and unconfined aquifers with neat sketches. **(10 Marks)**

     b.   Explain the importance of ground water. **(06 Marks)**

OR

2.   a.   With a neat sketch, explain in detail the vertical distribution of ground water. **(10 Marks)**

     b.   Write a note on the following with examples :
       i)   Aquiclude
       ii)   Aquifuge
       iii)   Aquitard. **(06 Marks)**

Module-2

3.   a.   Describe the Darcy's law with neat sketch and its limitations. **(08 Marks)**

     b.   An artesian aquifer 15m thick has a porosity of 20% and bulk modulus compression $3 \times 10^8 N/m^2$. Bulk modulus of water is 2.1 GN/m^2. Estimate the storage co-efficient of the aquifer. **(04 Marks)**

     c.   Define:
       i)   Hydraulic conductivity
       ii)   Co-efficient of transmissibility. **(04 Marks)**

OR

4.   a.   Derive the equation for discharge and phreatic surface for steady one-dimensional flow into an unconfined homogenous aquifer. **(10 Marks)**

     b.   On a particular day, in a field well the initial water table was observed 6m below the ground level. The water table was lowered 8m below the ground surface when quantity of 4,00,000 cubic meters of water was pumped per square kilometer. Compute the specific yield, specific retention of soil assuming the porosity as 30% and there are no other losses. **(06 Marks)**

Module-3

5.   a.   Derive an equation for discharge for the case of radial (steady) flow into an unconfined aquifer using Dupuit's theory. List assumptions and limitations. **(10 Marks)**

     b.   A 30cm well penetrates 45m below the static water table. After a long period of pumping at a rate of 1200 ℓpm, the drawdown in the wells 20 and 45m from the pumped well is found to be 3.8 and 2.4mm, respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well? Take R = 300m **(06 Marks)**

OR

6 a. Write a short note on interference among wells. (04 Marks)
  b. Describe briefly leaky aquifers. (04 Marks)
  c. A well is located in a 25m confined aquifer of permeability 30m/day and storage coefficient of 0.005. If the well is being pumped at the rate of 1750 litres per minute, calculate the drawdown at a distance of 100m from the well after 20hrs of pumping. Take W(u) = 3.35. (08 Marks)

Module-4

7 a. Describe the ground water exploration using Seismic refraction method. (08 Marks)
  b. Write a short note on fluid logging. (08 Marks)

OR

8 a. Describe in detail the exploration of ground water by electrical resistivity method. (08 Marks)
  b. Explain the radioactive logging method. (08 Marks)

Module-5

9 a. Explain in detail strainer tube well. (08 Marks)
  b. Explain in brief recharge induced by wells and basin. (04 Marks)
  c. What are the important factors to be considered for the selection of proper pump for lifting the water? (04 Marks)

OR

10 a. List the benefits occurring from conjunctive use of water. (06 Marks)
   b. Describe the following :
      i) Jetted wells (05 Marks)
      ii) Ground water runoff (05 Marks)

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