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Seventh Semester B.E. Degree Examination, Dec.2018/Jan.2019 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. Explain the vertical distribution of ground water with a neat sketch. (06 Marks)
b. Define the terms : i) Juvenile water ii) vadose water iii) connate water iv) meteoric water. (06 Marks)
c. Write a note on the importance of ground water. (04 Marks)

OR

- 2 a. What is an aquifer? Explain the different types of aquifers with neat sketches. (12 Marks)
b. Define the terms : i) aquifuge ii) aquiclude with example. (04 Marks)

Module-2

- 3 a. Explain Darcy's Law and discuss the validity and limitations. (06 Marks)
b. Explain storage coefficient with a neat diagram and derive an expression for storage coefficient of an confined aquifer. (10 Marks)

OR

- 4 a. What is permeability? Explain the determination of permeability by constant head permeameter. (08 Marks)
b. An artesian aquifer of 20m thick has a porosity of 20% and bulk modulus of compression 10^8 N/m^2 . Estimate the storage coefficient of the aquifer. What fraction of this is attributable to the expansibility of the water? Take elasticity of water $K_w = 2.13 \times 10^9 \text{ N/m}^2$. (08 Marks)

Module-3

- 5 a. Derive an equation for discharge for the case of steady radial flow into an unconfined aquifer using Dupuit's theory. List the assumptions and limitations. (12 Marks)
b. A tube well of 300mm diameter penetrates fully a confined aquifer. The length of the strainer is 25m. Calculate the yield from the well under a drawdown of 4m. The coefficient of permeability of aquifer is 50m/day. Assume radius of circle of influence $R = 200\text{m}$. (04 Marks)

OR

- 6 a. Explain Thei's method to determine aquifer constants S and T for unsteady radial flow towards well. (10 Marks)
b. A well is located in a 25m confined aquifer of permeability 30m/day and storage coefficient 0.005. If the well is being pumped at the rate of 1750 liters per minute, calculate the drawdown at a distance of 100m from the well after 20hrs of pumping. Take $W(u) = 3.35$. (06 Marks)

Module-4

- 7 a. List the various surface and subsurface methods of ground water exploration. (04 Marks)
b. Describe in detail, the exploration of groundwater by electrical resistivity method. (12 Marks)

OR

- 8 a. Enumerate the groundwater exploration by seismic refraction method. (10 Marks)
b. Briefly explain any two methods of logging. (06 Marks)

Module-5

- 9 a. Explain in brief the advantages and disadvantages of open wells and tube wells. (06 Marks)
b. What are the factors considered for the selection of pumps for shallow and deep wells? (04 Marks)
c. Design an open well in fine sand to give a discharge of 0.003 cumec when worked under a depression head of 2.5m Take fine sand value = $0.5 \text{ m}^3/\text{hr}/\text{m}^2$. (06 Marks)

OR

- 10 a. With the help of a neat sketch, explain the working of a submersible pump. (10 Marks)
b. What is importance of artificial recharge? Explain various methods of ground water recharge. (06 Marks)
