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Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
Ground Water and Hydraulics

Time: 3 hrs.   Max. Marks: 100

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

Module-1

1   a. Explain the importance of ground water.   **(06 Marks)**
    b. Describe the vertical distribution of ground water with neat sketches.   **(10 Marks)**
    c. Explain the Perched Aquifer with neat sketches.   **(04 Marks)**

OR

2   a. Describe confined aquifer and unconfined aquifer with neat sketches.   **(12 Marks)**
    b. Write a note on the following with examples:
        (i) Aquifers   (ii) Aquiclude   (iii) Aquifuge   (iv) Aquitard   **(08 Marks)**

Module-2

3   a. What is storage coefficient? Explain its characteristics in confined and un-confined aquifers with neat sketches.   **(10 Marks)**
    b. An artesian aquifer 20 m 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 aquifer is attributed to the expansibility of water?   **(10 Marks)**

OR

4   a. Describe Darcy's law with neat sketches.   **(08 Marks)**
    b. In a phretic aquifer extending over 1 km^2 the water table was initially at 25 m below ground levels. Some time after irrigation with a depth of 20 cm of water the water table rose to a depth of 24 m below ground level, later 3×10^5 m^3 of water was pumped out and water table dropped to 26.2 m below ground level.
        (i)   Determine the specific yield of the aquifer
        (ii) Deficit in soil moisture (below ground capacity) before irrigation   **(08 Marks)**
    c. Differentiate between specific yield and specific retention.   **(04 Marks)**

Module-3

5   a. Describe the steady radial flow into a wall in confined aquifer.   **(10 Marks)**
    b. A 30 cm well fully penetrates a confined aquifer 30 m deep. After a long period of pumping at rate of 1200 litres per minute the draw down in the wells at 20 and 45m from the pumping well are found to be 2.2 and 1.8 m respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well?   **(10 Marks)**

OR

6   a. Describe the unsteady radial flow into a well in unconfined aquifer.   **(10 Marks)**
    b. A confined aquifer with transmissibility of 1550 m^2/day and storage coefficient of 4.75×10^{-4} is pumped at the rate of 2880 m^3/day. Determine the drawdown distribution around the pumping well. Find out the radius of influence after 1 day pumping. When four wells located 10 m away also operate simultaneous, what will be the additional drawdown?
                                                                                    (10 Marks)

Module-4

7 a. Describe the ground water exploration using electrical resistivity method. (10 Marks)

   b. Explain the following:
     (i) Electrical logging (05 Marks)
     (ii) Radioactive logging (05 Marks)

OR

8 a. Describe the ground water exploration using Seismic method. (10 Marks)

   b. Describe the following:
     (i) Induction logging (05 Marks)
     (ii) Sonic logging (05 Marks)

Module-5

9 a. Explain the different types of deep bore wells. (10 Marks)

   b. Explain the parts of the Dug well with neat sketches. (05 Marks)

   c. Write a note on driven wells. (05 Marks)

OR

10 a. Describe the following:
     (i) Jetted wells (04 Marks)
     (ii) Groundwater run-off (04 Marks)

   b. Describe the different types of artificial ground water recharge methods. (12 Marks)

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