USN | | | | | | | | | | 15CV742

Seventh Semester B.E. Degree Examination, Jan./Feb. 2021
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. Write a note on importance of ground water. **(08 Marks)**
   b. Explain briefly occurrence of ground water in different rocks and soils. **(08 Marks)**

OR

2   a. With the help of neat sketches, explain   i) Unconfined   ii) Confined and
      iii) Perched aquifer. **(08 Marks)**
   b. With the help of a neat sketch, explain Vertical distribution of ground water. **(08 Marks)**

Module-2

3   a. State and explain Darcy's law. Explain its validity and limitations. **(08 Marks)**
   b. It was observed in a field test that 3 hour 30 minutes was required for a tracer to travel from one well to another 20m apart and the difference in their water surface elevations was 0.5m. Samples of the aquifer between the wells indicated a porosity of 15%. Determine the permeability of the aquifer , seepage velocity and the Reynold's number for the flow , assuming an average grain size of 1mm and kinematic viscosity of water as 0.008 stokes. **(08 Marks)**

OR

4   a. Define i) Storage coefficient   ii) Transmissibility   iii) Permeability and
      iv) Intrinsic permeability. **(08 Marks)**
   b. What is the flow rate in the confined aquifer shown in fig. Q4(b). Take width = 800m. **(08 Marks)**

Fig.Q4(b)
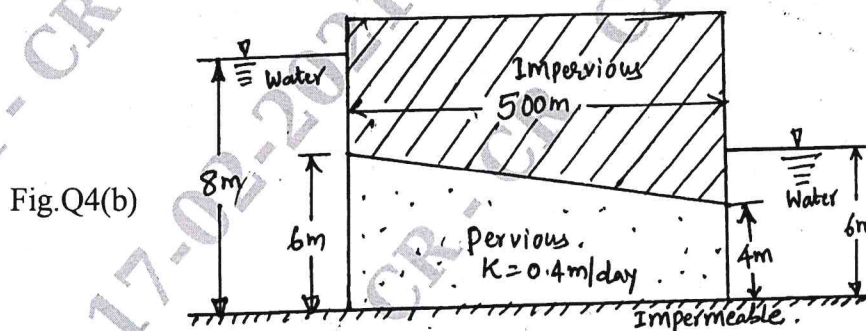
Module-3

5   a. Explain Cooper – Jacob method to determine storage coefficient and transmissivity of aquifer. **(08 Marks)**
   b. A gravity well has a diameter of 60cm. The depth of water in the well is 40 meters before pumping is started. When pumping is being done at the rate of 2000 litres per minute, the drawdown in a well 10 meters away is 4 meters and in another 20 meters away is 2 meters. Determine i) Radius of zero drawdown   ii) Coefficient and Permeability and
      iii) Drawdown in the well. **(08 Marks)**

OR

6 a. Derive an expression for discharge from a well penetrated in a confined aquifer.   **(08 Marks)**
   b. A well fully penetrating a confined aquifer is pumped at a uniform rate of 2500 litres per minute. The draw downs in an observation well situated at 60m away are given in table below. Determine formation constants of aquifer. Use Cooper – Jacob method.   **(08 Marks)**

Time (min)	0	1.50	3.00	6.0	10.0	18.00	40.00	80.00	120.00	180.00	240
Draw down(m)	0.0	0.26	0.36	0.48	0.56	0.66	0.80	0.91	0.98	1.05	1.10

Module-4

7 a. With the help of a neat sketch, explain Seismic Refraction method.   **(08 Marks)**
   b. With the help of a neat sketch, explain radioactive logging.   **(08 Marks)**

OR

8 a. Explain Electrical Resistivity method of ground water exploration.   **(08 Marks)**
   b. Explain briefly i) Sonic Logging and   ii) Induction Logging.   **(08 Marks)**

Module-5

9 a. With the help of a neat sketch, explain Strainer type tube well.   **(08 Marks)**
   b. What are the objectives and benefits of artificial ground water recharge?   **(08 Marks)**

OR

10 a. With the help of a neat sketch, explain working of a submersible pump.   **(08 Marks)**
   b. Explain ground water recharge using : i) Check dams and ii) Farm ponds.   **(08 Marks)**

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