



# CBCS SCHEME

15CV742

Seventh Semester B.E. Degree Examination, Dec.2019/Jan.2020

## Groundwater 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. With a neat sketch, explain the vertical distribution of Ground water. (08 Marks)  
b. Explain in brief the occurrence of Ground water in different types of rocks and soils. (08 Marks)

OR

- 2 a. Explain the importance of Ground water. (08 Marks)  
b. What is an aquifer? Explain different types of Aquifers, with a neat sketch. (08 Marks)

### Module-2

- 3 a. Define Specific yield, Specific retention and Porosity. Derive a relationship between them. (08 Marks)  
b. It is observed in a field test that 3 hr 20 min 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 Reynolds number for the flow assuming an average grain size of 1mm and kinematic viscosity of water at 27°C is 0.008 stoke. (08 Marks)

OR

- 4 a. With a neat sketch, explain Darcy's law, discuss its validity and limitations. (08 Marks)  
b. Derive an expression for one dimensional steady flow in homogenous unconfined aquifer. (08 Marks)

### Module-3

- 5 a. What are the assumptions made in Theis's method? Explain Theis's method to determine formation constants T and S for unsteady radial flow towards well. (06 Marks)  
b. Derive the discharge equation for steady radial flow into a well in a confined aquifer. (06 Marks)  
c. A tube well of 30cm diameter penetrates fully in an artesian aquifer. The strainer length is 15m. Calculate the yield from the well under a drawdown of 3m. The aquifer consists of sand of effective size of 0.2mm having coefficient of permeability equal to 50m/day. Assume radius of drawdown equal to 150 meters. (04 Marks)

OR

- 6 a. Explain Cooper Jacob methods of solutions for unsteady radial flow in a confined aquifer. (08 Marks)  
b. A 30 cm well penetrates 49.99m below the static water table. After a long period of pumping at a rate of 1799 lpm, the drawdown in the wells at 15 and 44.99m from the pumped well were 1.69 and 0.79m respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well? (08 Marks)

**Module-4**

- 7 a. Explain with a neat sketch, the Electrical resistivity (surface) method for ground water exploration. (08 Marks)  
b. Explain the Sonic logging with equation. (08 Marks)

**OR**

- 8 a. Explain with a neat sketch the Seismic Refraction method for Ground water exploration. (08 Marks)  
b. With a neat sketch, Electric logging for Ground water Exploration. (08 Marks)

**Module-5**

- 9 a. Explain the different types of wells also give the method of construction for any one of the well. (08 Marks)  
b. With the neat sketches, explain the various methods of Ground water recharge. (08 Marks)

**OR**

- 10 a. Explain what is conjunctive use of water also explain its necessity , technique involved of economics. (08 Marks)  
b. Describe what are the pumps used for lifting water from wells, also explain the working principle of centrifugal pump. (08 Marks)

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