2022

GROUND WATER HYDROLOGY

Full Marks : 100

Time : Three hours

The figures in the margin indicate full marks for the questions.

Answer ALL questions.

1. a) Write in details about the following $10*2 = 20$

        i. Advantages and disadvantages of artificial recharge

        ii. Time-drawdown relationships in well hydraulics for constant, discrete and variable pumping cases

2. a) Derive the governing equation for equivalent hydraulic conductivity for parallel strata to flow direction.   10

   b) Discuss about various ground water flow modelling techniques and their applications.   10

3. a) A well 0.5 m in diameter penetrates 33 m below the static water table. After a long period of pumping at a rate of 80 m^3/hr, the drawdown in wells 18 and 45 m from the pumped well were found to be 1.8 and 1.1 m respectively.   10

        i)   What is the transmissivity of the aquifer?

        ii)   What is the approximate drawdown in the pumped well?

        iii)   Determine the radius of influence of the pumping well.

   b) Write in details about various techniques of ground water recharge.   10

4. a) Derive the governing equation for a well when aquifer is unconfined homogeneous and isotropic. Consider flow is steady.   10

   b) Find the solution of question no. 4(a).   10

5. a) Derive the three dimensional advection-dispersion equation for solute transport in porous media. 10

b) Discuss about any two methods of estimation of ground water recharge. 10