(Following Paper ID and Roll No. to be filled in your Answer Book)

PAPER ID : 2856 Roll No. | | | | | | | | | | |

B.Tech.

(SEM. VIII) EVEN THEORY EXAMINATION 2012-13

GROUNDWATER MANAGEMENT

Time : 3 Hours *Total Marks : 100*

Note :– Attempt **all** questions. All questions carry equal marks.

1. Attempt any **two** parts of the following : **(10×2=20)**

   (a) Describe the concept of hydrologic cycle with the help of a neat sketch. What are the different components of the hydrologic cycle ? What do you mean by hydrologic system ?

   (b) What is Darcy's law ? Explain its significance in groundwater movement. What are its limitations ?

   (c) Explain the following :

   (i) The extent of radius of influence

   (ii) Assumptions in Dupuit's theory

   (iii) Cone of depression

   (iv) Drawdown.

2. Attempt any **two** parts of the following : **(10×2=20)**

   (a) Describe an expression for the yield of tube-wells for the case of confined aquifer. A 30 cm well fully penetrates an un-confined aquifer of 25 m depth. When a discharge of 2100 litres/minute was being pumped for a long time,

observation wells at radial distances of 30 m and 90 m indicated drawdown of 5 and 4 m respectively. Estimate the coefficient of permeability and transmissibility of the aquifer.

(b) With the help of the Dupit's assumptions, start an elementary prism of fluid bounded by a water table, show that for the steady one dimensional unconfined groundwater flow with a recharge rate R, the basic differential equation is $\frac{\partial^2 h^2}{\partial x^2} = -\frac{2R}{K}$. Where K = permeability of the porous medium.

(c) The aquifer properties S and T of a confined aquifer in which a well is driven are known. Explain a procedure to calculate the drawdown at a location away from the well at any instant after the pump has started.

3. Attempt any **two** parts of the following : **(10×2=20)**

(a) Write short notes on the following :

(i) Well shrouding and well development

(ii) Types of open wells.

(b) What are the various design considerations of wells ? Also write about the various methods to maintain the wells.

(c) Briefly describe the relative merits and demerits of well irrigation and the canal irrigation. What are the factors that govern the selection of suitable site for a tube well ?

4. Attempt any **two** parts of the following : **(10×2=20)**

(a) Write about the contamination of groundwater. Also give the measures to control the groundwater pollution.

(b) Enumerate the components of groundwater discharge and comment on the equations used for computing the ground water discharge.

(c) Explain all the surface methods of exploration to find out the presence of water rich aquifers.

5. Attempt any **two** parts of the following : **(10×2=20)**

(a) Define and explain in detail the ground water basin management ideas and aspects.

(b) Define SAR and give SAR based classification of ground water. What are the components of ground water recharge and write about the catchment or Watershed model approach to the computation of recharge.

(c) How can GIS be useful in artificial recharge of ground water ? Discuss in detail.