Registration No. : | | | | | | | | | | |

Total number of printed pages – 2

B. Tech

PECI 5402

Seventh Semester Back Examination – 2014

GROUND WATER HYDROLOGY

BRANCH : CIVIL

QUESTION CODE : L157

Full Marks – 70

Time : 3 Hours

*Answer Question No. **1** which is compulsory and any **five** from the rest.*
The figures in the right-hand margin indicate marks.

1. Answer the following questions : 2×10

   (a) What is an idealized aquifer ? What must be its specific yield ?

   (b) Define storage coefficient and leakage factor.

   (c) Define intrinsic permeability and transmissivity.

   (d) How do you define the aquifer boundary ?

   (e) Discuss the use of screens in well completion.

   (f) What is recharge mound ?

   (g) How do you protect a well from frost ?

   (h) How cesspools pollute ground water ?

   (i) What are various components of ground water balance ?

   (j) How do you measure the quality of water ?

2. (a) What is a spring ? Discuss various types of springs with neat sketches. 5

   (b) A well in the centre of an unconfined island aquifer, bounded externally by a circle of radius 1000 m, is proposed to be pumped at a rate that will limit the draw down to 5 m at a distance of 20 m from the well. What should be the maximum allowable discharge of the well, given that the height of the static water table above the impermeable base of the aquifer is 10 m and the hydraulic conductivity of the aquifer is 0.12 m / day ? 5

P.T.O.

3. (a) A 1 m diameter well penetrates vertically through a confined aquifer 40 m thick. When the well is pumped at 113 m^3/hour, the draw down in well 20 m away is 2.0 m; in another well 60 m away it is 0.5 m. What is the approximate head in the pumped well for steady state conditions and what is the approximate drawdown in the well ? Also compute the transmissibility of the aquifer and radius of influence of the pumping well. Take the initial piezometric level as 60 m above the datum. 5

(b) What is a flow net ? How can you construct a flow net for anisotropic flow ? Discuss the use of a flow net for ground water estimation. 5

4. (a) Discuss various sources of ground water pollution and remedial measures. What do you mean by attenuation of ground water pollution ? How it occurs ? 5

(b) Discuss the use of remote sensing applications to estimate the ground water potential. 5

5. Why ground water levels fluctuate ? Discuss various factors responsible for ground water fluctuations in detail. How can this fluctuation be reduced ? 10

6. Discuss various situations in the context of intrusion of saline water into the ground water. Narrate Ghyben-Herzberg relation for hydrostatic equilibrium between the salt water and fresh water. What is 'zone of diffusion'?Discuss how the salinity of ground water can be reduced ? What is a recharge well? How does it help reducing salinity of ground water ? 10

7. (a) Discuss various models for ground water management in brief. 5

(b) Discuss the gravity and magnetic methods of ground water investigation. 5

8. Write brief notes on any **five** : 2×5

(a) Ground water tracers

(b) Recovery test

(c) Infiltration gallery

(d) Crustal uplift

(e) Revitalization of wells

(f) Mound recession

(g) Geophysical logging.