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Total number of printed pages – 2

B. Tech  
PECI 5402

## Seventh Semester Examination – 2013

### GROUND WATER HYDROLOGY

BRANCH : CIVIL

QUESTION CODE : C-200

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
- Differentiate between *aquitard* and *aquifuge*.
  - What is *perched aquifer*?
  - State the Darcy's law and its validity.
  - What is *hydraulic conductivity* and what is its unit?
  - State the general Laplace equation for unsteady, non-uniform ground water flow.
  - What is the concept of *image well*?
  - State the basic well drilling tools for cable tool method.
  - What is philosophy of electrical resistivity method?
  - Explain the term, *recharge mound*.
  - What do you mean by *sorption*?
2. A 40 cm well was pumped at a rate of 2000lpm for 200 minutes and drawdown in an observation well 20 m from the pumping well was 1.51 m. The pumping was

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stopped and the residual drawdowns during recovery in the observation well for 2 hours are given in the following table. Determine the aquifer constants S and T.

10

Time since pumping stopped (min)	Residual drawdown (m)	Time since pumping stopped (min)	Residual drawdown (m)
3	0.66	70	0.145
10	0.42	80	0.14
20	0.31	90	0.135
30	0.24	100	0.13
40	0.2	110	0.13
50	0.16	120	0.13
60	0.15		

3. A 25 cm well penetrates an artesian aquifer of 10 m thick. After 10 hours of pumping at the rate of 1100 lpm the drawdown in the well is 2.6 m and after 48 hours the drawdown is 2.85 m. Determine the transmissibility and storage coefficients of aquifer. What is the permeability of aquifer material ? After what time will the drawdown be 4.1 m ? 10
4. (a) Explain different types of spring with labelled sketches. 5  
 (b) Explain the law of times to locate boundary of an aquifer. 5
- 5 Explain, in detail, about laboratory method of finding hydraulic conductivity by  
 (a) Constant head method 5  
 (b) Falling head method. 5
6. (a) Explain and draw the system of image wells for U-shaped stream. 5  
 (b) A discharging well is situated near a stream boundary. Locate the position of one image well and draw the flownet for only one pair of wells nearest to the stream boundary. 5
7. Explain the seismic refraction method to find the depth of topmost aquifer. 10
8. Write short notes on the following : 5×2  
 (a) Method of artificial recharge of ground water  
 (b) Evaluation of ground water pollution.