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Total Number of Pages : 02

B.Tech  
PECI5402

7<sup>th</sup> Semester Back Examination 2018-19  
GROUND WATER HYDROLOGY  
BRANCH : CIVIL  
Time : 3 Hours  
Max Marks : 70  
Q.CODE : E352

Answer Question No.1 which is compulsory and any FIVE from the rest.

The figures in the right hand margin indicate marks.

Logarithmic, Semi-logarithmic, Natural graph sheets are to be supplied.

**Q1** Answer the following questions : (2 x 10)

- Explain storativity for an unconfined aquifer.
- Differentiate between aquitard and aquifuge.
- What is perched aquifer?
- State the Darcy's law and its validity.
- Find the well discharge for steady radial flow to a well penetrating fully a confined aquifer.
- What is the concept of image well?
- How the recovery test is done?
- Show in a diagram, the basic well drilling tools for cable tool method.
- What is philosophy of electrical resistivity method?
- Explain the recharge mound.

**Q2** (10)

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 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.

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		

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- Q3** 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)**

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- Q4** a) Explain different types of spring with self explanatory figures. **(5)**  
b) Explain law of times to locate boundary of aquifer. **(5)**

- Q5** Explain in detail about laboratory method of finding hydraulic conductivity by  
a) Constant head method **(5)**  
b) Falling head method **(5)**

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- Q6** a) State the justification of application of Darcy's law in ground water flow. **(5)**  
b) A 25cm 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 2.85m. Determine the transmissibility and storage coefficients of aquifer. What is the permeability of aquifer material? After what time will the drawdown be 4.1m? **(5)**

- Q7** Explain the seismic refraction method to find the depth of topmost aquifer. **(10)**

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- Q8** **Write short answer on any TWO :** **(5 x 2)**  
a) Method of artificial recharge of ground water.  
b) Evaluation of ground water pollution.  
c) Image well  
d) Step-Drawdown

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