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Total Number of Pages: 02

**B.TECH**  
**PECI5402**

**7<sup>th</sup> Semester Regular / Back Examination 2016-17**

**GROUND WATER HYDROLOGY**

**BRANCH: CIVIL**

**Time: 3 Hours**

**Max Marks: 70**

**Q.CODE: Y263**

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

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

- a) What is an idealized aquifer? What must be its specific yield?
- b) What are various formation constants? Define leakage factor.
- c) Define intrinsic permeability and transmissivity.
- d) Write down the equilibrium equation for radial flow into a well explaining each of the terms involved in the equation.
- e) Enumerate various techniques for ground water recharge.
- f) What is jetted well?
- g) What do you mean by air-surfing?
- h) Sketch a base-flow recession curve.
- i) What are various components of ground water balance?
- j) What do you mean by roadway deicing? How does it pollute ground water?

**Q2 a)** 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 4.5 m at a distance of 18 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 12 m and the hydraulic conductivity of the aquifer is 0.125 m / day? **(5)**

- b) A field sample of an unconfined aquifer is packed in a test cylinder. The length and diameter of the test cylinder are 60 cm and 6 cm respectively. The field sample tested for a period of 2.5 min under a constant head difference of 18 cm. As a result 50.2 cm<sup>3</sup> of water is collected at the outlet. Determine the hydraulic conductivity of the aquifer sample. **(5)**

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- Q3 (a)** What is a unit hydrograph? How is it constructed? Discuss in brief. **(5)**  
What are its various functions?
- (b)** What is a flow net? How can you construct and use a flow net for ground water estimation? **(5)**
- Q4 (a)** Discuss various sources of ground water pollution and remedial measures. **(5)**
- (b)** Discuss the utility of remote sensing applications to estimate the ground water potential. **(5)**
- Q5** Discuss the effect of irrigation, stream flow, rain fall and other miscellaneous causes on the ground water fluctuations in detail. **(10)**
- Q6** 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. **(10)**
- Q7 (a)** Discuss various techniques for ground water management. **(5)**
- (b)** What is geophysical, resistivity and radiation logging? Discuss. **(5)**
- Q8** **Write brief notes on any five:** **(2 x 5)**
- a) Ground water tracers
  - b) Transmissibility
  - c) Down the hole hammer method
  - d) Infiltration Gallery
  - e) Well skin effect
  - f) Mound recession
  - g) Hydraulic compaction
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