

GUJARAT TECHNOLOGICAL UNIVERSITY**M. E. Sem. – IInd - Examination – June/July- 2011****Subject code: 1721201****Subject Name: Ground Water Management****Date: 22/06/2011****Time: 10:30 am – 01:00 pm****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.

- Q.1** (a) Distinguish between: (i) Isotropic and anisotropic media. (ii) Homogeneous and Heterogeneous media (iii) Confined and Unconfined aquifer. **07**
- (b) Define permeability and discuss the factors affecting permeability. **07**

- Q.2** (a) Discuss with the sketch the various type of sub surface water. **07**
- (b) Draw the porosity, specific yield and specific retention curve and discuss its relation. **07**

OR

- (b) Write a note on climate change and its impact on groundwater resources. **07**

- Q.3** (a) Explain the method of determination of aquifer parameter S and T by (i) Thies type curve method and (ii) Jacob's method. **07**
- (b) A fully penetrating artision well is pumped at 1600 m³/day from a aquifer whose $S = 4 \times 10^{-4}$, $T = 0.145$ m³/min. Find draw down at a dist $r_1 = 3m$ from the pumping well after $t = 1hr$ of pumping & dist = 350m after one day also find the approx value of radius of influence after one hour and one day of continues pumping. **07**

OR

- Q.3** (a) Explain Hantush's method for finding out the parameter of the leaky aquifer. **07**
- (b) A 30cm. well penetrates 35m below the static water table. After a long period of pumping at a rate of 1600 lpm, the draw downs in the wells at 19m. and 50m. from the pumped well were 4m and 2.5m respectively. What is the co.efficient of permeability of aquifer and drawdown in the well. Also determine specific capacity of the well and height of seepage surface in the well. **07**

- Q.4** (a) Discuss the movement of ground water and its governing law and also its limitations. **07**
- (b) A production well fully penetrating a non leaky isotropic artesian aquifer infinite in aerial extent was continuously pumped at a constant rate of 2500 lit/day for a period of 200 days. The drawdown in table was observed at various distances from the production well in fully penetrating observation wells at the end of 200 days pumping period. Compute the co.efficient of trainability and storage of the aquifer **07**

Dist from well in m	Drawdown in m
30	2.52
300	1.995
3000	0.852

OR

- Q.4 (a)** Ground water flow is irrotational- Explain in details. **07**
- (b)** Rain fall at the rate of 10mm/hr falls on a strip of land 1km. wide laying between two parallel canals with 2m difference in their water surface levels. It is underlain by a horizontal impermeable stratum at 10m below the water surface of the lower canal. Assuming a permeability of 12 m/day with vertical boundaries and all the rainfall infiltrates into the soil. Compute the discharge per meter length into both the canals. **07**
- Q.5 (a)** Derive the equation for sea water intrusion in form of wedge from sea towards aquifer. **07**
- (b)** Explain Ground water legislation. **07**
- OR**
- Q.5 (a)** Explain with neat sketches the different methods of preventive /control of seawater intrusion stating clearly the circumstances under which each is best suited. **07**
- (b)** The conductivity measurement near sea coast is carried out and following details was observed. (i) Location of wells from sea shore = 150m & 2225m (ii) Total solids observed = 1500 ppm at a depth of 15m and 22.5m from top of aquifer. (iii) Thickness of aquifer = 30m. (iv) Permeability of aquifer = 50m/day. (v) Porosity of aquifer = 10% (vi) Specific gravity of sea water = 0.03. Determine (a) The rate of fresh water flow towards sea. (b) The length of the intruded wedge. Also find depth of interface at every 40m interval. **07**
