Seat No.: _____ Enrolment No._____

# GUJARAT TECHNOLOGICAL UNIVERSITY

**M.E Sem-II Examination July 2010**

**Subject code: 721201**

**Subject Name: Ground Water Management**

**Date: 05 /07 /2010** **Time: 11.00am – 1.30pm**

**Instructions:** **Total Marks: 60**

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

**Q.1 (a)** Define and explain the terms: **06**
(i) Specific yield. (ii) storage coefficient (iii) Transmissibility coefficient
(iv) Perched aquifer (v) Permeability (vi) Aquitard

**(b)** Write Dupuit's assumptions for unconfined aquifer **06**

**Q.2 (a)** Explain Chow's method for determining aqufer parameter S and T. **06**

**(b)** Discuss remedial measures to prevent sea water entry in to fresh water aquifer. **06**

**OR**

**(b)** Explain the importance of ground water management **06**

**Q.3 (a)** Explain Hantush's method for finding out the parameter of the leaky aquifer. **06**

**(b)** A 30cm well penetrates 45cm below the static water table. After a long period of pumping at a rate of 1200lpm. The drawdown in the wells 20m & 45m from the pumped well is found to be 3.8m and 2.4m respectively. Determine the transmissibility of the aquifer. What is the drawdown in the pumped well? **06**

**OR**

**Q.3 (a)** Write short note on conjunctive use of water resources. **06**

**(b)** A30cm well yielding 300lpm.under a drawdown of 2m Penetrates an aquifer 35m thick. For the same drawdown what would be the probable yield of (a) 20 cm well (b) 40 cm well. Assume a radius of influence of 500m in all cases. **06**

**Q.4 (a)** Describe a procedure by using jacob's method to calcute the aquifer parameters of a confined aquifer by using the well pumping test data for unsteady flow. **06**

**(b)** A 30cm well penetrating a water table aquifer is pumped at the rate of 3600lpm. Initial saturated thickness of the aquifer is 8m. pumping test were conducted for 18 day and the drawdown values at the end of 18 days in 6 observation wells are given in table. Determine the aquifer constants T and S. **06**

| Well no. | Distance from the pumped well. r (m) | Observed drawdown after 18 days. S(m) |
|---|---|---|
| 1 | 15.0 | 1.8 |
| 2 | 30.7 | 1.4 |
| 3 | 57.7 | 1.04 |
| 4 | 14.9 | 1.67 |
| 5 | 30.6 | 1.31 |
| 6 | 57.9 | 1.19 |

**OR**

**Q.4 (a)** State Darcy's law its validity and applicability. **06**

**(b)** A aquifer averages 50m in thickness and 100ha in area. Determine the volume in ha.m of water available if (a) the aquifer is unconfined and is completely drained (b) The aquifer is confined and the piezometric head is lowered from 30m to 10m above the aquifer. (c) The aquifer is confined and the piezometric head is lowered 55m. Which brings the watertable 25m below the confining layer. Assume sj=15% and s = $2x10^{-4}$ **06**

| | | | |
|---|---|---|---|
| **Q.5** | **(a)** | Explain ground water legislation. | **06** |
| | **(b)** | Following data is observed during hydrogeological and geological survey find out the position of the toe of the sea water wedge.<br>Aquifer width = 2.8 km, Aquifer thickness = 32m, Difference in specific gravity = 0.035 , Permeability of aquifer = 48.9 m/day, Distance of well from sea = 150m and 245m , Total solids = 1500ppm, Total solid avaible at a depth = 15m & 23.5m from m.s.c | **06** |

**OR**

| | | | |
|---|---|---|---|
| **Q.5** | **(a)** | Explain test drilling and water level measurement methods | **06** |
| | **(b)** | Derive the continuity equation for confined aquifer and reduced it to the form $\nabla^2 h = (S.\partial h)/(T\partial t)$ | **06** |

**********