Seat No.: _____ Enrolment No._____

GUJARAT TECHNOLOGICAL UNIVERSITY

M. E. - SEMESTER – II • EXAMINATION – WINTER 2012

Subject code: 1721201 Date: 29-12-2012

Subject Name: Ground Water Management

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)**	Discuss the movement of ground water and its governing law and also its limitations.	**07**
	(b)	Explain Chaw's method for determining parameters S and T.	**07**
Q.2	**(a)**	Define permeability and discuss the factors affecting permeability.	**07**
	(b)	Draw the porosity, specific yield and specific retention curve and discuss its relation.	**07**
		OR	
	(b)	Discuss Remedial measure to prevent sea water entry into fresh water aquifer.	**07**
Q.3	**(a)**	Derive the fundamental equation for sea water intrusion in form of wedge from sea towards aquifer.	**07**
	(b)	The height of a point on the fresh / salt water interface above a fixed datum is 35.2 m. For a well bottoming at that point the level of fresh water in the well is 109 m. compute the height of sea level above the datum assuming a G-H interface. If there is a decline in the well water level by 0.75m, what would be the ratio of the earlier depth to the new depth of the interface below sea level? Given ρ_s=1025 kg/m^3, ρ_f = 1000 kg/m^3.	**07**
		OR	
Q.3	**(a)**	Write the various governing equations for ground water flow in various type of aquifer and also write detailed note on MODFLOW.	**07**
	(b)	Write a note on climate change and its impact on ground water resources.	**07**
Q.4	**(a)**	Discuss with the sketch the various types of sub-surface water.	**07**
	(b)	Rainfall at the rate of 10 mm/hr falls on a strip of land 1 km wide lying between two parallel canals with 2 m difference in their water surface levels. It is underlain by a horizontal impermeable stratum at 10 m below the water surface of the lower canal. Assuming a permeability of 12 m/day with vertical boundaries and all the rainfall in filters into the soil, compute the discharge per meter length into both the canals.	**07**
		OR	
Q.4	**(a)**	Explain the method of determination of aquifer parameter S and T by (i) Thies type curve method and (ii) Jacob's methods.	**07**
Q.4	**(b)**	A well penetrate fully a 10 m thick water bearing stratum of medium sand having coefficient of permeability of 0.004 m/s. The well radius is 100 mm and is to be worked under a drawdown of 4 m at the well face. Calculate the discharge from the well. What will be the percentage increases in the discharge if the radius of the well is doubled? Take	**07**

R=300 m in each case.

Q.5	**(a)**	Define and explains the following terms: (i) Specific discharge (ii) Specific yield (iii) Storage coefficient (iv) Transmissibility coefficient (v) Storativity (vi) Perched aquifer and (vii) Aquifuse.	**07**
	(b)	Write Dupuit's assumptions and derive an equation for discharge and drawdown in well for unconfined aquifer.	**07**

OR

Q.5	**(a)**	Write in details: (i) Theis recovery method (ii) Ground water legislation.	**07**
	(b)	(i) Explain the application of Image well theory. (ii) How remote sensing play a vital sole in ground water exploration?	**04** **03**

****