

GUJARAT TECHNOLOGICAL UNIVERSITY

BE - SEMESTER-V EXAMINATION – SUMMER 2025

Subject Code:3151311

Date:13-05-2025

Subject Name:Groundwater Hydrology and Contamination

Time:02:30 PM TO 05:00 PM

Total Marks:70

Instructions:

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What do you mean by Water Cycle? **03**
(b) Tabulate key differences between Surface water and Groundwater. **04**
(c) Illustrate and explain groundwater system in Hydrologic cycle with neat sketch. **07**
- Q.2** (a) What do you mean by Percolation? **03**
(b) Explain with sketch the term Aquifer and give its classification. **04**
(c) Compare in tabular form Aquifer, Aquiclude, Aquifuge & Aquitard with distinguishing parameters. **07**
- OR**
- (c) Explain with sketch the term Perched Aquifer. **07**
- Q.3** (a) What do you mean by Runoff? **03**
(b) Write down the assumptions made in Dupuit's theory. **04**
(c) Discuss vertical distribution of groundwater with neat sketch. **07**
- OR**
- Q.3** (a) What do you mean by Void ratio? **03**
(b) Explain cone of depression. **04**
(c) Explain the Darcy's law and its application to simple flow system. What is its limitation? Discuss its validity. **07**
- Q.4** (a) What do you mean by Degree of saturation? **03**
(b) How presence of Arsenic and Fluoride affects Ground water quality. **04**
(c) Write a note on salinity ingress and its control. **07**
- OR**
- Q.4** (a) What is Specific yield? **03**
(b) Write a note on physical and chemical analysis of Ground water to assess its quality. **04**
(c) Explain in detail different sources responsible for ground water pollution with causes. **07**
- Q.5** (a) What do you mean by Infiltration? **03**
(b) Explain sampling and monitoring methods for Ground water. **04**
(c) Explain different artificial recharge methods of Ground water. **07**
- OR**
- Q.5** (a) Define Evapotranspiration. **03**
(b) Discuss in detail Ground water budget. **04**
(c) Enlist and explain ground water pollution remedial and preventive measures. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – SUMMER 2024****Subject Code: 3151311****Date: 16-05-2024****Subject Name: Groundwater Hydrology and Contamination****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What is Groundwater Pollution? **03**
(b) Explain with neat sketch vertical distribution Groundwater. **04**
(c) Describe various sources responsible for Groundwater pollution. **07**
- Q.2** (a) Define Permeability. **03**
(b) Draw neat sketch groundwater in Hydrological cycle. **04**
(c) Enlist and explain preventive measures for Groundwater pollution. **07**
- OR**
- (c) Derive equation for steady radial flow in unconfined aquifer. **07**
- Q.3** (a) What is Aquifer? **03**
(b) Differentiate between Groundwater and Surface water. **04**
(c) Describe Darcy's law and its validity. **07**
- OR**
- Q.3** (a) What do you mean by Groundwater Hydrology? **03**
(b) Explain interference among wells. **04**
(c) Derive equation for steady radial flow in confined aquifer. **07**
- Q.4** (a) Define Void ratio for soil. **03**
(b) Differentiate between aquifer, aquiclude, aquitard and aquifuge. **04**
(c) Explain various artificial recharge methods for Groundwater. **07**
- OR**
- Q.4** (a) What is Degree of Saturation? **03**
(b) Describe sampling and monitoring methods for Groundwater. **04**
(c) Enlist and explain site selection criteria for artificial recharge. **07**
- Q.5** (a) What do you mean by Artesian well? **03**
(b) Differentiate between Confined and Unconfined aquifer. **04**
(c) Discuss on seepage from Surface water. **07**
- OR**
- Q.5** (a) What do you mean by Field capacity? **03**
(b) Give classification of Groundwater. **04**
(c) Write a note on Test pumping analysis. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE – SEMESTER- V EXAMINATION-SUMMER 2023****Subject Code: 3151311****Date: 23/06/2023****Subject Name: Groundwater Hydrology and Contamination****Time: 02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

		MARKS
Q.1*	(a) Differentiate between Confined and Unconfined aquifer.	03
	(b) Explain the Darcy's law. What is its limitation? Discuss its validity.	04
	(c) What is ground water? Discuss vertical distribution of ground water with neat Sketch.	07
Q.2	(a) Write the assumptions made in dupuit's theory.	03
	(b) Differentiate between Groundwater and Surface water.	04
	(c) Derive the expression for steady radial groundwater flow in Unconfined aquifer.	07
	OR	
	(c) Derive the expression for steady radial groundwater flow in Confined aquifer.	07
Q.3	(a) What is Cone of depression? Explain with Diagram.	03
	(b) Explain the recuperation test to estimate the safe yield of an open well.	04
	(c) Water is pumped out at the rate of 2500 lit/min from a well of 0.3 m diameter, penetrating fully in an aquifer of 30 m thickness. The draw downs observed in two adjoining wells at 20 m and 120 m from the pumping well are 8 m and 0.6 m respectively. Determine the average hydraulic conductivity.	07
	OR	
Q.3	(a) What do you mean by Artesian well?	03
	(b) Explain the pumping test to estimate the safe yield from an open well.	04
	(c) Design a tube well for the following data.	07
	1) yield required = 0.081 cumsec	
	2) Thickness of confined aquifer = 30 m	
	3) Radius of circle influenced = 300 m	
	4) Permeability coefficient = 60 m/day	
	5) Draw down = 5.1 m	
Q.4	(a) A pumping test was conducted for an open well of diameter 3.6m. the water was pumped out at a constant rate of 300lit/min. find Specific yield. Take h=3.5 m.	03
	(b) Enlist the site selection criteria for artificial recharge.	04
	(c) Enlist Groundwater pollution remediation methods and explain any one in detail.	07
	OR	
Q.4	(a) Explain the different methods of waste water recharge for reuse.	03

- (b) Explain artificial recharge for “energy purpose”. 04
- (c) Explain in detail different sources responsible for ground water pollution with causes. 07
- Q.5** (a) Give the difference between fully and partial penetrating wells. 03
- (b) Explain induced recharge method with their flow pattern. 04
- (c) An artesian tube well has a diameter of 20 cm. the thickness of an aquifer is 30m and its permeability is 40 m/day. Find its yield under a drawdown of 5 m at the well face use radius of influence as recommended by sichardt. 07

OR

- Q.5** (a) Explain the following terms: (1) porosity (2) permeability (3) transmissibility. 03
- (b) Write down Indian standards for Groundwater quality. 04
- (c) A well penetrates fully a 10 m thick water bearing stratum of medium sand having coefficient of permeability of 0.05 m/sec. the well radius is 10cm and is to be worked under a drawdown of 5 m at the well face. Calculate the discharge from the well. What will be the percentage increase in the discharge if the radius of the well is doubled? Take R= 300m in each case. 07

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V(NEW) EXAMINATION – SUMMER 2022****Subject Code:3151311****Date:02/06/2022****Subject Name:Groundwater Hydrology and Contamination****Time:02:30 PM TO 05:00 PM****Total Marks: 70****Instructions:**

1. Attempt all questions.
2. Make suitable assumptions wherever necessary.
3. Figures to the right indicate full marks.
4. Simple and non-programmable scientific calculators are allowed.

Q.1 (a) Write the assumptions made in dupuit's theory. **03**

(b) Describe the hydrological water budget with the aid of example. **04**

(c) An artesian tube well has a diameter of 20 cm. the thickness of an aquifer is 30m and its permeability is 40 m/day. Find its yield under a drawdown of 5 m at the well face use radius of influence as recommended by sichardt. **07**

Q.2 (a) What do you mean by Ground water table? **03**

(b) Differentiate between Groundwater and Surface water. **04**

(c) Explain in detail ground water in hydrological cycle with neat sketch. **07**

OR

(c) What is ground water? Discuss formation of ground water with neat sketch. **07**

Q.3 (a) Explain the Darcy's law. What are its limitations? Discuss its validity. **03**

(b) Explain the pumping test to estimate the safe yield from an open well. **04**

(c) Derive the expression for steady radial groundwater flow in Unconfined aquifer **07**

OR

Q.3 (a) What do you mean by Perched aquifer? **03**

(b) Explain the recuperation test to estimate the safe yield of an open well. **04**

(c) Derive the expression for steady radial groundwater flow in Confined aquifer. **07**

Q.4 (a) Enlist the site selection criteria for artificial recharge. **03**

(b) Explain artificial recharge for "energy purpose". **04**

- (c) What is artificial recharge? Explain different artificial recharge methods of ground water. **07**

OR

- Q.4** (a) Explain induced recharge method with their flow pattern. **03**
(b) Enlist and explain ground water remediation methods. **04**
(c) Explain in detail different sources responsible for ground water pollution with causes. **07**

- Q.5** (a) What do you mean by Artesian well? **03**
(b) Difference between fully and partial penetrating wells. **04**
(c) Write down the Indian & International standards for ground water quality **07**

OR

- Q.5** (a) Write down the ground water quality criteria for drinking water. **03**
(b) Differentiate between Aquitard, Aquifuge and Aquiclude. **04**
(c) A well penetrates fully a 10 m thick water bearing stratum of medium sand having coefficient of permeability of 0.05 m/sec. the well radius is 10cm and is to be worked under a drawdown of 5 m at the well face. Calculate the discharge from the well. What will be the percentage increase in the discharge if the radius of the well is doubled? Take R= 300m in each case. **07**
