

Enrolment No./Seat No _____

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V EXAMINATION – WINTER 2025

Subject Code:3151311

Date:17-11-2025

Subject Name:Groundwater Hydrology and Contamination

Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What do you mean by Groundwater Contamination? **03**
(b) Discuss vertical distribution of groundwater with neat sketch. **04**
(c) Explain the Darcy's law and its application to simple flow system. What is its limitation? Discuss its validity. **07**
- Q.2** (a) What do you mean by Cone of depression? **03**
(b) Tabulate key differences between Surface water and Groundwater. **04**
(c) Explain in detail different sources responsible for ground water pollution with causes. **07**
- OR**
- (c) Derive the equation for steady radial flow to well in confined aquifer. **07**
- Q.3** (a) What do you mean by Artesian well? **03**
(b) Give classification of Groundwater. **04**
(c) Explain with sketch the term Aquiclude, Aquifuge & Aquitard. **07**
- OR**
- Q.3** (a) What do you mean by Laminar flow? **03**
(b) Explain with sketch the term Perched Aquifer. **04**
(c) Illustrate and explain groundwater system in Hydrologic cycle with neat sketch. **07**
- Q.4** (a) What do you mean by Hydraulic gradient? **03**
(b) Explain sampling and monitoring methods for Ground water. **04**
(c) Write down Indian and International standards for Ground water quality. **07**
- OR**
- Q.4** (a) What is Permeability? **03**
(b) Differentiate between Confined and Unconfined aquifer. **04**
(c) Enlist and explain ground water pollution remedial and preventive measures. **07**
- Q.5** (a) What do you mean by Degree of saturation? **03**
(b) Discuss in detail Ground water budget. **04**
(c) Enlist site selection criteria for artificial recharge. **07**
- OR**
- Q.5** (a) Define Porosity. **03**
(b) Write a note on salinity ingress and its control. **04**
(c) Explain different artificial recharge methods of Ground water. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY

BE- SEMESTER-V (NEW) EXAMINATION – WINTER 2024

Subject Code:3151311

Date:25-11-2024

Subject Name: Groundwater Hydrology and Contamination

Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define following terms: (1) Porosity (2) Permeability (3) Transmissibility. **03**
(b) Explain the Darcy's law. What is its limitation? Discuss its validity. **04**
(c) Write down the ground water quality criteria for drinking water. **07**

- Q.2** (a) What is cone of depression? **03**
(b) Explain different artificial recharge methods of ground water. **04**
(c) What is ground water? Discuss vertical distribution of ground water with neat Sketch. **07**

OR

- (c) Describe the occurrences of ground water in unconfined & confined aquifer with neat sketch. **07**

- Q.3** (a) Explain the different methods of waste water recharge for reuse. **03**
(b) Explain site selection criteria for artificial recharge. **04**
(c) Derive the expression for steady radial groundwater flow in Confined Aquifer. **07**

OR

- Q.3** (a) Enlist & explain ground water remediation methods. **03**
(b) Explain induced recharge method with their flow pattern. **04**
(c) Derive the expression for steady radial groundwater flow in un confined Aquifer. **07**

- Q.4** (a) What do you mean by Perched aquifer? **03**
(b) Explain Pumping test to estimate safe yield from 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.4** (a) What do you mean by Leaky aquifer? **03**
(b) Explain the recuperation test to estimate the safe yield of an open well. **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**

- Q.5** (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) Explain Artificial recharge for “energy purpose”. **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) Write the assumptions made in dupuit’s theory.. **03**
- (b) Explain in detail different sources responsible for ground water pollution with causes. **04**
- (c) Design a tube well for the following data. 1) yield required = 0.081cumsec 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. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2023****Subject Code:3151311****Date:05-12-2023****Subject Name: Groundwater Hydrology and Contamination****Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) What do you mean by Ground water table? **03**
 (b) What do you mean by Groundwater contamination? **04**
 (c) Describe with neat sketch Groundwater in hydrological cycle. **07**
- Q.2** (a) Give the difference between fully and partial penetrating wells. **03**
 (b) Write the assumptions made in dupuit's theory. **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 do you mean by Perched aquifer? **03**
 (b) Explain artificial recharge for "energy purpose". **04**
 (c) Design a tube well for the following data. 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. **07**
- OR**
- Q.3** (a) What do you mean by Leaky aquifer? **03**
 (b) Enlist the site selection criteria for artificial recharge. **04**
 (c) What is artificial recharge? Explain different artificial recharge methods of ground water. **07**
- Q.4** (a) What do you mean by Artesian well? **03**
 (b) Explain Pumping test to estimate safe yield from an open well. **04**
 (c) Enlist Groundwater pollution remediation methods and explain any one in detail. **07**
- OR**
- Q.4** (a) What is Cone of depression? **03**
 (b) Explain the recuperation test to estimate the safe yield of an open well. **04**
 (c) Explain in detail different sources responsible for ground water pollution with causes. **07**
- Q.5** (a) Explain the Darcy's law. What are its limitations? Discuss its validity. **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) 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) Write down the Indian & International standards for ground water 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 $R= 300$ m in each case. **07**

GUJARAT TECHNOLOGICAL UNIVERSITY**BE - SEMESTER-V (NEW) EXAMINATION – WINTER 2022****Subject Code:3151311****Date:04-01-2023****Subject Name:Groundwater Hydrology and Contamination****Time:10:30 AM TO 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.
4. Simple and non-programmable scientific calculators are allowed.

- Q.1** (a) Define Ground water. **03**
(b) Differentiate between Groundwater and Surface water. **04**
(c) Describe Darcy's law and its validity. **07**
- Q.2** (a) Define Porosity. **03**
(b) Differentiate between Confined and Unconfined aquifer. **04**
(c) Discuss hydrologic properties of water bearing strata. **07**
- OR**
- (c) Explain with neat sketch groundwater in Hydrologic cycle. **07**
- Q.3** (a) What do you mean by Infiltration? **03**
(b) Explain with neat sketch vertical distribution Groundwater. **04**
(c) Derive equation for steady radial flow in unconfined aquifer. **07**
- OR**
- Q.3** (a) What do you mean by Yield of well? **03**
(b) Write down assumptions made in Dupuit's theory **04**
(c) Write down the Indian standards for Groundwater quality for various purposes. **07**
- Q.4** (a) What is Groundwater Contamination? **03**
(b) Describe cone of depression. **04**
(c) Describe various sources responsible for Groundwater pollution. **07**
- OR**
- Q.4** (a) What is Groundwater Conservation? **03**
(b) Write a note on seepage from Surface water. **04**
(c) Enlist and explain preventive measures for Groundwater pollution. **07**
- Q.5** (a) What do you mean by Seepage? **03**
(b) Explain interference among wells. **04**
(c) Explain various artificial recharge methods for Groundwater **07**
- OR**
- Q.5** (a) What do you mean by Artificial recharge? **03**
(b) Describe sampling and monitoring methods for Groundwater. **04**
(c) Enlist and explain site selection criteria for artificial recharge. **07**
