SRM VALLIAMMAI ENGINEERING COLLEGE

SRM Nagar, Kattankulathur – 603 203

DEPARTMENT OF AGRICULTURAL ENGINEERING

QUESTION BANK

VI SEMESTER

1902601- GROUNDWATER AND WELL ENGINEERING

B. Tech. AGRICULTURAL ENGINEERING

Regulation – 2019

Academic Year: 2024– 2025

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DEPARTMENT OF AGRICULTURAL ENGINEERING

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B.E. AGRICULTURE ENGINEERING

1902601- GROUNDWATER AND WELL ENGINEERING

Question Bank

SEMESTER: 06 **REGULATION-2019** **YEAR: B.E /III**

UNIT I - HYDROGEOLOGIC PARAMETERS			
Water Balance – Distribution of subsurface water – Water bearing properties of Rocks –Types of Aquifers – Aquifer properties Estimation – Pumping test – Permeability, Specific yield, transmissivity and Storage coefficient – Methods of Estimation – Ground water table fluctuation method – GEC Norms – Ground water development and potential in India - Groundwater prospective - Geophysical techniques – Electrical resistivity survey.			
PART A			
Q. No	**Questions**	**BT Level**	**Competence**
1.	Define aquifer.	BT-1	Remember
2.	Differentiate between confined and unconfined aquifer?	BT-1	Remember
3.	What are the types of aquifers?	BT-1	Remember
4.	Tell about the aquifer properties.	BT-1	Remember
5.	Define aquiclude.	BT-1	Remember
6.	Define aquifuge.	BT-1	Remember
7.	What do you mean by permeability?	BT-2	Understand
8.	Draw a typical aquifer cross section.	BT-2	Understand
9.	Define specific yield?	BT-2	Understand
10.	Define storage coefficient.	BT-2	Understand
11.	Explain the reason behind Groundwater fluctuations.	BT-2	Understand
12.	List the major zones below the ground level of the earth.	BT-1	Understand
13.	What is porosity	BT-2	Understand
14.	What is meant by specific storage?	BT-1	Remember
15.	Define Specific retention.	BT-1	Remember
16.	List the factors affecting occurrence of ground water.	BT-1	Remember
17.	Write about Groundwater development in India.	BT-2	Understand
18.	Outline about the Groundwater potential.	BT-2	Understand
19.	Outline advantages of geophysical method	BT-2	Understand
20.	Show the salient features of GEC Norms.	BT-2	Understand
21.	Define aquitard.	BT-1	Remember
22.	List out the importance of electrical resistivity.	BT-2	Understand
23.	What is meant by hydrogeological parameter?	BT-1	Remember
24.	Draw typical wells in aquifer systems.	BT-2	Understand
25.	Define transmissivity.	BT-1	Remember

PART-B			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Explain the following terms: (a) Soil water (b) Soil available water (c) Water holding capacity (d) Soil-water-plant relationship	BT-3	Apply
2.	Explain about water bearing properties of rock.	BT-3	Apply
3.	Explain about Groundwater Investigation with an example.	BT-3	Apply
4.	Write the groundwater balance equation and explain the components in detail.	BT-3	Apply
5.	During Hydro geological investigation two potential aquifers 32 km apart were located, one being 5000 years and the other 25000 years old. They were found to be connected by a water bearing stratum of 30m thickness running inclined at 20m/km. From a few observation wells, the hydraulic gradient was found to be 0.2m/km. Determine the transmissibility of the water bearing stratum.	BT-4	Analysis
6.	In a phreatic aquifer extending over 1 km^2 the water table was intially at 25 m below ground level. Sometime after the irrigation with a depth of 20 cm of water, the water table rose to a depth of 24 m. Later 3 x 10^5 m^3 of water was pumped out and the water table dropped to 26.2 m. Determine (a) specific yield of the aquifer, (b) Return flow from irrigation, (c) deficit in soil moisture before irrigation.	BT-4	Analysis
7.	Illustrate the methods of estimation of groundwater potential based on GEC methodology.	BT-3	Apply
8.	Write in detail about Groundwater fluctuations and interpretation.	BT-3	Apply
9.	Explain about Groundwater development potential in India.	BT-3	Apply
10.	Illustrate about GEC Norms and its Recommendations with a case study.	BT-3	Apply
11.	Develop about Electrical resistivity method.	BT-3	Apply
12.	Construct about seismic refraction method.	BT-3	Apply
13.	Outline about water table fluctuation in detail.	BT-3	Apply
14.	An artesian aquifer, 30 m thick has a porosity of 25% and bulk modulus of compression 2000 kg/cm^2. Estimate the storage coefficient of the aquifer. What fraction of this is attributable to the expansibility of water?	BT-3	Apply
15.	An undisturbed rock sample has an oven dry weight of 0.655 kg. After saturation with kerosene its weight is 0.732 kg. Its then immersed in kerosene and found to displace 0.301 kg. What is the porosity of the sample?	BT-3	Apply
16.	When 3.68 million m^3 of water was pumped out from an unconfined aquifer of 6.2 km^2 a real extent, the water table was	BT-3	Apply

	observed to go down by 2.6 m. What is the specific yield of the aquifer? During a monsoon season if the water table of the same aquifer goes up by 10.8 m. What is the volume of recharge?		
17.	The water table levels in two observation wells apart are +210.5 and +206.25 m respectively. If the hydraulic conductivity and porosity of the aquifer are 12.5 m/day and 15 per cent, what is the actual velocity of flow in the aquifer?	BT-3	Apply

PART-C

Q.No	Questions	BT Level	Competence
1.	Explain the water resources in India with a case study.	BT-3	Apply
2.	Elaborate the hydrologic cycle with neat sketch and its importance in groundwater hydrology.	BT-3	Apply
3.	Explain the various types' water bearing stratum with neat sketch.	BT-3	Apply
4.	Prepare a case study on Neyveli artesian aquifer.	BT-3	Apply
5.	A sample has a hydraulic conductivity of 10 m/day. What would be its intrinsic permeability? What is its hydraulic conductivity in cm/s? What would be its hydraulic conductivity at 30°C?	BT-4	Analysis

UNIT II - WELL HYDRAULICS

Darcy's law – Groundwater Flow Equation – Steady state flow – Dupuit Forcheimer Assumption – Theim's Equation - unsteady flow – Theis method and Jacob method – Image well theory – Partial penetration of wells.

PART A

Q.No	Questions	BT Level	Competence
1.	What is groundwater recharge zone?	BT-1	Remember
2.	What is meant by well hydraulics?	BT-1	Remember
3.	State any two assumptions of dupits theory.	BT-1	Remember
4.	What is Darcy's law of permeability?	BT-1	Remember
5.	What is unsteady state flow?	BT-1	Remember
6.	Write the different types of flow condition.	BT-1	Remember
7.	What is meant by Drawdown in well hydraulics?	BT-2	Understand
8.	Define cone of depression.	BT-2	Understand
9.	Illustrate about steady state flow.	BT-2	Understand
10.	Show about the application of Darcy's law.	BT-2	Understand
11.	Outline the specific capacity of well.	BT-2	Understand
12.	Tell about the water table in aquifer.	BT-1	Remember
13.	Write about the Thiem equation for confined aquifers.	BT-1	Remember
14.	Interpret about Dupuit equation for unconfined aquifers.	BT-2	Understand
15.	Write any two assumptions of Theis theory.	BT-1	Remember
16.	Interpret about radius of influence.	BT-2	Understand
17.	Write about steady flow.	BT-2	Understand
18.	What is hydraulic gradient?	BT-1	Remember

19.	Write about Jacob method.	BT-2	Understand
20.	Write about Dupuit equation for confined aquifers.	BT-2	Understand
21.	What is the water balance equation?	BT-1	Remember
22.	What is field water balance?	BT-1	Remember
23.	State any two assumptions of steady radial flow to wells.	BT-1	Remember
24.	Outline the partially penetrating well?	BT-2	Understand
25.	Write the Thiem equation for unconfined aquifers.	BT-1	Remember

PART-B

Q. No	Questions	BT Level	Competence
1.	A pumping test was carried out on a new irrigation bore well penetrating fully into a confined aquifer at a rate of 22 lit/s. The drawdown measured in an observation well connected at 45.7 m from the pumping well during the test is as given below. Determine T and S of the aquifer, using Cooper - Jacob method.	BT-4	Analysis

Time t in hours	Drawdown s in m
0.5	0.091
1.8	0.294
2.7	0.382
5.4	0.55
9.0	0.701
12.0	0.785
18	0.911
30	1.06
54	1.24

2.	(a) Write in detail about partial penetration of wells. (3) (b) During a recuperation test conducted on an open well in a region, the water level in the well was depressed by 3m and it observed to rise by 1.75m in 75 minutes (a) What is the specific yield of open wells in that region (3) (b) What could be the yield from a well of 5m diameter under a depression head of 2.5m? (3) (c) What should be the diameter of the well to give a yield of 12 lit/s under a depression head of 2.0 m (4)	BT-4	Analysis
3.	Derive steady unidirectional flow in unconfined aquifer with recharge from rainfall.	BT-3	Apply
4.	A 30 cm diameter well penetrates 25 m below the static water table. After 24 hours of pumping @ 5400 liters/minute, the water level in a test well at 90 m is lowered by 0.53 m, and in a well 30 m away the drawdown is 1.11 m. (a) What is the transmissibility of the aquifer? (b) Also determine the drawdown in the main well.	BT-4	Analysis
5.	Derive steady unidirectional flow in unconfined aquifer.	BT-3	Apply
6.	Derive Cooper and Jacob method and compute T and S.	BT-3	Apply

<table>
<tr><td>7.</td><td>A 30cm well fully penetrate a confined aquifer 30m deep. After a long period of pumping at a rate of 1200 lpm, the drawdown in the well at 20 and 45m from the pumping well are found to be 2.2 and 1.8 m respectively. Determine transmissibility of the aquifer. What is the draw down?</td><td>BT-3</td><td>Apply</td></tr>
<tr><td>8.</td><td>Derive the steady radial flow to a well in an unconfined aquifer.</td><td>BT-3</td><td>Apply</td></tr>
<tr><td>9.</td><td>The following data were collected during the pumping test of a confined aquifer to determine the aquifer parameters. The test well was pumped at the rate of 31.5 Ips. The observation well is located at 15.2 m from the main pumping well. Determine T and S of an aquifer by Jacob's technique.
<table>
<tr><th>Time (hrs)</th><th>Drawdown (m)</th></tr>
<tr><td>0.5</td><td>0.15</td></tr>
<tr><td>1</td><td>0.30</td></tr>
<tr><td>2</td><td>0.46</td></tr>
<tr><td>4</td><td>0.76</td></tr>
<tr><td>6</td><td>0.98</td></tr>
<tr><td>12</td><td>1.31</td></tr>
<tr><td>24</td><td>1.65</td></tr>
<tr><td>48</td><td>1.95</td></tr>
</table></td><td>BT-4</td><td>Analysis</td></tr>
<tr><td>10.</td><td>(a) What should be the diameter of an open well to give a yield of 4.8 lit/s? Assume the working head as 3.75m and the subsoil consists of fine sand. (5)
(b) The following date is obtained from a recuperation test on an open well of diameter 6.5m
R.L of water table = 237.8 m
R.L of water level in the well when the pumping is just stopped = 231.2 m
R.L of the water level in the well 2.5 hrs after the pumping is stopped = 234.5 m
Estimate the safe yield of the well, if the working head is 3m (8)</td><td>BT-4</td><td>Analysis</td></tr>
<tr><td>11.</td><td>Derive the unsteady radial flow to a well in a confined aquifer</td><td>BT-4</td><td>Analysis</td></tr>
<tr><td>12.</td><td>In an artesian aquifer of 8m thick, a 10 cm diameter well is pumped at a constant rate of 100 lit/minute. The steady state drawdown observed in two wells located at 10 m and 50 m distances from the centre of the well are 3m and 0.05 m respectively, compute the transmissivity and the hydraulic conductivity of the aquifer.</td><td>BT-3</td><td>Apply</td></tr>
<tr><td>13.</td><td>Derive the steady radial flow to a well in a confined aquifer.</td><td>BT-3</td><td>Apply</td></tr>
<tr><td>14.</td><td>A 30cm well penetrates 50m below static water table. After a long period of pumping at a rate of 1800 lpm, the drawdown in the well at 15 m and 45 m from the pumped well where 1.7m and 0.8m respectively. Determine transmissibility of the aquifer. What is the draw down?</td><td>BT-4</td><td>Analysis</td></tr>
<tr><td>15.</td><td>Streams A and B are separated by an aquifer formation of width 3.8 km and the depths of flow in them are 18.6 and 12.2 m</td><td>BT-4</td><td>Analysis</td></tr>
</table>

<table>
<tr><td></td><td>respectively. Compute the flow from stream A to stream B if the hydraulic conductivity of the aquifer is 0.1 mm/s and also find when the rainfalls with an intensity which is always more that the infiltration capacity of the aquifer and which may taken as 0.3 cm/h.</td><td></td><td></td></tr>
<tr><td>16.</td><td>A 30 cm well completely penetrates an unconfined aquifer of depth 40 m. After a long period of pumping at a steady rate of 1500 lpm, the drawdown in two observation wells 25 m and 75 m from the pumping well were found to be 3.5 m and 2.0 m respectively. Determine the transmissibility of the aquifer. What is the drawdown at the pumping well?</td><td>BT-4</td><td>Analysis</td></tr>
<tr><td>17.</td><td>A tube well of 30 cm diameter penetrates fully in an artesian aquifer. The strainer length is 15 m. Calculate the yield from the well under a drawdown of 3 m. The aquifer consists of sand of effective size of 0.2 mm having coefficient of permeability equal to 50 m/day. Assume radius of drawdown equal to 150 meters.</td><td>BT-4</td><td>Analysis</td></tr>
<tr><td colspan="4">PART-C</td></tr>
<tr><td>Q. No</td><td>Questions</td><td>BT Level</td><td>Competence</td></tr>
<tr><td>1.</td><td>Write the basic assumptions for analyzing flow to wells. With any practical examination.</td><td>BT-3</td><td>Apply</td></tr>
<tr><td>2.</td><td>Explain about the image well theory and partial penetration of wells?</td><td>BT-4</td><td>Analysis</td></tr>
<tr><td>3.</td><td>Evaluate the discharge computation of partial penetrations of wells.</td><td>BT-3</td><td>Apply</td></tr>
<tr><td>4.</td><td>Drawdown was measured during a pumping test at frequent intervals in an observation well 200 feet from a well that was pumped at a constant rate of 500 ppm. The data for this pump test is listed in table. These measurements shows that the water level is still dropping after 4000 minutes of pumping, therefore analysis of the test data requires use of the Thesis non equilibrium procedure. Determine S and T for this aquifer
<table>
<tr><th colspan="2">Pump test data</th></tr>
<tr><th>Time (min)</th><th>Drawdown (feet)</th></tr>
<tr><td>1</td><td>0.05</td></tr>
<tr><td>2</td><td>0.22</td></tr>
<tr><td>3</td><td>0.4</td></tr>
<tr><td>4</td><td>0.56</td></tr>
<tr><td>5</td><td>0.7</td></tr>
<tr><td>7</td><td>0.94</td></tr>
<tr><td>10</td><td>1.2</td></tr>
<tr><td>20</td><td>1.8</td></tr>
<tr><td>40</td><td>2.5</td></tr>
<tr><td>100</td><td>3.4</td></tr>
</table></td><td>BT-4</td><td>Analysis</td></tr>
</table>

		300	4.5			
		1000	5.6			
		4000	7			
5.	An unconfined aquifer has a thickness of 30 m. A fully penetrating 20 cm diameter well in this aquifer is pumped at a rate of 35 lit/s. The drawdown measured in two observation wells located at distances of 10m and 100m from the well are 7.5 m and 0.5 m respectively. Determine the average hydraulic conductivity of the aquifer. At what distance from the well the drawdown is significant.				BT-4	Analysis

UNIT III - WELL DESIGN

Design characteristics – Design of wells - Well diameter, depth and Well screen design – Materials for well screens – Well casing – Design of collector wells and Infiltration gallery – Dug wells versus tube wells.

PART-A

Q.No	Questions	BT Level	Competence
1.	What are the objectives of well design?	BT-1	Remember
2.	How is a water well-constructed?	BT-1	Remember
3.	Can you build a well anywhere?	BT-1	Remember
4.	What material is used for well casing?	BT-1	Remember
5.	What is well screen?	BT-1	Remember
6.	Can PVC be used for well casing?	BT-1	Remember
7.	What is difference between wells and tube wells?	BT-2	Understand
8.	What are the different types of wells?	BT-2	Understand
9.	Show the specification of well diameter	BT-2	Understand
10.	What is a cased well?	BT-2	Understand
11.	Explain about well depth.	BT-2	Understand
12.	What is the function of well screen in tube wells?	BT-1	Remember
13.	How deep is a dug well?	BT-2	Understand
14.	What is the need of collector well?	BT-1	Remember
15.	What are dug wells?	BT-2	Understand
16.	How Can groundwater be drawn out through tube wells?	BT-1	Remember
17.	Discuss about basin	BT-1	Remember
18.	What is Ranny well?	BT-1	Remember
19.	What is river intake?	BT-1	Remember
20.	What are the advantages of infiltration gallery?	BT-2	Understand
21.	What is Jack well?	BT-2	Understand
22.	How do infiltration galleries work?	BT-2	Understand
23.	Define artesian well.	BT-2	Understand
24.	How the well was dug?	BT-1	Remember

25.	What is meant by infiltration gallery?	BT-1	Remember

PART-B			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Draw the cross section of well and explain its components with examples.	BT-3	Apply
2.	Explain the design principle of well with an example?	BT-3	Apply
3.	Design an open well in coarse sand to give a discharge of 0.004 cumec when worked under depression head of 3 metres.	BT-4	Analysis
4.	Explain about infiltration wells with example.	BT-3	Apply
5.	Outline the design principle of well screen with neat sketch.	BT-2	Apply
6.	Design an open well in fine sand to give a discharge of 0.003 cumec when worked under depression head of 2.5 metres.	BT-4	Analysis
7.	What are the selection factors for site of well with a case study?	BT-3	Apply
8.	A fully penetrating well in a confined sandy aquifer has a maximum discharge capacity of 1200 l/min. The aquifer is overlain and underlain by impervious formations. The thickness of the aquifer is 20m. Design the length of the well screen assuming the percentage of the open area of the available strainer to be 15%, and bore hole diameter as 15 cm.	BT-4	Analysis
9.	Design a tube well for the following data Yield required = 0.08 cumec Thickness of confined aquifer = 30 m Radius of circle of influence = 300 m Permeability coefficient = 60 m/ day Drawdown = 5 m	BT-4	Analysis
10.	Describe in detail about advantages and disadvantages of open well and tube well.	BT-3	Apply
11.	Enumerate the test to calculate the yield of an open well.	BT-3	Apply
12.	Explain about infiltration galleries with an example.	BT-3	Apply
13.	Explain different types of wells with an example.	BT-3	Apply
14.	Design a tube well for the following data Yield required = 0.06 cumec Thickness of confined aquifer = 33 m Radius of circle of influence = 330 m Permeability coefficient = 75 m/ day Drawdown = 7 m	BT-4	Analysis
15.	Differentiate between dug well and tube well.	BT-3	Apply
16.	List the advantages of well irrigation over canal irrigation.	BT-3	Apply
17.	Explain about collector well in detail with an example.	BT-3	Apply

PART-C

Q.No	Questions	BT Level	Competence
1.	Describe in detail about bore wells. Explain its advantages and disadvantages. Also write a short notes on bore well in India	BT-3	Apply
2.	Explain the types of well and also the selection factor for site of well with a case study?	BT-3	Apply
3.	Outline the construction of dug well and collector well with examples.	BT-3	Apply
4.	Explain in detail about the infiltration galleries with neat sketch.	BT-3	Apply
5.	Design a tube well to deliver 33,000 gallons per hour at a depression head of 5 m. The average water level is 10 m below the ground in October and 15 m in July. The geological investigation has yielded the following results at the site of boring:	BT-4	Analysis

DEPTH	TYPE OF STRATA
0 to 5 m	Surface clay
5 to 20 m	Very fine sand
20 to 30 m	Clay with Kankar
30 to 50 m	Coarse sand
50 to 60 m	Clay
60 to 70 m	Medium sand
Below 70 m	Clay with sand stone.

UNIT IV - WELL CONSTRUCTION AND MAINTENANCE

Types of wells – Well drilling - Boring, Jetting – Rotary drilling, Hammer drilling Construction– Installation of pipes and screens - Well development, Completion and disinfection – Well maintenance – Well performance test – Well effectiveness – Well loss – Pumping equipment – Rehabilitation of wells and borewells

PART-A

Q.No	Questions	BT Level	Competence
1.	What are the types of auger?	BT-1	Remember
2.	Write the need of casing.	BT-1	Remember
3.	How do you maintain a well?	BT-1	Remember
4.	State bore hole.	BT-1	Remember
5.	How do you rehabilitate a water well?	BT-1	Remember
6.	State the uses of well seal.	BT-1	Remember
7.	Identify the methods of drilling.	BT-2	Understand
8.	Compare PVC casing and steel casing.	BT-2	Understand
9.	Mention the reason for well disinfection.	BT-2	Understand

10.	Compare over pumping with backwashing.	BT-2	Understand
11.	Show the methods of well development.	BT-2	Understand
12.	Define the well completion operations.	BT-1	Remember
13.	What is well rehabilitation?	BT-2	Understand
14.	Write about well development.	BT-2	Understand
15.	Write about different types of bore well.	BT-1	Remember
16.	Sketch the cross section of water well.	BT-1	Remember
17.	Classify the types of pumps.	BT-1	Remember
18.	Explain the sequence procedure for construction well.	BT-1	Remember
19.	How do you backflush a well?	BT-1	Remember
20.	Where large diameter low yield wells?	BT-2	Understand
21.	Mention the need of filter pack.	BT-2	Understand
22.	Do wells need to be cleaned?	BT-2	Understand
23.	Draw the sketch of drillers.	BT-2	Understand
24.	Write about the needs of dispersing agents in well development.	BT-2	Understand
25.	What was meant by disturbed sample?	BT-1	Remember
	PART-B		
Q.No	**Questions**	**BT Level**	**Competence**
1.	Explain the difference between drilled well and driven well with suitable examples.	BT-3	Apply
2.	Explain in detail about process of rotary drilling with an example.	BT-3	Apply
3.	Explain in detail about the disinfection of wells with an example.	BT-3	Apply
4.	Explain the different types of pumps with a neat sketch.	BT-3	Apply
5.	List the advantages and disadvantages of different types of pump with an example.	BT-3	Apply
6.	What are the different components of well? Explain in detail with neat sketch.	BT-3	Apply
7.	Explain the construction of well using hammer drilling with an example.	BT-3	Apply
8.	Explain in details about the pumping equipment's with an example.	BT-3	Apply
9.	Outline the processes of Auger boring with typical sketch.	BT-3	Apply
10.	Sketch the well completion operation.	BT-3	Apply
11.	Explain the construction of jetting with an example.	BT-3	Apply
12.	How will you construct water well?	BT-3	Apply
13.	What are the well maintenance methods with an example?	BT-3	Apply
14.	Explain the types of screens and also design of gravel pack with sketch an example.	BT-3	Apply
15.	Outline the protection of water well.	BT-3	Apply
16.	Outline the wash boring technique with neat sketch and example.	BT-3	Apply
17.	List the following: (a) Major Causes of Deteriorating Well Performance. (7) (b) Well Maintenance and Rehabilitation Techniques. (6)	BT-3	Apply

PART-C			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Prepare a case study on quality of ground water on your native district.	BT-4	Analysis
2.	Explain the placement of well casing and well screen with an example.	BT-3	Apply
3.	Outline the pumping equipment used in wells construction with a neat sketch and example.	BT-3	Apply
4.	Enumerate the facts about rehabilitation of wells with an example.	BT-3	Apply
5.	Explain the methods of well development in detail.	BT-3	Apply

UNIT V - SPECIAL TOPICS

Artificial Recharge Techniques – Sea water Intrusion – Introduction to Ground water modeling Techniques – Ground water pollution and legislation - Groundwater quality – Dose response assessment – Risk analysis.

PART-A			
Q.No	**Questions**	**BT Level**	**Competence**
1.	Why artificial recharge required?	BT-1	Remember
2.	State the objectives of artificial recharge	BT-1	Remember
3.	Outline the advantages of artificial recharge.	BT-1	Remember
4.	Compare natural recharge and artificial recharge.	BT-1	Remember
5.	What is recharge structure?	BT-1	Remember
6.	What is dose response assessment?	BT-1	Remember
7.	What causes seawater intrusion?	BT-2	Understand
8.	What is an example of saltwater intrusion?	BT-2	Understand
9.	Why is seawater intrusion bad?	BT-2	Understand
10.	How does saltwater intrusion affect humans?	BT-2	Understand
11.	Why ground water Modeling is needed?	BT-2	Understand
12.	What is numerical groundwater Modeling?	BT-1	Remember
13.	State groundwater contamination.	BT-1	Remember
14.	What is MODFLOW used for?	BT-2	Understand
15.	Define saltwater intrusion.	BT-2	Understand
16.	Discuss the Impacts of saltwater intrusion?	BT-1	Remember
17.	List the remedies to be taken to reduce saltwater intrusion?	BT-1	Remember
18.	What pollutants are in groundwater?	BT-1	Remember
19.	What are the sources of groundwater Pollution?	BT-2	Understand
20.	What is the difference between groundwater and surface water pollution?	BT-2	Understand
21.	How do you recognize protection zone delineation?	BT-2	Understand
22.	Why groundwater legislation is needed in India?	BT-2	Understand

23.	What do you mean by MAR?	BT-3	Remember
24.	Why groundwater quality is important?	BT-3	Understand
25.	What are groundwater quality parameters?	BT-3	Remember

PART-B

Q.No	Questions	BT Level	Competence
1.	Describe in detail about Surface spreading method of artificial recharge with an example.	BT-3	Apply
2.	Show the influence of recharge factors with an example.	BT-3	Apply
3.	Explain about Sub Surface method of artificial recharge with an example.	BT-3	Apply
4.	Identify Remediation schemes of contaminant present in ground water.	BT-3	Apply
5.	Explain the Recent Progress on Groundwater Legislation.	BT-3	Apply
6.	Enumerate the potential sources of groundwater contamination.	BT-4	Analysis
7.	How can you stop groundwater pollution explain any two methods in detail?	BT-4	Analysis
8.	Why is pollution of groundwater a greater environmental hazard than pollution of surface water? Explain in detail.	BT-3	Apply
9.	Show the remedial measures of saline intrusion.	BT-3	Apply
10.	Outline the groundwater quality parameters in detail with an example.	BT-3	Apply
11.	Write the preventive measures of groundwater pollution with a case study.	BT-3	Apply
12.	Describe in detail about causes of ground water pollution with an example.	BT-3	Apply
13.	Show the ground water quality features of the country with an example.	BT-3	Apply
14.	Summarize the facts about risk analysis in groundwater pollution. Explain an area where the groundwater pollution is identified.	BT-3	Apply
15.	Write about the advantages and disadvantages of artificial recharge.	BT-3	Apply
16.	Explain the factors affecting groundwater.	BT-3	Apply
17.	Explain about seismic refraction method.	BT-3	Apply

PART-C

Q.No	Questions	BT Level	Competence
1.	Outline the methods to remediate saline intrusion.	BT-3	Apply
2.	Prepare a case study on quality of groundwater on your native district	BT-3	Apply
3.	Enumerate the roles and responsibilities of Central water commission on groundwater quality.	BT-4	Analysis
4.	Elaborate the Water quality standards for irrigation water with an	BT-3	Apply

	example.		
5.	Explain in detail about artificial recharge and also the advantages and disadvantages.	BT-3	Apply