

**G-3/367/22**

Roll No. ....

**III Semester Examination, January 2022**

**M.Sc.**

**GEOLOGY**

Paper I

(Hydrogeology)

Time : 3 Hours ]

[ Max. Marks : 80

**Note :** *All questions are compulsory. Question Paper comprises of 3 Sections. Section A is objective type/multiple choice questions with no internal choice. Section B is short answer type with internal choice. Section C is long answer type with internal choice.*

**SECTION A**

**1×10=10**

**(Objective Type/Multiple Choice Questions)**

*Choose the correct answer :*

- 1.** Water entrapped in sediments during lithogenesis is called :  
(a) Connate water    (b) Cosmic water  
(c) Juvenile water    (d) Rejuvenated water
- 2.** In an anisotropic aquifer :  
(a) The aquifer parameters are dependent on direction

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- (b) The aquifer parameters are independent of direction
  - (c) The aquifer parameters are constant
  - (d) None of the above
- 3.** Perennial stream in nonrainy periods behave as :  
(a) Influent stream    (b) Insulated stream  
(c) Effluent stream    (d) None of these
- 4.** Perched aquifer occurs :  
(a) Below water table  
(b) In zone of aeration  
(c) In zone of saturation  
(d) In zone of disconnected openings
- 5.** The length of screen is selected on the basis of the :  
(a) Thickness of the aquifer  
(b) Anticipated drawdown and decline in the water level  
(c) Stratification of the aquifer  
(d) All of the above

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6. Cavity wells are preferred in :
- Weathered granite at shallow depth
  - Thin permeable unconfined aquifer occurring at shallow depth
  - Deep confined aquifer
  - Thin aquifer comprising loose materials below hard day at relatively shallow depth
7. Electrical sounding survey gives information about :
- Lateral variation
  - Both lateral and vertical variation
  - Vertical variation
  - None of the above
8. In gamma ray log method the gamma radiation is generally increases with
- Increasing quartz content
  - Decreasing clay content
  - Increasing clay content
  - Increasing calcareous content
9. The most important water quality parameter for domestic use of water is :
- Carbonate hardness
  - Non carbonate hardness

- Colliform group of bacteria
  - Chlorides
10. SAR stands for :
- Sodium adsorption ratio
  - Sodium adsorption ratio
  - Soil alkanitg ratio
  - Soil and recharge

**SECTION B****4×5=20****(Short Answer Type Questions)****Note :** Answer the following questions in **250** words.**Unit-I**

1. Describe the Darcy's law and its validity.

*Or*

Describe the porosity.

**Unit-II**

2. Discuss the causes of water table fluctuations.

*Or*

Describe the perched aquifer with diagram.

**Unit-III**

3. Discuss the various assumptions for pumping test analysis.

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*Or*

What is the function of well screen ?

**Unit-IV**

4. What is the use of radioisotopes in hydrogeological studies ?

*Or*

Discuss the geologic control on groundwater occurrence and movement.

**Unit-V**

5. Describe the rooftop rainwater harvesting for groundwater.

*Or*

Express your views on water management in urban areas.

**SECTION C**

**10×5=50**

**(Long Answer Type Questions)**

**Note :** Answer the following questions in **500** words.

**Unit-I**

1. Describe the vertical distribution of subsurface water showing various aquifer conditions.

*Or*

Describe the hydrologic properties of rocks.

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**Unit-II**

2. What is well inventory and what is water table maps ? Describe the different types of water table maps and their importance.

*Or*

Describe the terms groundwater mounds, groundwater depression, groundwater ridges, groundwater trenches influent and effluent seepage with neat sketches.

**Unit-III**

3. Describe the different types of well and method of construction.

*Or*

Describe the different methods of pumping test for unconfined aquifer, nonsteady state condition.

**Unit-IV**

4. Describe the groundwater provinces of India.

*Or*

Describe the graphical well logging method for groundwater exploration.

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**Unit-V**

- 5.** Discuss the pollution of groundwater in term of source and nature of pollution, mechanism detection and prevention.

*Or*

Discuss various methods for artificial recharge and also discuss how the natural recharge takes place.

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