

**2 0 2 5**

( NEP—2020 )

( 5th Semester )

**GEOLOGY (MAJOR3/MINOR)**

**( Hydrogeology and Groundwater Exploration )**

*Full Marks : 75*

*Time : 3 hours*

*The figures in the margin indicate full marks for the questions*

**( SECTION : A—OBJECTIVE )**

( Marks : 10 )

Tick (✓) the correct answer in the brackets provided :

1×10=10

**1.** If the dew point is greater than 0 °C, then

- (a) dew will be formed ( )
- (b) frost will be formed ( )
- (c) vapours will be formed ( )
- (d) None of the above ( )

**2.** Infiltration capacity of soil depends upon

- (a) number of voids present in the soil ( )
- (b) shape and size of soil particles ( )
- (c) arrangement of soil particles ( )
- (d) All of the above ( )

- 3.** The groundwater contribution to a stream is termed as
- (a) base flow ( )
  - (b) runoff ( )
  - (c) infiltration ( )
  - (d) overland flow ( )
- 4.** The specific retention
- (a) increases with increasing size ( )
  - (b) increases with decreasing size ( )
  - (c) does not depend on size ( )
  - (d) is equal to specific yields ( )
- 5.** Darcy's law is valid for
- (a)  $NR > 1$  ( )
  - (b)  $NR < 1$  ( )
  - (c)  $NR > 10$  ( )
  - (d)  $NR = 1$  ( )
- 6.** Hydrograph unit is useful in
- (a) estimating runoff from basin ( )
  - (b) estimating number of days of rainfall ( )
  - (c) knowing the drought month in a year ( )
  - (d) deciding the land for hydel power plant ( )
- 7.** The accuracy of snow gauges in measuring snowfall depends on
- (a) gauge design ( )
  - (b) gauge placement ( )
  - (c) calibration ( )
  - (d) All of the above ( )
- 8.** Topographic interpretation on appraisal of regional and local relief settings for groundwater exploration can be done through
- (a) geological method ( )
  - (b) aerial method ( )
  - (c) subsurface method ( )
  - (d) surface method ( )

9. In groundwater exploration, low resistivity indicates

- (a) dry/compact rocks ( )
- (b) low porosity zone ( )
- (c) granite formation ( )
- (d) clay rich zones ( )

10. Major ions make up over \_\_\_\_ of the total dissolved solids (TDS) in groundwater.

- (a) 75% ( )
- (b) 86% ( )
- (c) 95% ( )
- (d) 96% ( )

**( SECTION : B—SHORT ANSWERS )**

( Marks : 15 )

Write short notes on *five* of the following, taking at least *one* from each Unit : 3×5=15

UNIT—I

1. Precipitation
2. Vertical distribution of groundwater

UNIT—II

3. Retention water in rock
4. Aquitard and aquiclude

UNIT—III

5. Components of hydrograph
6. ISI classification of water

UNIT—IV

7. Industrial source of groundwater pollution
8. Salinization of groundwater

( SECTION : C—DESCRIPTIVE )

( Marks : 50 )

Answer *five* questions, taking at least *one* from each Unit :

10×5=50

UNIT—I

1. With the help of suitable diagram, describe in detail about the hydrogeological cycle. 2+8=10
2. What is an aquifer? Describe various types of aquifers with figures. 2+8=10

UNIT—II

3. Describe Darcy's law with the help of illustrations. 10
4. Define spring. Write about the various types of springs with figures. 2+8=10

UNIT—III

5. Write the importance and uses of a rain gauge and compare the advantages and limitations of non-recording and recording rain gauges. 10
6. Describe the major factors influencing the shape of a flood hydrograph. Illustrate your answer with suitable examples. 10

UNIT—IV

7. What is remote sensing? Explain the role of remote sensing in groundwater resources. 2+8=10
8. Write brief notes on the following two methods of groundwater exploration : 5+5=10
  - (a) Geological method
  - (b) Resistivity method

★ ★ ★