PG Odd Semester (CBCS) Exam., December—2016

EARTH SCIENCE

(3rd Semester)

Course No. : ESCCC–303

(Hydrogeology)

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer **all** questions

1. *(a)* Compare the terms 'hydrology' and 'hydrogeology'. Discuss the scope and application of the subject hydrogeology. 2+3+2=7

(b) Describe with suitable sketches the types of aquifers. Add briefly the role of groundwater in hydrologic cycle. 4+3=7

OR

2. *(a)* Define water table and potentiometric level. Explain, with neat sketch, the vertical column of groundwater. 2+5=7

(b) Discuss the following : 3½+3½=7

(i) Porosity and Permeability

(ii) Hydraulic conductivity and Transmissivity

3. *(a)* What are equipotential lines and flow lines? Giving suitable sketches, explain different types of flow boundary conditions. 2+5=7

(b) What is hydraulic head? Explain Darcy's law with neat sketch. Comment on the validity of Darcy's law. 1+4+2=7

OR

4. *(a)* Define hydraulic conductivity. Explain how hydraulic conductivity can be measured. 2+5=7

(b) What are aquifer parameters? Describe various types of field-based methods for determination of aquifer parameters. 2+5=7

5. *(a)* What is vertical electrical sounding? Describe the derivation of apparent resistivity in Wenner configuration with neat sketch. 2+5=7

(b) What are resistance and resistivity in electrical resistivity method? Describe different types of resistivity surveys and their applications. Add shortly the basic differences between Wenner and Schlumberger electrode configuration surveys. 2+3+2=7

OR

6. *(a)* Explain the occurrence of groundwater in different rock types. 3½

(b) Explain the groundwater prospect zones of India. 3½

7. *(a)* Describe the characteristics of basic physico-chemical parameter of water. 7

(b) Explain the basic characteristics of major ions and trace elements of water. 7

OR

8. *(a)* What is hydrochemical facies? Describe the evolution of groundwater in terms of chemical composition. 2+5=7

(b) Explain the units for expressing ion concentrations. What are the commonly used graphical diagrams for hydrochemical data presentation? Briefly explain trilinear diagram. 2+3+2=7

9. *(a)* What are environmental tracers? Describe stable and non-stable isotopes present in water. 2+5=7

(b) What is water table fluctuation? Describe the causes of water table fluctuation. 2+5=7

OR

10. *(a)* Describe the types of wells. Discuss the different types of drilling methods briefly. 3½+3½=7

(b) Discuss the basic components of groundwater management and development. 7

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