

Serial No.

C-HFP-L-HMD

HYDROGEOLOGY

Time Allowed : Three Hours

Maximum Marks : 200

INSTRUCTIONS

Candidates should attempt SIX questions in all including Question No. 1, which is compulsory, from Part—I and attempt ONE question each from Sections A, B, C, D and E from Part—II.

The number of marks carried by each question is indicated at the end of the question.

Answers must be written only in ENGLISH.

Symbols and abbreviations are as usual.

Neat sketches may be drawn to illustrate answers, wherever required.

Wherever graphs/tables are required to be drawn, these may be plotted on the answer-book itself.

PART—I

1. Write notes on the following in not more than 5 sentences each :— 10×5=50
 - (a) Vertical distribution of groundwater
 - (b) Hydrographs
 - (c) Water table fluctuations

- (d) Pumping tests
- (e) Theory of groundwater flow
- (f) Problems of fluoride in groundwater
- (g) Fracture trace analysis
- (h) Location of springs
- (i) WENNER electrode arrangement
- (j) Storage coefficient.

PART—II

SECTION—A

2. Explain hydrologic cycle with a suitable diagram. Discuss various governing factors responsible for groundwater movement. 30
3. Write notes on the following :— 6×5=30
- (a) Juvenile and Magmatic waters
 - (b) Classification of aquifers
 - (c) Relation between porosity and permeability
 - (d) Water table contour maps
 - (e) Wet lands.

SECTION—B

4. Discuss briefly various types of Wells. Enumerate the causative factors of Well failures. Add a note on remedial steps for increasing their life. 30
5. Write notes on the following :— 6×5=30
- (a) Steady state flow through penetrating wells
 - (b) Groundwater flow models

- (c) Purpose of gravel pack
- (d) Their recovery method
- (e) Flow net characteristics.

SECTION—C

6. Explain sea water intrusion in the coastal belt and the measures suggested to control it. Add a note on groundwater contamination. 30
7. Write notes on the following :— 6×5=30
- (a) Chemical properties of water
 - (b) Water quality for agricultural purposes
 - (c) Quality of water in sedimentary rocks
 - (d) Necessity of Desalination
 - (e) Significance of radioisotopes in hydrogeologic studies.

SECTION—D

8. Explain the role of geological structures and intrusives which govern the potential groundwater zones. Add a note on the role of satellite imagery for groundwater exploration. 30
9. Write notes on the following :— 6×5=30
- (a) Collection of hydrogeological data
 - (b) Lineament mapping
 - (c) Radioactivity logging
 - (d) Tracer studies
 - (e) Interpretation of electrical resistivity data.

SECTION—E

10. Explain the principles involved in groundwater management and conjunctive use of water resources. Add a note on necessity of groundwater legislation.

30

11. Write notes on the following :—

6×5=30

- (a) Problems of over exploitation of groundwater
- (b) Management of renewable groundwater resources
- (c) Groundwater balance
- (d) Problems in groundwater mining
- (e) Recharge well method.