This question paper contains **3** printed pages]

Roll No. | | | | | | | | | | |

S. No. of Question Paper : **1979**

Unique Paper Code : **2193010011**

Name of the Paper : **Research Methods in Geoscience**

Name of the Course : **B.Sc. (Hons.) Geology (NEP)**

Semester : **VI**

Duration : **3 Hours** Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any *five* questions.

All questions carry equal marks (**18** each).

Draw neat and labelled diagrams wherever necessary.

1. (*a*) Define Hypothesis. Formulate a suitable hypothesis for arsenic contamination in soil near an industrial area. 9

   (*b*) Explain the significance of literature review in geoscience research. 9

2. (*a*) Differentiate between the following : 9

   (*i*) Descriptive and applied research

   (*ii*) Channel and grab sampling

   (*iii*) Bibliography and references.

P.T.O.

(*b*) What is IMRAD format ? Explain its importance in scientific writing. 9

3. (*a*) Define research planning. Describe the key steps involved in planning a geological research project, including formulation of objectives, selection of appropriate methodology and setting timeline. 9

(*b*) Discuss the ethical issues in scientific research, with particular reference to plagiarism, integrity in data collection and analysis and accuracy in reporting of results. 9

4. Answer any *two* of the following : 9×2=18

(*a*) Explain the sample preparation, working principle and applications of Scanning Electron Microscopy (SEM).

(*b*) Describe the sample preparation, working principle and applications of Inductively Coupled Plasma Mass Spectrometry (ICP-MS).

(*c*) Explain the sample preparation, principle and uses of X-ray Diffraction (XRD) in geology.

5. (*a*) Describe the procedure for preparation of a thin section of a rock sample. 12

(*b*) Explain the working and applications of a petrographic microscope. 6

6. Describe different methods of data collection in geosciences. Explain the difference between primary and secondary data with suitable examples. Discuss precautions to be taken while using secondary data. 18

7. (*a*) Give *one* example each of the following : 6

(*i*) Plagiarism detection software

(*ii*) Image processing software

(*iii*) Referencing software.

(*b*) Comment on the following : 12

(*i*) Random and systematic sampling and their uses in geology

(*ii*) Good laboratory practices.

8. (*a*) Calculate the mean and standard deviation for the given dataset : 9

12, 15, 18, 21, 24.

(*b*) Justify the following statements : 9

(*i*) Pre-analysis planning ensures representative sampling and appropriate analytical methods, thereby improving data reliability and minimizing errors.

(*ii*) Framing relevant scientific question is most important for research.