GEOLOGY

Paper – II

*Time Allowed : **Three** Hours*

*Maximum Marks : **200***

Question Paper Specific Instructions

Please read each of the following instructions carefully before attempting questions :

*There are **EIGHT** questions in all, out of which **FIVE** are to be attempted.*

*Questions no. **1** and **5** are **compulsory**. Out of the remaining **SIX** questions, **THREE** are to be attempted selecting at least **ONE** question from each of the two Sections A and B.*

Attempts of questions shall be counted in sequential order. Unless struck off, attempt of a question shall be counted even if attempted partly. Any page or portion of the page left blank in the Question-cum-Answer Booklet must be clearly stuck off.

All questions carry equal marks. The number of marks carried by a question/part is indicated against it.

Neat sketches may be drawn, wherever required.

*Answers must be written in **ENGLISH** only.*

SECTION A

Q1. (a) What are 'Symmetry elements' in crystallography ? Write the symmetry elements of normal class of tetragonal system. *8*

(b) Describe inosilicate structure with examples. *8*

(c) Petrographically differentiate between the following rock types : *8*

(i) Granite and Syenite

(ii) Basalt and Anorthosite

(d) Write a note on agents of metamorphism. *8*

(e) Discuss the depositional environment for carbonate rocks. *8*

Q2. (a) Discuss the process of extinction in anisotropic minerals. Describe the different types of extinction in minerals with examples. *10*

(b) Give a detailed account of the twinning in minerals. *15*

(c) What is magmatic differentiation ? Discuss various differentiation processes involved in magma modification. *15*

Q3. (a) Write a brief account of ACF diagram. *10*

(b) Discuss the crystal structure, classification, composition, physical and optical properties of feldspar group of minerals. *15*

(c) What are sedimentary structures ? Describe the sedimentary structures produced on top of the bedding plane. *15*

Q4. (a) What is metasomatism ? Write a brief account of metasomatic processes. *10*

(b) Differentiate between :

(i) Matrix and Cement *5*

(ii) Diagenesis and Lithification *5*

(iii) Clastic and Non-clastic sedimentary rocks *5*

(c) Give the classification of sandstone based on its detrital component and matrix. *15*

SECTION B

Q5. (a) Describe the methods of ore reserve estimation. *8*

(b) Describe the conditions necessary for the formation of hydrothermal ore deposits. *8*

(c) What is Sampling ? Describe briefly the techniques of sampling in mineral exploration. *8*

(d) Discuss the strategy adopted for the storage and disposal of radioactive waste. *8*

(e) Discuss the hazards caused due to industrial waste. *8*

Q6. (a) Give a brief account of mineralogy, classification and distribution of iron-ores in India. *15*

(b) Define Exclusive Economic Zone (EEZ). Add a note on the Law of the Sea (UNCLOS). *10*

(c) Discuss the structure, composition and elemental distribution of our Solar System. *15*

Q7. (a) Describe the Petroleum deposits of India. *15*

(b) What are Pathfinder Elements ? Give a detailed account of geobotanical prospecting. *10*

(c) Differentiate between :

(i) Isomorphism and Polymorphism *5*

(ii) Planar and Rotational Slides *5*

(iii) Magnitude and Intensity of Earthquake *5*

Q8. (a) What is Ore Beneficiation ? Briefly explain floatation method of separation. *15*

(b) Discuss the environmental hazards caused due to :

(i) Open cast mining *5*

(ii) Use of fertilizers *5*

(iii) Unplanned urbanization *5*

(c) Describe the various environmental protection laws of India. *10*