

GEOLOGY (Paper II)

Time Allowed : Three Hours

Maximum Marks : 300

QUESTION PAPER SPECIFIC INSTRUCTIONS

(Please read each of the following instructions carefully before attempting questions)

There are EIGHT questions divided in two Sections.

Candidate has to attempt FIVE questions in all.

Question Nos. 1 and 5 are compulsory and out of the remaining, any THREE are to be attempted choosing at least ONE question from each Section.

The number of marks carried by a question/part is indicated against it.

Wherever any assumptions are made for answering a question, they must be clearly indicated.

Word limit in questions, wherever specified, should be adhered to.

SECTION 'A'

1. Write on the following with diagrams as necessary: 12×5=60
- (a) Acute bisectrix interference figure of a biaxial crystal.
 - (b) Principle of X-ray diffraction study of a crystalline mineral.
 - (c) Distinguish andesite from dolerite by studies in thin sections.
 - (d) How the direction of flow of the sediment-carrying fluid is determined in a rock?
 - (e) Write on zones of metamorphism with special reference to an area in India.
2. (a) Discuss basis of classification of silicate structures of minerals. 20
- (b) Describe with a diagram the approximate limits of solid solution in the feldspar group of minerals. 20
- (c) Write on the principle of stereographic projection of crystals. Draw a sketch of the stereogram of a tetragonal crystal. 20
3. (a) Show how you determine the pleochroic scheme of a biaxial mineral. 20
- (b) Write notes on the following with diagrams. (i) Dispersion of axial angle in brookite (TiO_2) (ii) Powder X-ray diffraction method (iii) Granulose structure and its origin (iv) Trachytic and graphic texture 40
4. (a) Write a note on the cosmic abundance of elements and their significance. 20
- (b) Draw the diagram of Mg_2SiO_4 - Fe_2SiO_4 - SiO_2 and write its implication in the crystallization of basic magma. 20
- (c) Write on the metamorphism of argillaceous rocks. 20

SECTION 'B'

5. (a) Write on the geology and origin of stratiform and alpine-type chromite deposits in the world. 12
- (b) Enumerate the main factors of accretion of Mn-nodules on the ocean floor and their future mining possibilities. 12
- (c) Write on geophysical methods of exploration of oil deposits. 12
- (d) Comment on application of air-borne survey in mineral exploration. 12
- (e) Describe effects of long term application of nitrate fertilizers on ground water regime. 12

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| 6. | (a) | Write on the genesis and occurrences of the following mineral deposits in India: (i) Sillimanite (ii) Baryte (iii) Mn-ores | 30 |
| | (b) | Write short notes on: (i) Chondrite and tektite (ii) Duty and responsibility of sample collector in mineral prospection (iii) Mercury pollution | 30 |
| 7. | | Write notes on the following with sketches as necessary: | |
| | (a) | Name and discuss on Antarctic meteorites originating from the Moon. | 20 |
| | (b)(i) | Kamacite and octahedrite. | 10 |
| | (b)(ii) | Meteorite crater in India and its age. | 10 |
| | (c) | Anorthosite provinces of India and their origin. | 20 |
| 8. | (a) | Name the minerals used as refractories in Industries and cite their respective occurrences in India. | 20 |
| | (b) | Write on the sea-level changes through the geological history, and the associated environment and life, as known from fossil and sedimentary records. | 20 |
| | (c) | Explain marine pollution in India. Comment on the analytical techniques that are widely used for determining toxic elements in water. | 20 |