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.

Question Nos. **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.

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

Neat sketches may be drawn, wherever required.

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 struck off.

Answers must be written in ENGLISH only.

SECTION—A

1. *(a)* Explain briefly about the extinction angle of augite, hornblende and hypersthene with suitable diagrams. 8

(b) Discuss briefly about the geographical distribution, tectonic setting and petrogenetic aspects of Deccan Volcanic Province. 8

(c) Briefly explain the secondary structures of sedimentary rocks with suitable diagrams. 8

(d) Why do anisotropic minerals exhibit interference colours between crossed polars? Explain with the help of neat sketches. 8

(e) How would you distinguish between the following pairs of rocks petrographically? 8

(i) Granite and Gabbro

(ii) Syenite and Charnockite

2. *(a)* Describe the sedimentary basins of India and mention their types, area, hydrocarbon prospects and regions. 15

(b) Define the term 'cataclastic metamorphism' and describe the important products formed due to cataclastic metamorphism. 15

(c) Elaborate the symmetry elements of 'normal class' of cubic system with the help of neat well-labelled diagrams. 10

3. *(a)* Explain the significance of heavy minerals in relation to mineral stability during transit and intrastratal solution. 15

(b) Explain the factors responsible for the diversification of magma in igneous systems. 10

(c) Describe the crystal structure, types, mineralogy, composition, physical and optical properties of mica group of minerals. 15

4. *(a)* Write the mineral composition, texture and petrological characteristics of conglomerate and shale. 10

(b) Discuss the significance of texture in understanding the origin and formation of igneous rocks with the help of suitable sketches. 15

(c) Discuss the diagnostic physical, optical and chemical characteristics of two common rock-forming minerals each from inosilicates and nesosilicates. 15

SECTION—B

5. *(a)* Write briefly about the origin of ore minerals from residual liquid of magma. 8

(b) Mention briefly about the important types, depth and resources of important marine minerals. 8

(c) Discuss briefly any four Pauling's rules related to crystal structure. 8

(d) Discuss briefly the nature and morphology of concordant ore bodies with suitable sketches. 8

(e) What do you understand by polymorphism? Also add a note on different types of polymorphism. 8

6. *(a)* Give a brief account of mineralogy, modes of occurrence and distribution of gold deposits in India. 15

(b) Discuss the causes and impacts of an earthquake on mankind. Mention the measures to be taken to reduce the disaster during the earthquake. 15

(c) What are industrial resource minerals? Mention their applications with examples. 10

7. *(a)* Write the necessary conditions for the formation of oil pool and also mention the kinds of oil and gas traps. 15

(b) Discuss the geochemical classification of trace elements and explain the role of HFSE (high field strength elements) in magmatic crystallization. 10

(c) Discuss in detail about the classification of mining methods with the help of suitable diagrams and examples. 15

8. *(a)* What are the main objectives and highlights of 'National Mineral Policy' approved in 2019? 10

(b) Mention briefly about the various types of chemical bonds found in minerals giving suitable examples and neat sketches. Also throw light on chemical bonding in diamond and graphite. 15

(c) Discuss various principal methods used in geophysical investigations with suitable diagrams and examples. 15

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