

CSM – 35/20
Geology
Paper – II

Time : 3 hours

Full Marks : 300

The figures in the right-hand margin indicate marks.

*Candidates should attempt Q. No. 1 from Section – A and Q. No. 5 from Section – B which are compulsory and any **three** of the remaining questions, selecting at least **one** from each Section.*

SECTION – A

1. Answer any **three** of the following in about 200 words each : 20×3 = 60
 - (a) Discuss the powder method of X-ray diffraction. How Bragg's law is applicable in the identification of minerals ?
 - (b) Explain the elements of symmetry and forms present in the normal class of Isometric system.

- (c) Name the aluminosilicate minerals that result from the partial substitution of aluminum for silicon in the tectosilicate framework. Having identified the group, mention the classification of common minerals put under this class.
- (d) Write a note on physical and optical properties, chemical composition of clay minerals. Mention the common method used for the identification of clay minerals.
2. (a) Elaborate texture of igneous rocks. Outline the petrogenetic significance of each textural type. Illustrate your answer with representative diagrams. 15+9+6 = 30
- (b) Why certain types of minerals tend to be found together while others are almost never associated with one another-discuss the observation in terms of Bowen's reaction series ? In which year Prof. N.L. Bowen published his book, 'The Evolution of the Igneous Rocks' ? 8+20+2 = 30

3. (a) What is metamorphism ? Mention the processes of the development of metamorphic minerals and the factors controlling grain size of metamorphic rocks.

5+15+10 = 30

- (b) Discuss the petrography and petrogenesis of I-or S-type granite. 30

4. (a) Give a comprehensive summary of Deccan Basalt. 30

- (b) Name a few heavy minerals that occur in sandstones. Add a note on the applications of heavy minerals. 10+20 = 30

SECTION – B

5. Answer any **three** of the following in about 200 words each : 20×3 = 60

- (a) Give an account of the processes of formation of magmatic deposits.
- (b) What are the controlling mechanisms of ore localization ? How structural control helps entrapment of hydrocarbon ?
- (c) Write about the geology and mineralization of Khetri copper deposits.

- (d) Importance of conservation and utilization of mineral resources. Give suitable examples.
6. (a) Give an account of beach placer deposits of India, their distribution and mineralogical variation. 30
- (b) Mention the sequence of geophysical methods for hydrocarbon exploration. 15+15 = 30
7. (a) What are the factors responsible for the occurrence of earthquake ? How important is the zonations in predicting seismic vulnerability ? 25+5 = 30
- (b) Write a note on the method of geobotanical survey for mineral exploration. Give suitable examples. 15+15 = 30
8. (a) Distinguish between opencast and underground mining methods. Discuss about the iron mining method of India. 15+15 = 30
- (b) Why active volcanoes are confined to the subduction zones ? What is Pacific ring of fire and what is its significance ? 30

