

GEOLOGY
Paper – IITime 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 chronological 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.

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

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

Neat sketches may be drawn, wherever required.

SECTION A

- Q1. Answer the following in about 150 words each : 8×5=40**
- (a) Describe the symmetry elements and unit forms of the normal class of Tetragonal system. Mention the names of common minerals that crystallise in this class. 8
 - (b) Discuss the plane of symmetry in Rotation, Translation, Reflection and Glide Reflection with neat sketches. 8
 - (c) Explain the magmatic differentiation during crystallisation of magma and its petrogenetic significance. 8
 - (d) Discuss the Bowen's reaction principle and explain its mineral series of chemical composition. 8
 - (e) Write a brief discussion on metamorphism and deformational effects on Phyllites. 8

- Q2.** (a) Briefly discuss the most abundant minerals of phosphates and sulphates and their mineralization in the Earth's crust. 10
- (b) Write a brief explanation on organic sedimentary rock types and their economic importance, with Indian examples. 10
- (c) Discuss in brief metamorphism on sandstone. What are the reproductive rocks and what is their economic importance with respect to mineralization? 10
- (d) Discuss the geologic processes, environmental conditions and types of deposited sediments during depositional environment. 10
- Q3.** (a) Discuss in brief angles, axis, faces and type of lattice defects using stereographic projections in crystal system. 15
- (b) Discuss the metal detecting and metalliferous mineral prospecting in relation to Geological, Geochemical and Geophysical methods. 15
- (c) Describe what are the methods and processes adopted for mineral mining, mineral dressing and mineral beneficiation. 10
- Q4.** (a) Discuss in brief morphology and mode of occurrence of massive sulphide deposits in marine conditions. 10
- (b) Briefly explain the origin and occurrence of economically important gem variety precious stones, with Indian examples. 10
- (c) Explain the economic importance of hydrothermal ore deposits. 10
- (d) Write a brief note on the volcanic and back arc collisional belts and their economic importance in relation to mineralization. 10

SECTION B

- Q5. Answer the following in about 150 words each : 8×5=40**
- (a) Write a brief explanation on metallogenic epochs. 8
 - (b) Briefly discuss on compatible and incompatible trace elements. 8
 - (c) Discuss on origin and occurrence with geologic conditions and ore reserves of Hutti-Muski Schist belt. 8
 - (d) Briefly discuss on ore reserves, structure, geologic conditions and mineral occurrence in copper deposits of Mosabani in Purbi Singhbhum district. 8
 - (e) Explain in brief geological conditions and mode of occurrence of abrasive minerals in India. 8
- Q6.**
- (a) What are argillaceous rocks ? What are the metamorphic conditions in contact with other lithological units ? 10
 - (b) Enumerate the different types of sedimentary structures with origin and occurrence of different mineralization. 10
 - (c) List out and discuss briefly proterozoic sedimentary basins of India and their mineral economics. 10
 - (d) Briefly discuss on precious metalliferous deposits with origin and occurrence in Indian deposits. 10
- Q7.**
- (a) Discuss in brief coal formation in India with geological set-up and distribution. 10
 - (b) Explain in brief geology, mode of occurrence and origin of Ankleshwar petroleum deposit. 10
 - (c) Explain the geophysical exploration method in mineral exploration. 10
 - (d) How are the mineral deposits associated with the mechanism of concentrating oceanic spreading ridges ? Discuss. 10
- Q8.**
- (a) Describe the different types of crystal textures formed during main solidification stage of ore minerals. 10
 - (b) Write a note on metallogenic provinces in relation to plate tectonic environment. 10
 - (c) Write a brief explanation on Aulacogen mineralization through hot spots, rifts and failed rift environment. 10
 - (d) Explain briefly mid-oceanic ridge setting and passive continental orogeny and their mineralization. 10