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 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: 8x5=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.

(b) Discuss the plane of symmetry in Rotation, Translation, Reflection and Glide Reflection with neat sketches.

(c) Explain the magmatic differentiation during crystallisation of magma and its petrogenetic significance.

(d) Discuss the Bowen’s reaction principle and explain its mineral series of chemical composition.

(e) Write a brief discussion on metamorphism and deformational effects on Phyllites.
Q2. (a) Briefly discuss the most abundant minerals of phosphates and sulphates and their mineralization in the Earth's crust.  
(b) Write a brief explanation on organic sedimentary rock types and their economic importance, with Indian examples.  
(c) Discuss in brief metamorphism on sandstone. What are the reproductive rocks and what is their economic importance with respect to mineralization?  
(d) Discuss the geologic processes, environmental conditions and types of deposited sediments during depositional environment. 

Q3. (a) Discuss in brief angles, axis, faces and type of lattice defects using stereographic projections in crystal system.  
(b) Discuss the metal detecting and metalliferous mineral prospecting in relation to Geological, Geochemical and Geophysical methods.  
(c) Describe what are the methods and processes adopted for mineral mining, mineral dressing and mineral beneficiation. 

Q4. (a) Discuss in brief morphology and mode of occurrence of massive sulphide deposits in marine conditions.  
(b) Briefly explain the origin and occurrence of economically important gem variety precious stones, with Indian examples.  
(c) Explain the economic importance of hydrothermal ore deposits.  
(d) Write a brief note on the volcanic and back arc collisional belts and their economic importance in relation to mineralization.
SECTION B

Q5. Answer the following in about 150 words each: 8x5=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