

GEOLOGY (Paper II)

Time Allowed : Three Hours

Maximum Marks : 250

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.

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.

SECTION 'A'

1. Attempt the following with suitable diagrams:**10×5=50**
 - (a) Explain why all quartz grains in a rock section do not show first order yellow interference colour when viewed under crossed polars.
 - (b) What is pleochroism? Explain why a section of biotite cut parallel to cleavage does not show any pleochroism but when it is cut oblique to cleavage shows pleochroism.
 - (c) How are the clastic rocks classified on the basis of their grain-size?
 - (d) Distinguish between 'concordant' and 'discordant' bodies of igneous rocks. Illustrate the following with block diagrams (i) laccolith and (ii) lopolith.
 - (e) Distinguish between conglomerate and breccia.
2.
 - (a) Write the classification of silicate structure with neat sketches. **20**
 - (b) Discuss briefly on the construction of Nicol prism. Why it is necessary to cut and recement the calcite crystal in the classification of Nicol prism? **15**
 - (c) A mineral section remains dark in all positions under crossed polars – explain how it is possible and how will you proceed to determine the optic sign of the mineral, if applicable. **15**
3.
 - (a)(i) Explain the petrogenetic significance of the Diopside-Anorthite system (at 1 atm. dry). Draw labelled sketches. **10**
 - (a)(ii) How will you explain zoning in plagioclase by taking help of albite-anorthite system. **5**
 - (b) Elucidate petrogenetic significance of following: (i) porphyritic texture (ii) perthitic texture and (iii) corona structure. **15**
 - (c) "Deccan volcanism marks an important event in Indian Geology" – Explain this statement with logic. **6**
 - (d) Citing an example of Al_2SiO_5 polymorphs, draw T-P phase diagram. Discuss its significance in metamorphism. **6**
 - (e) Discuss briefly on 'Paired Metamorphic Belt'. **8**
4.
 - (a) Sketch and explain different types of sedimentary facies. **15**
 - (b) Give an account of the cementing materials in sedimentary rocks. **10**

- (c) What is shale? Describe texture, composition and environments of deposition of shales. 15
- (d) How would you distinguish arkose and greywackes? Comment upon their environment of deposition. 10

SECTION 'B'

5. (a) What are the differences between Banded Iron Formation and Ironstone? Discuss about detrital component of Banded Iron Formation. 10
- (b) Describe the geochemical and geobotanical methods of prospecting and their applications. 10
- (c) Describe various estimation methods of ore reserves. 10
- (d) Explain marine erosion as a coastal hazard and list its mitigation-measures. 10
- (e) Briefly give your concepts on Metallogenic provinces and Metallogenic epochs. Give suitable examples. 10
6. (a) "Gossans are the signboard of sulphide mineralization." Justify the statement citing an example of Rajpur-Dariba areas of Rajasthan. 15
- (b) Discuss role of Singhbhum Shear Zone as a guide to mineralization with special reference to ore-forming processes. 15
- (c) Give an outline of the National Mineral Policy. Comment on conservation and utilization of mineral resources in India. 20
7. (a) What are the common methods of resistivity survey? Discuss working principle and field procedures involved in resistivity survey. Comment briefly on advantages and disadvantages of various configurations. 15
- (b) What are the non-metallic minerals used in two different industries namely, Cement and Fertilizer? Comment upon mode of occurrence and their reserves in India. 20
- (c) What do you understand by mineral beneficiation? How beneficiation of beach placer is useful for radioactive minerals? 15
8. (a) Describe internal structure and composition of the earth. Discuss various rules governing distribution of trace elements in the earth's crust. 20
- (b) What do you understand by Landslides? Discuss briefly various types of landslides. Comment upon causes and remedial measures of landslides. 15
- (c) Describe Reservoir Induced Seismicity (RIS) with a particular reference to Koyna earthquake. 15