

2 0 1 3

(2nd Semester)

GEOLOGY

SECOND PAPER

(**Crystallography and Mineralogy**)

(PART : A—OBJECTIVE)

(Marks : 20)

The figures in the margin indicate full marks for the questions

SECTION—A

(Multiple Choice)

(Marks : 5)

1. Choose the correct answer and put its number within the brackets provided : 1×5=5

(a) Uranium is a

(i) precious metal

(ii) light metal

(iii) nuclear metal

(iv) steel-industry metal []

(b) Which of the following minerals has a conchoidal fracture?

(i) Biotite

(ii) Olivine

(iii) Quartz

(iv) None of the above []

(c) Minerals that crystallize in the tetragonal and hexagonal crystal systems are

(i) biaxial minerals

(ii) uniaxial minerals

(iii) isotropic minerals

(iv) anisotropic minerals []

(d) The maximum number of planes of symmetry is found in

(i) isotropic

(ii) tetragonal

(iii) hexagonal

(iv) triclinic

[]

(e) Fused glass discs are prepared for the analysis of

(i) major elements

(ii) trace elements

(iii) REE

(iv) None of the above

[]

(4)

SECTION—B
(Very Short Answer)
(Marks : 15)

2. Define the following :

3×5=15

(a) Gossan and placer deposits

(5)

(b) Hardness and tenacity

(6)

(c) Isotropic and anisotropic substances

(d) Miller indices

(e) Rare earth elements

2 0 1 3

(2nd Semester)

GEOLOGY

SECOND PAPER

(**Crystallography and Mineralogy**)

Full Marks : 55

Time : 2 hours

(PART : B—DESCRIPTIVE)

(*Marks : 35*)

*The figures in the margin indicate full marks
for the questions*

Answer **five** questions, taking **one**
from each Unit

UNIT—I

1. Write notes on any *two* of the following :

$3\frac{1}{2} \times 2 = 7$

- (a) Oxidation and supergene enrichment
- (b) Hydrothermal deposits
- (c) Sedimentation

(2)

2. Define mineral. Write notes on any *two* of the following : 1+3+3=7
- (a) Habit
 - (b) Cleavage
 - (c) Fracture

UNIT—II

3. Write short notes on the following : 3½×2=7
- (a) Molecular weight
 - (b) Atomic bonding
4. Write the physical properties of any *two* of the following minerals : 3½×2=7
- (a) Orthoclase
 - (b) Hornblende
 - (c) Calcite

UNIT—III

5. Explain different optical properties of minerals observed under plane polarized light.

7

6. Answer the following :

(a) Write the optical properties of the following minerals : 2+2=4

(i) Garnet

(ii) Hypersthene

(b) Explain why a grain of an isotropic substance will remain extinct on the microscope stage when both the analysers are inserted on the polarizing microscope.

3

UNIT—IV

7. Describe the symmetry elements of 'hexagonal system'. Name two minerals crystallizing in the hexagonal system. 6+1=7

8. Answer/Write detailed notes on any *two* of the following : 3½×2=7

(a) Determination of face symbols using Miller indices

(b) Draw a neat and labeled sketch showing parts of crystals.

(c) Types of crystal forms

UNIT—V

9. List the important 'analytical technique methods'. What are their main objectives? Describe the principle of any one technique.

2+2+3=7

10. Write short notes on the following :

1½+1½+2+1+1=7

- (a) Precision of data
- (b) Detection limit
- (c) Detectors
- (d) Bragg's equation
- (e) Secondary beam
