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(November)

GEOLOGY

(Major)

Course : 303

(Crystallography and Mineralogy)

Full Marks : 48

Pass Marks : 19/14

Time : 2 hours

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

UNIT—5.1

(Crystallography)

(Marks : 12)

1. Write short notes on any *two* of the following : 3×2=6
- (a) Crystal structure
 - (b) Hermann-Mauguin indices
 - (c) Law of rational indices
 - (d) Space lattice

(2)

2. Describe the symmetry elements with stereograms and forms developed in normal class of isometric system. 5

Or

Describe the symmetry elements of tetragonal system and describe the forms developed. 5

3. Write as directed :

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

(a) Every crystal system has a definite axial ratio.

(Write Yes or No)

(b) Minerals are always formed in crystallized form.

(Write Yes or No)

UNIT—5.3

(**Thermodynamics and Crystal Chemistry**)

(Marks : 10)

4. What is the difference between extensive and intensive variables? Write briefly about thermal expansion. 2+4=6

Or

What is thermal equilibrium? Define the term 'internal energy'. Write shortly about Gibbs phase rule. 1+1+4=6

5. Write short note on any one of the following : 3

(a) Enthalpy

(b) Entropy

6. Fill in the blanks : $\frac{1}{2} \times 2 = 1$

(a) Albite-orthoclase system is an example of _____ type of phase diagram.

(b) Thermodynamic processes that occurs at constant volume is called _____.

UNIT—5.2 & 5.4

(Descriptive Mineralogy and Optical Mineralogy)

(Marks : 12+14=26)

7. (a) Describe the physical properties of minerals. 2

(b) What do you mean by habit of mineral? Describe some of the habit of minerals.

2+3=5

8. (a) What are isotropic and anisotropic minerals? Give examples. 2

(b) Describe the construction and use of Nicol prism with proper diagram. 2

Or

How can the optic sign of a biaxial mineral be examined using gypsum and mica plates?

2+2=4

(Turn Over)

9. Write short note on any *one* of the following : 3

- (a) Interference figures
- (b) Pleochroic scheme
- (c) Michael Levy method for determination of composition of plagioclase feldspar

10. Describe the atomic structure, physical and optical properties of either pyroxene or plagioclase group of minerals. 9

Or

Write notes on chemical composition, physical and optical properties of any *three* of the following : 3×3=9

- (a) Microcline
- (b) Muscovite
- (c) Potash-feldspar
- (d) Kyanite
- (e) Augite

11. Fill in the blanks : 1×3=3

- (a) The hardness of quartz is _____.
- (b) Crosshatch twinning is seen in _____ feldspars.
- (c) Corona reaction rim is formed by _____ and _____ minerals.
