

2018

(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. Fill in the blanks : 1
'Dome' is characteristic of ____ and ____.
2. Write short notes on any two of the following : 2½×2=5
 - (a) Morphology of crystals
 - (b) Bragg's law for X-ray crystallography

(2)

- (c) Different types of crystal twins
- (d) Point group and space group symmetry
3. What do you mean by symmetry? Describe the symmetry elements with stereograms and forms developed in either dihexagonal-dipyramidal class or orthorhombic-dipyramidal class.

6

UNIT—5.3

(**Thermodynamics and Crystal Chemistry**)

(Marks : 10)

4. Write short notes on (any three) : $3 \times 3 = 9$
- (a) Laws of thermodynamics
- (b) Nesosilicates
- (c) Mineralogical phase rule
- (d) Macroscopic properties of a system
- (e) Chemical potential and activities of thermodynamics
- (f) Polymorphism

5. Answer the following as directed : $\frac{1}{2} \times 2 = 1$

(a) When anions and cations of similar size and in same numbers crystallize in similar type of structure, the phenomenon is known as ____.

(Fill in the blank)

(b) Which parameter does not characterize the thermodynamic state of matter? (Temperature/Pressure/Work/Volume)

(Choose the correct option)

UNIT—5.2 & 5.4

(**Descriptive Mineralogy and Optical Mineralogy**)

(Marks : 13+13=26)

6. Define mineral. Explain the different physical properties of minerals. $1+6=7$

7. What is RI of a mineral? Describe how the RI of a mineral is determined by Becke line method. 6

Or

Discuss about the construction of Nicol prism and show how light is polarized by the prism. 6

8. Write short notes on (any one) : 3
- (a) Interference colour
 - (b) Extinction
 - (c) Pleochroic scheme
9. Describe the atomic structure, physical, chemical and optical properties of either amphibole or quartz group of minerals. 1+2+2+2=7
10. Fill in the blanks : 1×3=3
- (a) 'Luster' is defined as the appearance of a mineral in _____.
 - (b) Quartz shows _____ relief.
 - (c) The Mohs' scale of hardness is an _____ scale.
