

Roll No. : .....

Total No. of Questions : 11 ]

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# GEOLSEM-128

M.Sc. (Ist Semester) Examination, Dec., 2022

## GEOLOGY

Paper - GEOL-103

(Crystallography and Mineralogy)

Time : 3 Hours ]

[ Maximum Marks : 75

The question paper contains three Sections.

### Section-A

(Marks : 2 × 10 = 20)

**Note** :- Answer all *ten* questions (Answer limit 50 words). Each question carries 2 marks.

### Section-B

(Marks : 5 × 5 = 25)

**Note** :- Answer all *five* questions. Each question has internal choice (Answer limit 200 words). Each question carries 5 marks.

### Section-C

(Marks : 10 × 3 = 30)

**Note** :- Answer any *three* questions out of five (Answer limit 500 words). Each question carries 10 marks.

### Section-A

1. (i) What are small circles and great circles ?
- (ii) Describe the laws of Crystallography.
- (iii) What is Bragg's law ?

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- (iv) Explain the elements of Twinning.
- (v) Differentiate between pleochroic colours and polarization colours.
- (vi) What is optic axis ? Give the classification of minerals based on optic axis.
- (vii) Differentiate between Augite and Hornblende on the basis of physical and optical properties.
- (viii) Differentiate optically between Olivine and Garnet.
- (ix) Give the names of Gem varieties of Beryl.
- (x) Give the chemical composition of minerals of feldspathoid group.

**Section-B**

2. Discuss the constructional characteristics and uses of stereographic projection.

*Or*

Discuss the symmetry elements.

3. Describe Bravais space lattice.

*Or*

Explain the Internal Symmetry Elements.

4. What is Silica Tetrahedron ? Explain silicate structures.

*Or*

What is Isomorphism and polymorphism ? Give *two* examples of both.

5. Discuss the chemical constitution, mode of occurrence and origin of minerals of amphibole group.

*Or*

Discuss the structure, chemical composition, mode of occurrence and origin of Garnet group of minerals.

6. Discuss the chemical composition, mode of occurrence, origin and alteration of Zeolite group of minerals.

*Or*

Discuss the physical and optical properties of Gem minerals.

### Section-C

7. Derive thirty-two symmetry classes.
8. Discuss the classification and types of twinning.
9. Discuss the construction and uses of 5 axis universal stage.
10. Discuss the structure, chemical composition, physical and optical properties, mode of occurrence and origin of pyroxene group of minerals.
11. Discuss the structure, chemical composition, physical and optical properties, mode of occurrence and origin of Mica group of minerals.