

G-1/167/22

Roll No.

I Semester Examination, January, 2022

M.Sc.

GEOLOGY

Paper I

(Mineralogy, Mineral Optics and Crystallography)

Time : 3 Hours]

[Max. Marks : 80

Note : *All questions are compulsory. Question Paper comprises of 3 Sections. Section A is objective type/multiple choice questions with no internal choice. Section B is short answer type with internal choice. Section C is long answer type with internal choice.*

SECTION A

1×10=10

(Objective Type/Multiple Choice Questions)

Choose the correct answer :

- 1.** Hardness of Kyanite along its C-axis is :
(a) 5 (b) 6
(c) 7 (d) 8
- 2.** In Phyllosilicate structure, the ratio of Si : O in silicon-oxygen tetrahedron is :
(a) 1 : 3 (b) 4 : 11
(c) 2 : 5 (d) 1 : 2

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- 3.** Chemical composition of Leucite is :
(a) NaAlSiO_4 (b) KAlSi_2O_6
(c) $\text{CaMgSi}_2\text{O}_6$ (d) MgSiO_3
- 4.** High-pressure polymorph of Quartz :
(a) Stishovite (b) Cristobalite
(c) Tridymite (d) Coesite
- 5.** Uniaxial minerals crystallize in which crystal system ?
(a) Cubic (b) Tetragonal
(c) Orthorhombic (d) Monoclinic
- 6.** Olivine is a common mineral in :
(a) Pyroxenite (b) Peridotite
(c) Granite (d) Gabbro
- 7.** Property of minerals examined in a crossed polar condition of microscope :
(a) Relief (b) Refractive index
(c) Interference color (d) Pleochroism
- 8.** Find out the Uniaxial Positive mineral from the following options :
(a) Quartz (b) Muscovite
(c) Biotite (d) Enstatite

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9. Select the Miller indices of Octahedron form :

(a) (111) (b) (100)

(c) (101) (d) (hko)

10. Find out the suitable twin that occurs in Gypsum :

(a) Baveno (b) Carlsbad

(c) Manebach (d) Swallowtail

SECTION B

4×5=20

(Short Answer Type Questions)

Note : Answer the following questions in **250** words.

Unit-I

1. Write brief note on the light-dependent physical properties of mineral.

Or

What is Fluorescence and Phosphorescence ?
Give examples.

Unit-II

2. Write the chemistry and physical properties of Garnet group of minerals.

Or

Write in short about the extinction angle of Augite, Hypersthene and Hornblende with proper figures.

Unit-III

3. Write optical properties of Cordierite and Epidote.

Or

Write physical properties and paragenesis of Apatite.

Unit-IV

4. How do you measure the refractive index of minerals ?

Or

Write short note on interference colour.

Unit-V

5. What is Twinning ? Add a short note on twin elements.

Or

Write short note on Hemihedral and Hemimorphism forms.

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SECTION C

10×5=50

(Long Answer Type Questions)

Note : Answer the following questions in **500** words.

Unit-I

1. Write in detail on Structural classification of silicate minerals with labelled diagrams and suitable examples.

Or

Define Mineral. Write about the physical properties of minerals with suitable examples.

Unit-II

2. Differentiate pyroxene group of minerals from amphibole group of minerals by considering their physical and optical properties.

Or

Briefly discuss the paragenesis of Mica, Olivine and Garnet.

Unit-III

3. Explain the optical properties and paragenesis of Alumino-silicates.

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Or

Briefly discuss the paragenesis of chlorite, talc and staurolite.

Unit-IV

4. Write note on interference figure in uniaxial and biaxial crystals.

Or

Define optical indicatrix. Add a note on uniaxial and biaxial indicatrix with the suitable figure.

Unit-V

5. Write lattice parameter, symmetry elements and forms present in *Beryl class* of hexagonal crystal system.

Or

By using stereographic projection (diagram) describe lattice parameter and symmetry elements present in the *Normal class* of cubic system.

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