3 (Sem–2/CBCS) GLG HG/RC

2023

GEOLOGY

(Honours Generic/Regular)

Paper : GLG–HG–2016/GLG–RC–2016

(Crystallography and Mineralogy)

Full Marks : 60

Time : Three hours

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

1. Choose the correct option : 1×7=7

   (a) Crystal system which satisfies the condition "$a = b = c$" is _____ .

   (i) tetragonal system

   (ii) isometric *or* cubic system

   (iii) hexagonal system

   (iv) monoclinic system

(b) The highest degree of symmetry is shown by the _____ and the lowest degree of symmetry is exhibited by the _____ system.

(i) isometric; triclinic

(ii) orthorhombic; isometric

(iii) monoclinic; triclinic

(iv) isometric; tetragonal

(c) In crystallography, 'Edge' is the line of intersection of two adjacent _____.

(i) faces

(ii) form

(iii) solid angle

(iv) None of the above

(d) Birefringence is a measure of the difference between the maximum and minimum _____ of a particular mineral.

(i) refraction

(ii) extinction

(iii) refractive indices

(iv) optic axis

(e) The hardness of the mineral Quartz is

(i) 5

(ii) 6

(iii) 8

(iv) 7

(f) Sclerometer is an instrument used for determining hardness. *(True/False)*

(g) The colour of the powder of a mineral in small amount is called as

(i) Lusture

(ii) Streak

(iii) Cleavage

(iv) Diaphaneity

2. Write short notes on the following : ***(any four)*** 2×4=8

(a) Interfacial angle

(b) Axis of symmetry

(c) Unit cell

(d) Extinction

(e) Pleochroism

(f) Optic axis

3. Answer the following questions : ***(any three)*** 5×3=15

(a) Double refraction

(b) Elements of symmetry

(c) Isomorphism and polymorphism

(d) Characteristics of different crystal systems

(e) Various lusture exhibited by minerals

4. Answer the following questions : ***(any three)*** 10×3=30

(a) Write about the symmetry elements and forms of normal class in the Tetragonal system. Give some examples of minerals crystallized in this class. 3+4+3=10

(b) What are parameters of crystal system ? Describe how Miller's indices for the faces of a crystal are determined. 2+8=10

(c) Define mineral. Write about physical properties of mineral. 2+8=10

(d) What do you mean by optic axis ? Write briefly on the optic sign of uniaxial and biaxial minerals. 2+4+4=10

(e) Write the chemical composition and diagnostic physical properties of the following minerals : 2×5=10

(i) Olivine

(ii) Kyanite

(iii) Quartz

(iv) Muscovite

(v) Garnet

(f) Write the optical properties of the following minerals : 2×5=10

(i) Calcite

(ii) Microcline

(iii) Quartz

(iv) Biotite

(v) Hornblende

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