

SEMESTER II
MAJOR COURSE – MJ 2
CRYSTALLOGRAPHY & MINERALOGY
MODEL QUESTION PAPER – SET 3

Full Marks: 75 Time: 3 Hours

GROUP A

Q1. Choose the correct answer. ($5 \times 1 = 5$)

1. Which symmetry element is represented by a point about which a crystal may be inverted? (a) Centre of symmetry (b) Plane of symmetry (c) Axis of symmetry (d) Zone axis
2. The plane represented by three Miller indices is called a: (a) Crystal plane (b) Symmetry axis (c) Cleavage plane only (d) Optical plane
3. Which mineral is a framework silicate? (a) Feldspar (b) Olivine (c) Pyroxene (d) Amphibole
4. The refractive index of a mineral is related to the: (a) Velocity of light in the mineral (b) Hardness only (c) Cleavage only (d) Colour only
5. Which mineral generally lacks cleavage? (a) Quartz (b) Pyroxene (c) Amphibole (d) Feldspar

Q2. Explain Miller indices and describe their importance in representing crystal faces and planes. (5 marks)

Q3. What is optical mineralogy? Explain any three important optical properties used for mineral identification. (5 marks)

GROUP B

Answer any FOUR questions. Each question carries 15 marks. ($4 \times 15 = 60$)

Q4. Describe the morphology and internal structure of crystals. Explain crystal parameters, crystallographic indices and the six crystal systems. (15 marks)

Q5. Explain crystal symmetry, point groups and stereographic projections. Discuss how symmetry elements and crystal forms are represented. (15 marks)

Q6. Discuss the definition and classification of minerals. Explain the composition and structure of common rock-forming silicate and non-silicate minerals. (15 marks)

Q7. Explain close packing in crystals with special reference to C.C.P. and H.C.P. structures. Discuss their relation to mineral structures. (15 marks)

Q8. Describe the nature of light and the basic principles of optical mineralogy. Explain important observations made using the petrological microscope. (15 marks)

Q9. Write detailed notes on olivine, pyroxene, amphibole, quartz and feldspar, covering their physical, chemical, optical properties and common identification features. (15 marks)