2025

(CBCS)

(5th Semester)

GEOLOGY

SEVENTH PAPER

(Igneous and Metamorphic Petrology)

Full Marks : 75

Time : 3 hours

The figures in the margin indicate full marks for the questions

(SECTION : A—OBJECTIVE)

(*Marks* : 10)

Tick (✓) the correct answer in the brackets provided : 1×10=10

1. The CIPW classification is essentially a

(a) mineralogical classification ( )

(b) chemical classification ( )

(c) genetic classification ( )

(d) textural classification ( )

2. Volcanic igneous rocks consisting of high numerous vesicles are known as

(a) pegmatite ( )

(b) pumice ( )

(c) rhyolite ( )

(d) dolerite ( )

3. Magma is generated by partial melting of

(a) crust ( )

(b) mantle ( )

(c) outer core ( )

(d) crust and upper mantle ( )

4. A pure solid phase when brought to its melting point, melts completely to produce a liquid of identical composition of the solid is known as

(a) congruent melting ( )

(b) incongruent melting ( )

(c) phase ( )

(d) components ( )

5. The invariant point where the liquidus curves and solidus curves intersect is known as

(a) univariant ( )

(b) bivariant ( )

(c) solid solution ( )

(d) eutectic ( )

6. A type of rock when a segment of oceanic crust and mantle tectonically exposed on land by obduction (overthrust) usually when an ocean basin is closed is

(a) dunite ( )

(b) dolerite ( )

(c) ophiolite ( )

(d) pyroxenite ( )

7. The contact metamorphism in which the composition of the rock has been altered by introduced gaseous magmatic material is known as

(a) metasomatism ( )

(b) pneumatolysis ( )

(c) anatexis ( )

(d) polymorphism ( )

8. Hornfels belongs to which type of metamorphic facies?

(a) Contact metamorphic facies ( )

(b) Green schist facies ( )

(c) Amphibolite facies ( )

(d) Granulite facies ( )

9. Migmatites are the rocks which are characterized by

(a) basaltic nature ( )

(b) granitic nature ( )

(c) low-grade regional metamorphism ( )

(d) contact metamorphism ( )

10. Eskola's ACF and AKF diagrams are used only for the rocks with

(a) low $CaCO_3$ ( )

(b) excess $CaCO_3$ ( )

(c) low SiO_2 ( )

(d) excess SiO_2 ( )

(SECTION : B—SHORT ANSWERS)

(*Marks* : 15)

Write on the following : 3×5=15

UNIT—I

1. Composition of granite

OR

2. Occurrence of pumice

UNIT—II

3. Rock series

OR

4. Assimilation of sedimentary rock by basic magma

UNIT—III

5. Reaction rim in forsterite-silica system

OR

6. Petrogenesis of ultrabasic rocks

UNIT—IV

7. Metamorphic zone

OR

8. Metasomatism

UNIT—V

9. Petrography of granulite

OR

10. Goldschmidt's mineralogical phase rule

(SECTION : C—DESCRIPTIVE)

(*Marks* : 50)

Answer the following questions : 10×5=50

UNIT—I

1. Write a note on IUGS classification of igneous rocks with a neat diagram. 10

OR

2. Write on the compositions, textures and occurrences of the following : 5+5=10

(a) Gabbro

(b) Pegmatite

UNIT—II

3. What is magmatic differentiation? Write a note on different processes of magmatic differentiation. 2+8=10

OR

4. Write notes on the following : 5+5=10

(a) Genesis of magma

(b) Petrological significance of mixed crystals

UNIT—III

5. Describe the phase relationship of any *one* of the following binary systems : 10

(a) Albite-anorthite

(b) Forsterite-silica

OR

6. Write notes on the petrography and petrogenesis of the following : 5+5=10

(a) Carbonatite

(b) Syenite-trachyte family

UNIT—IV

7. Define metamorphism. Write a note on PT conditions and mineral assemblages of contact metamorphic facies. 2+8=10

OR

8. Write on any *two* of the following : 5+5=10

(a) Prograde and retrograde metamorphism

(b) Regional metamorphism of basic igneous rocks

(c) Composition, texture and structure of schist

UNIT—V

9. Illustrate the mineral assemblages of ACF. 10

OR

10. Write notes on the following : 5+5=10

(a) Petrography of migmatites

(b) Petrogenesis of eclogites

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