PG Even Semester Exam, 2023

Earth Science

2nd Semester

COURSE NO. ESCC- 551

[Metamorphic Petrology and Geochemistry]

Full Marks : 70
Pass Marks : 28

Time : 3 hours

The figures in the margin indicate full marks for the questions

Answer five questions, taking one from each Unit

UNIT-I

1. a. Define Dynamo thermal metamorphism. Illustrate metamorphic reaction texture with suitable examples. 2+6=8

   b. Discuss the concept of Univariant, divariant and Invariant points citing examples of aluminosilicate minerals. 6

2. a. Discuss in detail the ACF and AKF diagrams for metamorphic mineral assemblages with suitable diagrams. 6

Turn over

b. Write an explanatory note on interrelationship between metamorphism and plate tectonics with diagrams. 8

UNIT-II

3. a. Write descriptive note on the high-pressure metamorphic facies. 8

   b. Write short notes on the following: 3+3=6

      i. Clapyron equation

      ii. Metamorphic Facies series

4. a. Correlate metamorphic facies with Barrovian zones concept citing appropriate examples of mineral assemblages. 8

   b. Write short notes on the following: 3+3=6

      i. Sanbagawa Facies Series

      ii. Mineral assemblages of Greenschist, Amphibolite and Granulite facies.

UNIT-III

5. a. Define partition coefficient of elements. What are LILE's and HFSEs. 3+3=6

   b. Outline the Geochemical classification of elements and distribution of elements within earth. 8

6. Write short notes on the following: 5+4+5=14

   i. Principles of Ionic substitution in minerals.

   ii. Geochemical behavior of major elements.

   iii. Capture, Camouflage and Admittance of elements.

UNIT-IV

7. a. Describe the REE characteristics of Olivine Clinopyroxene, plagioclase and Garnet with appropriate diagram. 8

   b. Write an account on the geochemical variability of magma. 6

8. a. What is meteorite? Write a detailed account on classification of meteorite and composition of different types of meteorite. 2+4+4=10

   b. Discuss the significance of meteorite in geological studies. 4

UNIT-V

9. a. Illustrate the whole-rock Rb-Sr age dating system. 7

   b. Write an explanatory note on applications of carbon isotopes in understanding palaeoclimates. 7

10. Write short notes on the following: 5+5+4=14

   a. Mechanisms of stable isotope fractionation.

   b. Mechanisms of radioactive disintegration

   c. Isotopic characteristics of clouds and rains of equatorial and polar regions.

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