b) Kinetic fractionation mechanism of stable isotopes.

c) Standards used in isotopic studies of O, H, C and S.

UNIT-V

9. Illustrate the Whole-rock Rb-Sr age dating systematic. Write on the limitations of the Rb-Sr dating technique. 10+4=14

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

a) Mechanisms of radioactive disintegration

b) Radiogenic and Non-radiogenic daughter isotopes.

c) Wetherill Concordia diagram.

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PG (CBCS) ODD SEMESTER EXAMINATION, 2022 held in MARCH, 2023

EARTH SCIENCE

3rd Semester

COURSE NO. ESCCC - 304

(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 any five questions, taking one from each unit

UNIT-I

1. a) What is burial metamorphism? Add a note on grade of metamorphism. 1+3=4

b) Define Gibb's free energy of a system. Discuss in detail the role of partial pressure of fluids in metamorphic dehydration reaction with a suitable example. 1+5=6

c) Write a note on ACF chemographic diagram for mafic rocks. 4

2. a) Discuss in detail the mineralogical changes of mafic rocks with increase in metamorphic P-T conditions. 6

   b) Write notes on the following: 4x2=8

      i) Sold-Solid net transfer and Ion exchange reaction.

      ii) Kelyphitic and pseudomorph textures of metaporphic-rock.

UNIT-II

3. a) Define metamorphic facies. Write a descriptive note on Ultra-high pressure metaporphism of rock. 1+6=7

   b) Give detailed insights on Barrovian metamorphism of pelitic rocks. 7

4. a) Describe in detail the metamorphic facies series with suitable diagram: 6

   b) Write notes on the following: 2x4=8

      i) Low pressure metamorphic facies

      ii) Mineral reaction isogards

      iii) Geothermal gradient in subduction zone.

      iv) Stable mineral assesmblages in biotite and garnet zones.

UNIT-III

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

   a) Camouflage, capture and admittance of elements.

   b) Rare earth element characteristics of Garnet and Plagioclase

   c) Nerst's distribution co-efficient.

6. What is meteorite? Write a detailed account on composition of meteorite, their classification and significance in geological studies. 2+4+4+4=14

UNIT-IV

7. a) What are stable isotopes? Write a detailed account on application of Oxygen isotope in paleoclimatic studies. 2+6=8

   b) Write an explanatory note on mechanisms of stable isotope fractionation. 6

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

   a) Isotopic characteristics of clouds and rains of equatorial and polar region.