

This question paper contains 4 printed pages]

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S. No. of Question Paper : 8583

Unique Paper Code : 219305

C

Name of the Paper : GEHT303 : Metamorphic Petrology

Name of the Course : B.Sc. (Hons.) Geology Part II

Semester : III

Duration : 3 Hours

Maximum Marks : 75

(Write your Roll No. on the top immediately on receipt of this question paper.)

Answer five questions in all.

All questions carry equal marks.

Question no. 8 is compulsory.

1. Compare the concepts of *facies* and *facies series*. What are the *three* common types of facies series, and what sequence of facies occurs along each series ? (15 marks)
2. Describe types of metamorphism with respect to their position in the plate tectonic settings with a neat diagram. Also describe the type of metamorphic rocks in this setting and characteristic textures of each type briefly. (15 marks)
3. Explain briefly the following :
 - (a) What is the difference between porphyroblast, poikiloblast and porphyroclast. (3 marks)
 - (b) Crystalloblastic series. (2 marks)

P.T.O.

- (c) Component and phases in phase rule. (2 marks)
- (d) Isograd and Index mineral. (2 marks)
- (e) Prograde and retrograde metamorphism. (2 marks)
- (f) Intensive and extensive variables. (2 marks)
- (g) Open and closed system. (2 marks)
4. Describe the following in detail with example and diagrams.
- (a) Metamorphic reactions. ($7\frac{1}{2}$ marks)
- (b) Discuss the role of fluids in Metamorphism. ($7\frac{1}{2}$ marks)
5. What do you understand by Chemographic projection ? What does A, C and F represent in ACF diagrams and A, K and F represent in the AKF diagram ? Which bulk composition metamorphic rock is generally represented in these diagrams ? What is the meaning of the term "rotation of the tie lines"? Illustrate your answer with example. (15 marks)
6. Describe the characteristic textures with at least *two* examples of each :
- Pre-kinematic, Post-kinematic and Synkinematic metamorphic texture. (6 marks)
- Shear sense indicators. (5 marks).
- Replacement textures. (4 marks)

7. Define the following :

- (i) Protolith (2 marks)
- (ii) Anatexis (2 marks)
- (iii) Charnockite (2 marks)
- (iv) Khondalite (2 marks)
- (v) Mylonite (2 marks)
- (vi) Migmatite (2 marks)
- (vii) Corona and Moat texture (3 marks)

8. Fill in the blanks : ((1×8) + 7 = 15 marks)

- (i) The lower limit of metamorphism is _____ with a P-T range of _____.
- (ii) The average geothermal and geoburial gradient is _____ and _____.
- (iii) At univariant point the degree of freedom is _____ and at invariant point it is _____.
- (iv) Dehydration reaction and recrystallization of minerals into new sizes and shapes is an effect of change in _____.
- (v) Normal stress is parallel to the surface and shear stress is perpendicular to the surface.
(True or False)
- (vi) Name *two* foliated and *two* unfoliated metamorphic rocks.

P.T.O.

(vii) Arrange the following in the increasing grade of metamorphism :

Phyllite, chlorite-schist, sillimanite gneiss, slate, migmatite, garnet-staurolite schist

(viii) In a Pressure and Temperature plot (temperature along X-axis) the geothermometer reactions generally have a steep slope and a geobarometer reaction generally occur as low slope. (True or False)

(ix) Write down the characteristic mineral/s of each facies/metamorphic group :

Greenschist

Blueschist

Eclogite

Hornfels

Granulite

Amphibolite

Zeolite