

2022

( February )

GEOLOGY

( Honours )

( Igneous and Sedimentary &  
Metamorphic Petrology )

[ GELH-501 ]

Marks : 56

Time : 3 hours

The figures in the margin indicate full marks  
for the questions

Answer **four** questions, selecting **one** from each Unit

GROUP—A

## ( Igneous Petrology )

UNIT—I

## ( Introduction )

1. (a) What do you understand by primitive magma and primary magma? How do magmas move? 2+2=4

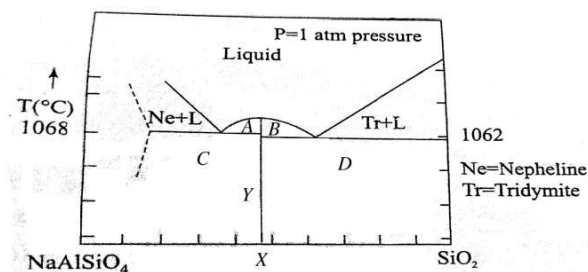
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( Turn Over )

- (b) "Magmas originate from the upper mantle and lower crust." Justify your answer. 6

- (c) Write on the distribution of igneous rocks in the continental and oceanic crust. 4

2. (a) Study the isobaric binary phase diagram of  $\text{NaAlSi}_3\text{O}_8$ - $\text{SiO}_2$  given below and answer the following questions :



- (i) Find out the mineral assemblages in A, B, C, D, the line Y and composition X. 3
- (ii) Using this diagram, explain why nepheline and quartz do not coexist in nepheline syenite. 1
- (b) Describe the crystallization of diopside-anorthite system with reference to phase rule. Give any two petrogenetic significances of the system. 8+2=10

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UNIT—II

( Mineralogy and Petrogenesis )

3. (a) What is nucleation? Mention the factors that control nucleation. 1+2=3
- (b) Explain the relationship between nucleation and crystal growth with suitable diagram. 7
- (c) Give the mineralogical and textural feature of any one of the following rocks : 4
- (i) Lamprophyre
- (ii) Kimberlite
4. Describe the petrogenesis of granite. Add a note on its distribution in India. 12+2=14

GROUP—B

( Sedimentary and Metamorphic Petrology )

UNIT—III

( Sedimentary Petrology )

5. (a) What is sedimentary facies? Describe how one facies may be distinguished from another facies. 2+5=7
- (b) Give an account on continental environment of deposition. 7

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6. Write short notes on any four of the following :  $3\frac{1}{2} \times 4 = 14$

- (a) Sediment transportation by running water
- (b) Heavy minerals as indicator of provenance
- (c) Sorting
- (d) Kurtosis
- (e) Evaporite and its formation under marine conditions

UNIT—IV

( Metamorphic Petrology )

7. (a) Define metasomatism. Describe different types of metasomatic processes. 2+6=8
- (b) Explain the following terms : 2×3=6
- (i) Tourmalinization
- (ii) Greisening
- (iii) Kaolinisation

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8. Write short notes on any *four* of the following :  $3\frac{1}{2} \times 4 = 14$

- (a) Mylonite
- (b) Classification and *P-T* fields of different metamorphic facies
- (c) Phase rule and its application in metamorphic studies
- (d) Metamorphic zone
- (e) Contact metamorphism of impure limestone

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