8. Write short notes on : (3×6)

(a) Fractional crystallization

(b) Magma mixing

(c) Crustal assimilation of magma

[This question paper contains 8 printed pages.]

Your Roll No.....

Sr. No. of Question Paper : 4118 **H**

Unique Paper Code : 2192011202

Name of the Paper : Igneous Petrology

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

Semester : II

Duration : 3 Hours Maximum Marks : 90

Instructions for Candidates

1. Write your Roll No. on the top immediately on receipt of this question paper.
2. Attempt question no. **1** and any **four** from the rest.

1. A. Choose the correct answer from the options provided : (1×6=6)

(a) Which one of the following is a silica undersaturated rock?

(i) Tonalite

(ii) Quartz monzonite

(iii) Nepheline syenite

(iv) Hypersthene granite

(b) Which one of the following is an extensive parameter?

(i) Pressure

(ii) Molar volume

(iii) Temperature

(iv) Heat capacity

(c) Which mineral is **NOT** in the Continuous Series of Bowen's Reaction Series?

(i) Anorthite

(ii) Albite

(iii) Bytownite

(iv) Olivine

(c) Discuss the factors controlling the polymerization of magma. (2+4+12)

6. Distinguish between **(any three)** : (3×6)

(a) Island arc and continental arc basalt.

(b) Acidic magma and basic magma

(c) Ophitic and cumulate texture

(d) Major elements and trace elements

7. (a) Write the different sources of heat in the Earth.

(b) How does the heat is transferred from Earth's interior to its surface?

(c) Define the pressure gradient in the Earth's interior.

(d) Calculate the pressure at the base of 35 km of continental crust assuming the density of continental crust is $\rho = 2.8$ g/cm^3. (4+6+2+6)

P.T.O.

(b) Discuss in detail the crystallization trend of a melt in this system. Support your answer with suitable sketches.

(c) What is lever rule? How it is used to extract information on the crystal-melt system for the above phase diagram?

(d) Add a note on perthite and antiperthite giving reference to the phase diagram. (2+6+5+5)

4. (a) Draw the IUGS classification of plutonic rocks and label them.

(b) Discuss the difference and similarity between :

(i) Granite and diorite

(ii) Gabbro and basalt. (12+3×2)

5. (a) What do you understand by the term magma?

(b) What is polymerization of magma?

(d) Spinifex texture is commonly seen in

(i) Kimberlite

(ii) Komatiite

(iii) Gabbro

(iv) Granite

(e) Tholeiitic basalt is most commonly found in :

(i) Hotspots

(ii) Continental Rift zone

(iii) Mid oceanic ridge

(iv) Shear zones

(f) The average continental geothermal gradient in the Earth's crust is :

(i) 20°C / km

(ii) 25°C / km

P.T.O.

(iii) 35°C / km

(iv) 40°C / km

B. Answer the following : (2×6=12)

(a) Temperature range for basaltic melt is _____ and that of rhyolite melt is _____ .

(b) Give two examples each of concordant and discordant igneous bodies.

(c) Match the followings :

(i) Peridotite	(1) K-feldspar + Quartz + Plagioclase
(ii) Granite	(2) Plagioclase
(iii) Gabbronorite	(3) Olivine + Orthopyroxene + Clinopyroxene
(iv) Anorthosite	(4) Plagioclase + Orthopyroxene + Clinopyroxene

(d) During the differentiation of a basaltic magma through fractional crystallization of olivine, pyroxene and plagioclase, the _____ content increases and the _____ content decreases with progressive enrichment of SiO_2 in the melt.

(e) What is solidus and liquidus?

(f) During crystallization of a melt, plagioclase becomes richer in _____ . Why?

2. Describe and explain the origin of each of the following textures : (3×6)

(a) Phaneritic and Aphanitic texture

(b) Phenocrysts and matrix

(c) Intersertal and intergranular texture

3. (a) What do you understand by phase diagram with partial solid solution?