

Total number of printed pages-4

3 (Sem-3/CBCS) GLG HC 1

2022

GEOLOGY

(Honours)

Paper : GLG-HC-3016

(Igneous Petrology)

Full Marks : 60

Time : Three hours

The figures in the margin indicate full marks for the questions.

1. Answer the following questions : $1 \times 7 = 7$

(a) Write true **or** false :

The composition of the Atlantic, Pacific and Indian Ocean ridges is remarkably consistent.

(b) Choose the correct option :

The forms of the igneous bodies, depend upon

(i) mode of formation

Contd.

(ii) viscosity of magma

(iii) nature of the country rocks

(iv) All of the above

(c) Choose the correct option :

The alkaline rocks are less abundant than tholeiites because of

(i) smaller degree of partial melting

(ii) difference in density and viscosity of magmas

(iii) non-ideal behaviour in the liquids

(iv) All of the above

(d) Fill in the blank :

Lherzolite and harzburgite are two varieties of _____ rock.

(e) What is the name of pure natural glass of basaltic composition ?

(f) What does eutectic point indicate in a phase diagram ?

(g) In the IUGS classification, the field of diorite falls which end of the triangle ?

2. Give short answers to the following :

2×4=8

(a) Why is earth's crust mainly composed of Si-Al bearing minerals ?

(b) How are metastable and unstable phases different from each other ?

(c) Who first introduced the variation diagrams for the interpretation of geochemical data ? What are its types ?

(d) Why has magmagenic pegmatite coarse grain size ?

3. Write short notes on **any three** of the following : 5×3=15

(a) Heat flow zone of the earth

(b) Petrographic and petrogenetic difference between basalt and gabbro

(c) Tabular and non-tabular intrusive bodies

(d) Petrography and genetic significance of kimberlite

(e) Geothermal gradient

4. Answer the following questions : **(any three)**

$$10 \times 3 = 30$$

(a) What are different types of magma series ? How are these originated ?

$$4 + 6 = 10$$

(b) Write short notes on the following :

$$5 + 5 = 10$$

(i) IUGS classification for volcanic rocks

(ii) Role of secondary igneous textures in the petrogenesis of rocks

(c) Briefly describe *three* components forsterite-anorthite-silica phase equilibria system with suitable diagram.

(d) Explain the generation of felsic magma in the crust.

(e) Describe the mechanism of magma generation in destructive plate margins.

(f) Explain how magma generation and its products are compositionally different in island arcs and continental arcs.

(g) Discuss the composition, origin and nature of basaltic magma.

(h) What is ophitic texture ? Describe the ophitic texture in the light of *two* component phase equilibria system.