3 (Sem–3/CBCS) GLG HC 1

2021

(Held in 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 as directed : 1×7=7

   (a) Obsidian is a pure natural glass of granitic composition.

   (State True or False)

   (b) Where might the geothermal gradient be lower than average ?

   (i) Near zones of crustal thickening or crustal extension

(ii) In a subducting plate

(iii) Near an igneous intrusion

(iv) Above a hot spot

(Choose the correct option)

(c) In a chemical classification of igneous rocks, a rock with 45 wt % silica would be

(i) felsic

(ii) intermediate

(iii) mafic

(iv) ultramafic

(Choose the correct option)

(d) QAPF stands for _____.

(Fill in the blank)

(e) Name the texture where exsolved lamellae of aibite within K-feldspar are present.

(f) Write the name of two most dominant elements in the earth mantle.

(g) What does solidus curve represent in a phase diagram ?

2. Give short answers to the following : 2×4=8

(a) Why are kimberlite rocks not found in oceanic crust ?

(b) Give *two* examples of secondary texture in igneous rock.

(c) Write the name of two intensive variables which play important role in phase equilibria.

(d) State the difference between kimberlites and lamproites.

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

(a) Genesis of granitoids

(b) Magma generation in the crust

(c) Types of magma

(d) Petrography and genetic significance of komatiite

(e) Geothermal gradient

4. Describe various primary textures of igneous rocks. Briefly explain the importance of these textures in the petrogenesis of igneous rocks. 5+5=10

Or

Write short notes on the following : 5+5=10

(a) IUGS classification

(b) Different modes of occurrence of intrusive bodies

5. Briefly describe two components $Mg_2SiO_4 - SiO_2$ phase equilibria system with suitable diagram. 10

Or

Explain the generation of basaltic magma in mantle. 10

6. Describe the mechanism of magma generation in Mid-ocean Ridges (MOR). 10

Or

How are MORB and OIB compositionally different ? Explain magma generation process of OIB. 2+8=10
