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**M.Sc.(Second Semester)
EXAMINATION, May-June, 2022**

GEOLOGY**Paper First****(Igneous Petrology)***Time : Three Hours]**[Maximum Marks: 80***Note: Attempt all sections as directed.****Section - A****(Objective/Multiple Choice Questions)****(1 mark each)****Note: Attempt all questions.**

1. Which of the following represent a correct magmatic fractionation sequence?
- (A) Basalt-andesite-dacite-phonolite
 - (B) Basalt-andesite-trachyte-rhyolite
 - (C) Basalt-mugearite-trachyte-phonolite
 - (D) None of the above

2. Positive Eu anomaly in the REE chondrite normalized diagram can be seen inrocks
- (A) Komatiite
 - (B) Granite
 - (C) Anorthosite
 - (D) Andesite
3. Which among the following mineral cannot be made in CIPW NORM?
- (A) Albite
 - (B) Nepheline
 - (C) Biotite
 - (D) Olivine
4. Lherzolite is formed by..... percentage of partial melting of mantle
- (A) Very low
 - (B) Intermediate
 - (C) Very high
 - (D) None of the above
5. The slope pattern of the chondrite normalized REE diagram of kimberlite rock exhibit
- (A) Steep LREE and steep HREE
 - (B) Gentle LREE and steep HREE
 - (C) Steep LREE and gentle HREE
 - (D) Gentle LREE and gentle HREE

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6. Decrease of Al_2O_3 and CaO with SiO_2 enrichment in a binary graph indicate
- (A) Olivine fractionation
 - (B) Plagioclase fractionation
 - (C) Plagioclase and clinopyroxene fractionation
 - (D) Plagioclase and orthopyroxene fractionation
7. As per IUGS classification, a plutonic rock with 25% quartz, 15% alkali feldspar and 60% plagioclase, then the rock can be named as
- (A) Granodiorite
 - (B) Granite
 - (C) Syenite
 - (D) Quartz monzonite
8. In a rock, if the molar proportion of $\text{Al}_2\text{O}_3 > (\text{CaO} + \text{Na}_2\text{O} + \text{K}_2\text{O})$, then the rock will be
- (A) Peraluminous
 - (B) Metaaluminous
 - (C) Peralkaline
 - (D) None of the above
9. Which among the following statement is NOT TRUE for lamprophyres?
- (A) It is an high potassic rock
 - (B) The common texture noticeable is panidiomorphic
 - (C) Either biotite or amphibole should be present as a mineral constituent in this rock
 - (D) Plagioclase will be noticeable as a phenocryst in this rock

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10. Graphic texture is noticeable in
- (A) Granite
 - (B) Gabbro
 - (C) Dolerite
 - (D) Rhyolite
11. Rock contributing the highest amount of radioactive heat in crust is
- (A) Basalt
 - (B) Gabbro
 - (C) Dunite
 - (D) Granite
12. Volcanic equivalent of syenite is
- (A) Trachyte
 - (B) Diorite
 - (C) Dacite
 - (D) Basalt
13. A plutonic rock comprising of 70% modal nepheline, 20% modal clinopyroxene and remaining 10% other accessory minerals can be named as
- (A) Dunite
 - (B) Ijolite
 - (C) Boninite
 - (D) Larvikite

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14. Tholeiitic basalts are
- (A) Olivine
 - (B) Quartz
 - (C) Nepheline
 - (D) None of the above
15. Which among the following is an intergrowth texture
- (A) Porphyritic
 - (B) Myrmekite
 - (C) Perthite
 - (D) Spherulitic
16. If a granite contains 46-70 wt% SiO₂, low Na₂O/K₂O and high Ca and Sr contents, it will be --- type granite
- (A) A
 - (B) M
 - (C) I
 - (D) S
17. Which among the following Indian place do not have carbonatite occurrences?
- (A) Amba Dongar(Gujarat)
 - (B) Sevattur(Tamil Nadu)
 - (C) Purulia(West Bengal)
 - (D) Gwalior (Madhya Pradesh)

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18. _____ is a gabbroic rock containing orthopyroxene as one of the major mineral constituent
- (A) Oceanite
 - (B) Norite
 - (C) Picrite
 - (D) Dunite
19. Which among the following rocks have the highest modal olivine content?
- (A) Gabbro
 - (B) Dolerite
 - (C) Peridotite
 - (D) Dunite
20. The typical texture found in komatiite is
- (A) Spherulitic
 - (B) Panidiomorphic
 - (C) Spinifex
 - (D) Variolitic

Section - B

(Very Short Answer Type Questions)

(2 marks each)

Note: -Attempt all questions:

1. What is Primary magma?
2. Write a note on upper mantle mineralogy
3. Write the textures noticeable in basalt

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4. What is ophitic texture?
5. What is the effect of water in the partial melting of mantle?
6. What is peritectic point?
7. Write the minerals present in Carbonatite rock
8. Give two Indian locations of komatiite occurrences

Section - C

(Short Answer Type Questions)

(3 marks each)

Note: Attempt all questions:

1. Write a note on the factors affecting magma and magmatic evolution.
2. What is variation diagram and discuss its importance various petrogenetic aspects?
3. Write a note on fractional crystallization.
4. Write the petrogenetic significance of the Diopside-Albite-Anorthite system.
5. Write a note on the classification of basalt.
6. Write a note on the petrogenesis of carbonatite.
7. Write a note on the classification of lamprophres.
8. Write a note on the I and S type granites.

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Section - D

(Long Answer Type Questions)

(5 marks each)

Note:- Attempt any four questions only:

1. What is differentiation of magma? Which are the processes involved in differentiation? Write a note on the behaviour of major and trace elements during fractional crystallization.
2. Describe Diopside-Fosterite-Silica system and add a note on its petrogenetic significance
3. Discuss the mineralogy, classification, geochemistry and petrogenesis of kimberlite
4. Write a detailed note on petrology and geochemistry of MORB.
5. Write a note on the geochemistry of magma in subduction zones.