

This question paper contains 4 printed pages]

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S. No. of Question Paper : **2055**

Unique Paper Code : **2192011202**

Name of the Paper : **(DSC) Igneous Petrology**

Name of the Course : **B.Sc. Geology**

Semester : **II (NEP)**

Duration : **3 Hours**

Maximum Marks : **90**

(Write your Roll No. on the top immediately on receipt of this question paper.)

Attempt any six questions.

Question No. 1 is compulsory.

All questions carry equal marks.

1. Answer the following :

9×2=18

- (a) An intrusive igneous rock composed of crystals that are large enough to see with the naked eye is said to exhibit a texture.
- (b) Crust plus the more rigid portion of the uppermost mantle together is called
- (c) Based on the total alkali *vs.* silica classification, what are the two distinct group of magma ?
- (d) Fluid flux induced melting primarily occurs along which type of plate boundary ?

P.T.O.

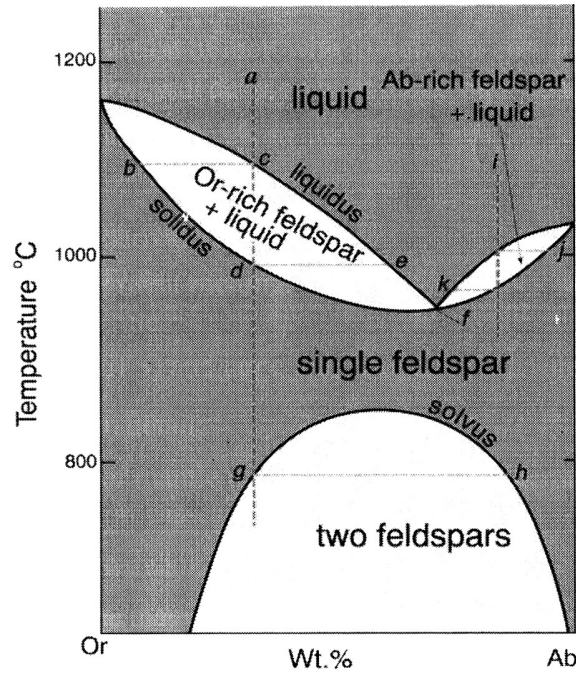
- (e) The texture in which phenocrysts are present in glassy groundmass is called
- (f) In the divariant fields, the degree of freedom is
- (g) Ophitic texture is commonly observed in :
 - (i) Trachyte.
 - (ii) Lamprophyres.
 - (iii) Rhyolite.
 - (iv) Dolerite.
- (h) Elements whose partition coefficient is less than one is called elements.
- (i) Name the coarse-grained (plutonic) rock consisting primarily of sodic plagioclase and hornblende :
 - (i) Syenite
 - (ii) Diorite
 - (iii) Gabbro
 - (iv) Granite

2. Answer the following :

6+6+6

- (a) Phase and component in the igneous phase diagram.
- (b) Equilibrium melting and Fractional melting.
- (c) Rapakivi and Spinifex textures.

3. Given below is the isobaric T-X phase diagram for solid solution with eutectic :
Or-Ab phase diagram. Answer the following questions : 8+4+6



- Describe the crystallization of melt with initial bulk compositions of ***a*** and ***i***.
- Describe the texture that will develop with initial bulk compositions of ***a*** and ***i***.
- What is the effect of pressure on the T-X phase diagram for the alkali feldspars phase diagram ?

4. Answer the following : 6+6+6
- (a) Congruent and incongruent melting.
 - (b) Lever rule and Phase rule.
 - (c) High field strength (HFS) and large ion lithophile (LIL) elements.
5. Describe the following in detail : 9+9
- (a) Factors responsible for mantle melting and magma generation.
 - (b) Describe the various processes of magma differentiation.
6. Describe the following in detail : 6+6+6
- (a) Tholeiitic and alkaline magma.
 - (b) Differences between island and continental arc magmatic suites.
 - (c) Volcanism associated with hotspots.
7. Answer the following : 12+6
- (a) Briefly describe the different physical properties of magma.
 - (b) Define major, minor and trace elements.
8. Answer the following : 6+6+6
- (a) Primary magma and derivative magma
 - (b) I-type and S-type granite.
 - (c) Classification of granite based on the aluminum saturation index (ASI).