

1. Fill in the blanks with correct answer from the given options:

(10)

- 1) Variation in grainsize of igneous rock is controlled by _____ .
a) pressure b) temperature c) pressure & temperature d) None of these
 - 2) The temperature region in which the generation of crystals is slow is called as _____ region.
a) metastable b) metalabile c) labile d) None of these
 - 3) Holocrystalline structure is characteristically represented by _____ rocks .
a) volcanic b) plutonic c) hypabyssal d) None of these
 - 4) The continuous and discontinuous reaction series of Bowen's reaction relation merge together to form _____ .
a) K-feldspar b) biotite c) quartz d) None of these
 - 5) Ophitic texture is a special type of _____ texture .
a) poikilitic b) porphyritic c) graphic d) granophyric
 - 6) Dolerite is _____ igneous rock.
a) plutonic b) hypabyssal c) volcanic d) None of these
 - 7) Zoning in Plagioclase is found due to -----crystallisation.
(a) Equilibrium, (b) Segregation, (c) Fractional d) None of these
 - 8) The continuous and discontinuous reaction series of Bowen's reaction relation merge to form _____ .
a) K-feldspar b) olivine c) biotite d) None of these
 - 9) Pitchstone is a _____ rock.
a) plutonic b) volcanic c) hypabyssal d) None of these
 - 10) Which volcanic rock contains relatively high percentage of silica -----.
a) Basalt, b) Rhyolite, c) Andesite d) None of these
- 1) b- temperature
 - 2) a- metastable
 - 3) b- plutonic
 - 4) a- K-feldspar
 - 5) a- poikilitic
 - 6) b- hypabyssal
 - 7) c- fractional
 - 8) a- K-feldspar
 - 9) b- volcanic
 - 10) b) Rhyolite
- 1) Reaction between a rising magma and crystal with which it comes into contact is -----.
a) Syntexis, b) Xenolith, c) Differentiation d) None of these
 - 2) Which one is not a discordant igneous body -----.
a) Dyke, b) Sill, c) Batholith d) None of these
 - 3) Arrange the following minerals according to discontinuous reaction series of Bowen:
a) Amphibole-Olivine-Pyroxene-Biotite,
b) Olivine-Pyroxene-Amphibole-Biotite,
c) Olivine-Amphibole-Biotite-Pyroxene

- d) None of these
- 4) In a binary system, without solid solutions, the solidus is -----.
- a) Straight line, b) Flat plane, c) Curved line d) None of these
- 5) Gabbro is -----.
- a) Leucocratic, b) Mesocratic, c) Melanocratic d) None of these
- 6) Geologists use the word “phaneritic” to describe igneous rocks that are -----.
- a) Full of glass bubbles, b) Glassy, c) Coarse grained d) None of these
- 7) Wall rock surrounding a magmatic intrusion becomes hot by -----.
- a) Conduction, b) Convection, c) Radiation d) None of these
- 8) The crystallization of magma is governed by the factors -----.
- a) Temperature and pressure ,
b) Composition and viscosity of magma,
c) Composition only,
d) All of the above.
- 9) The volcanic equivalent of granite is _____ .
- a) trachyte b) limburgite c) rhyolite d) None of these
- 10) According to Bowen’s reaction relation _____ is the first mineral to crystallise.
- a) olivine b) augite c) hornblende d) None of these

- 1) a) Syntaxis
2) b) Sill
3) b) Olivine-Pyroxene-Amphibole-Biotite
4) a) Straight line
5) b) Mesocratic
6) c) Coarse grained.
7) a) Conduction
8) c) All of the above.
9) c- rhyolite
10) a- olivine

- 1) The eutectic intergrowth of orthoclase and quartz produces _____ .
- a) granite b) graphic granite c) microgranite d) None of these
- 2) Porphyritic texture is a type of _____ texture.
- a) equigranular b) inequigranular c) directive d) None of these
- 3) The plutonic equivalent of rhyolite is _____ .
- a) granite b) gabbro c) trachyte d) None of these
- 4) Presence of glass in an igneous rock indicates _____ cooling.
- a) rapid b) slow c) very slow d) None of these
- 5) Ophitic texture is associated with _____ .
- a) quartz and plagioclase b) quartz and augite c) augite and plagioclase d) None of these
- 6) The rocks comprising only dark minerals are termed as-----.
- (a) Leucocratic, (b) Mesocratic, (c) Melanocratic d) None of these
- 7) Igneous rocks comprising silica content greater than 66% are termed as -----.
- (a) Ultrabasic rocks, (b) Intermediate rocks, (c) Acidic rocks d) None of these

- 8) Basaltic lavas can flow to greater distances because of -----.
- a) High viscosity, b) Low viscosity, c) High temperature d) None of these
- 9) Presence of water in the melt causes -----.
- a) Lowering of the solidus and liquidus temperatures,
 b) Rising of the solidus and liquidus temperatures,
 c) No change in the solidus and liquidus temperatures
 d) None of these
- 10) Obsidian is classed as -----.
- a) Holocrystalline, b) Holohyaline, c) Hemicrystalline d) None of these
- 1) b- graphic granite
 2) b- inequigranular
 3) a- granite
 4) a- rapid
 5) c- augite and plagioclase
 6) c-melanocratic
 7) c- acidic
 8) b) Low viscosity
 9) a) Lowering of the solidus and liquidus temperatures
 10) b) Holohyaline

2. Attempt any TWO of the three sub-questions :

(20)

- A) Describe classification of Igneous rocks in detail.
 B) Describe Diopside-Anorthite system with a neatly labelled diagram.
 C) Define differentiation. Write a note on the processes of differentiation.
- A) Describe Albite-Anorthite system in detail.
 B) Define Assimilation. Describe the reactions between basaltic magma and different rocks.
 C) Write a detailed note on forms of Igneous rocks.
- A) Describe crystallization processes of unicomponent magma in detail.
 B) Describe the forms of Igneous rocks in detail.
 C) Describe the crystallization of Dyopside-Albite-Anorthite system in detail.

3. Write short notes on any four :

(20)

- a) Composition, types and origin of magma.
 b) Forms of Igneous rocks .
 c) Crystallization of unicomponent magma.
 d) Porphyritic and poikilitic texture.
 e) Textures with respect to granulariry.
 f) Reaction Rim structures.
- a) Crystallization process of unicomponent magma.
 b) Bowen's Reaction Series.
 c) Formation of glass and crystals.
 d) Classification of igneous rocks based on mode of occurrence.
 e) Poikilitic and porphyritic texture.

- f) Classification of igneous rocks based on silica percentage.
- a) Differentiation.
- b) Assimilation.
- c) Classification of igneous rocks based on silica saturation.
- d) Classification of igneous rocks based on mode of occurrence.
- e) Ophitic and graphic textures.
- f) Bowen's reaction relation.

- 1) Variation in grain size of igneous rock is controlled by _____.
 - a) pressure b) temperature c) pressure & temperature
- 2) The temperature region in which the generation of crystals is slow is called as _____.
 - a) metastable b) metalabile c) labile
- 3) Holocrystalline structure is characteristically represented by _____ rocks.
 - a) volcanic b) plutonic c) hypabyssal
- 4) The volcanic equivalent of granite is _____.
 - a) trachyte b) limburgite c) rhyolite
- 5) According to Bowen's reaction relation _____ is the first mineral to crystallise.
 - a) olivine b) augite c) hornblende
- 6) The eutectic intergrowth of orthoclase and quartz produces _____.
 - a) granite b) graphic granite c) microgranite
- 7) The plutonic equivalent of basalt is _____.
 - a) tachylite b) dolerite c) gabbro
- 8) Ophitic texture is developed in _____.
 - a) dolerite b) granite c) syenite
- 9) The first mineral formed in plagioclase series is _____.
 - a) Anorthite b) anorthoclase c) albite.
- 10) The continuous and discontinuous reaction series of Bowen's reaction relation merge together to form _____.
 - a) K-feldspar b) biotite c) quartz
- 11) Ophitic texture is a special type of _____ texture.
 - a) poikilitic b) porphyritic c) graphic.
- 12) Dolerite is _____ igneous rock.
 - a) plutonic b) hypabyssal c) volcanic
- 13) Porphyritic texture is a type of _____ texture.
 - a) equigranular b) inequigranular c) directive
- 14) The plutonic equivalent of rhyolite is _____.
 - a) granite b) gabbro c) trachyte
- 15) Presence of glass in an igneous rock indicates _____ cooling.
 - a) rapid b) slow c) very slow
- 16) The last mineral to crystallize in Bowen's reaction series is _____.
 - a) olivine b) muscovite c) quartz

- 17) The volcanic equivalent of gabbro is _____ .
 a) basalt b) diorite c) rhyolite
- 18) When crystal shows radiating arrangement about a common center, the structure is called _____ .
 a) spherulitic b) xenolithic c) orbicular.
- 19) Zoning in Plagioclase is found due to -----crystallisation.
 (a) Equilibrium, (b) Segregation, (c) Fractional.
- 20) The continuous and discontinuous reaction series of Bowen's reaction relation merge to form _____ .
 a) K-feldspar b) olivine c) biotite
- 21) Pitchstone is a _____ rock.
 a) plutonic b) volcanic c) hypabyssal
- 22) Ophitic texture is associated with _____ .
 a) quartz and plagioclase b) quartz and augite c) augite and plagioclase
- 23) The rocks comprising only dark minerals are termed as-----.
 (a) Leucocratic, (b) Mesocratic, (c) Melanocratic .
- 24) Igneous rocks comprising silica content greater than 66% are termed as -----.
 (a) Ultrabasic rocks, (b) Intermediate rocks, (c) Acidic rocks.
- 25) In ----- texture, the large grains are embedded in a finer groundmass.
 (a) Poikilitic, (b) Porphyritic, (c) Ophitic .
- 26) Which is the best example of solid solution -----.
 a) Plagioclase, b) Mica, c) Quartz.
- 27) The amount of assimilation of cool wall rock into a magma is limited by -----.
 a) Composition of wall rock,
 b) Composition of magma,
 c) Thermal energy of magma itself.
- 28) Which volcanic rock contains relatively high percentage of silica -----.
 a) Basalt, b) Rhyolite, c) Andesite.
- 29) Reaction between a rising magma and crystal with which it comes into contact is -----.
 a) Syntexis, b) Xenolith, c) Differentiation.
- 30) Which one is not a discordant igneous body -----.
 a) Dyke, b) Sill, c) Batholith.
- 31) Basaltic lavas can flow to greater distances because of -----.
 a) High viscosity, b) Low viscosity, c) High temperature.
- 32) Presence of water in the melt causes -----.
 a) Lowering of the solidus and liquidus temperatures,
 b) Rising of the solidus and liquidus temperatures,
 c) No change in the solidus and liquidus temperatures.
- 33) Obsidian is classed as -----.
 a) Holocrystalline, b) Holohyaline, c) Hemicrystalline.
- 34) Which of the following magmas will be more viscous :
 a) Magma rich in SiO₂,

- b) Magma containing high concentration of alkalis and aluminium complexes,
 - c) Magma deficient in SiO₂.
- 35) Which of the following rocks is typical ultrabasic rock:
- a) Norite, b) Diorite, c) Peridotite.
- 36) Dunites are almost pure -----.
- a) Pyroxene rocks, b) Olivine rocks, c) Amphibole rocks.
- 37) Arrange the following minerals according to discontinuous reaction series of Bowen:
- a) Amphibole-Olivine-Pyroxene-Biotite,
 - b) Olivine-Pyroxene-Amphibole-Biotite,
 - c) Olivine-Amphibole-Biotite-Pyroxene.
- 38) In a binary system, without solid solutions, the solidus is -----.
- a) Straight line, b) Flat plane, c) Curved line.
- 39) Gabbro is -----.
- a) Leucocratic, b) Mesocratic, c) Melanocratic.
- 40) Which of the following rock is phaneric -----.
- a) Rhyolite, b) Syenite, c) Dacite.
- 41) A rock containing silica percentage between 55% and 44% is classified as -----.
- a) Acid rock, b) Basic rock, c) Intermediate rock.
- 42) In basic and acidic magma “basic” and “acidic” refer to the content of -----.
- a) Silica, b) Water, c) Felsic mineral.
- 43) The formation of magma by melting of two or more rock types is known as -----.
- a) Anatexis, b) Syntexis, c) Assimilation.
- 44) A volcano erupts violently, producing a large cloud of ash and cinders. What kind of magma was probably erupting from this volcano:
- a) Granitic, b) Basaltic, c) Carboniferous.
- 45) As plagioclase magma begin to crystallize, the first crystals to form -----.
- a) Contain a higher percentage of calcium than the magma itself,
 - b) Contain a lower percentage of calcium than the magma itself,
 - c) Are crystals of olivine.
- 46) Geologist use the word “phaneritic” to describe igneous rocks that are -----.
- a) Full of glass bubbles, b) Glassy, c) Coarse grained.
- 47) Wall rock surrounding a magmatic intrusion become hot by -----.
- a) Conduction, b) Convection, c) Radiation.
- 48) The crystallization of magma is governed by the factors -----.
- a) Temperature and pressure ,
 - b) Composition and viscosity of magma,
 - c) All of the above.
- 49) Choose the correct statement:
- a) The rate of crystallization is slow in labile region,
 - b) The rate of crystallization is rapid in metastable region and slow in labile region,
 - c) The rate of crystallization is rapid in labile region and slow in metastable region,
- 50) The Gibbs phase rule for systems of variable pressure and temperature is -----.

$$\text{a) } F = 2 + C - \phi(P), \quad \text{b) } F = 3 + C - \phi(P), \quad \text{c) } F = 4 + C - \phi(P),$$

Answers

- 1) b- temperature
- 2) a- metastable
- 3) b- plutonic
- 4) c- rhyolite
- 5) a- olivine
- 6) b- graphic granite
- 7) c- gabbro
- 8) a- dolerite
- 9) a- anorthite
- 10) a- K-feldspar
- 11) a- poikilitic
- 12) b- hypabyssal
- 13) b- inequigranular
- 14) a- granite
- 15) a- rapid
- 16) c- quartz
- 17) a- basalt
- 18) a- spherulitic
- 19) c- fractional
- 20) a- K-feldspar
- 21) b- volcanic
- 22) c- augite and plagioclase
- 23) c- melanocratic
- 24) c- acidic
- 25) b- porphyritic
- 26) a) Plagioclase
- 27) c) Thermal energy of magma itself.
- 28) b) Rhyolite
- 29) a) Syntaxis
- 30) b) Sill
- 31) b) Low viscosity
- 32) a) Lowering of the solidus and liquidus temperatures
- 33) b) Holohyaline
- 34) a) Magma rich in SiO_2
- 35) c) Peridotite
- 36) b) Olivine rocks
- 37) b) Olivine-Pyroxene-Amphibole-Biotite
- 38) a) Straight line

- 39) b) Mesocratic
- 40) b) Syenite
- 41) c) Intermediate rock.
- 42) a) Silica
- 43) c) Assimilation
- 44) a) Granitic
- 45) a) Contain a higher percentage of calcium than the magma itself.
- 46) c) Coarse grained.
- 47) a) Conduction
- 48) c) All of the above.
- 49) c) The rate of crystallization is rapid in labile region and slow in metastable region.
- 50) a) $F = 2 + C - \phi(P)$.
