

7.

Volcanoes

EXERCISE

A. Answer the following questions :

1. What are volcanoes?

Ans. A volcano is a vent or opening in the crust of the Earth, connected by a conduit to an underlying magma chamber from which molten lava, volcanic gases and steam are ejected.

2. How are volcanoes caused?

Ans. Causes of volcanic eruptions are sea floor spreading, plate tectonics and mountain building processes. The main causes are:

- (i) **Radioactive elements** : They increase the temperature at the rate of 1° per 32 metres of descent. There is also a great pressure. Molten magma under great pressure has the capacity to liquefy great volumes of gases.
- (ii) **Cracks and crevices** : The surface water percolates through the cracks and crevices to the interior until it reaches the very hot rock which turns it into steam and steam being very powerful, forces itself through the weak points of the Earth's surface along with molten material.
- (iii) **Plate tectonics** : Splitting of the major and minor plates of the Earth cause cracks, crevices and fissures in the Earth's crust through which the magma is poured out.

3. How can volcanoes be classified on the basis of their activity?

Ans. Classification of volcanoes based on their activity:

- (i) **Active volcanoes**: They constantly eject lava, gases, ashes and cinder, e.g., Mt. St. Helens (USA).
- (ii) **Dormant volcanoes**: It is not extinct but has not been known to erupt within historic time, e.g., Vesuvius.
- (iii) **Extinct Volcanoes**: They no longer are active but had erupted in the distant geological past. e.g., Arthur's seat in Scotland.

4. Name the four major types of volcanic eruptions.

Ans. The four major types of volcanic eruptions are:

Intrusive : Sills, Dykes

Extrusive : Ash and cinder cones and strata cone. (chk)

5. What is volcanicity?

Ans. Volcanicity is a process which involves the intrusion of magma in the rise of the Earth's crust or the extrusion of such molten material into the Earth's surface. This process gives rise to volcanic eruptions.

6. What are the products of volcanic eruption?

Ans. Volcanoes eject lava, gases, ashes, cinder, pumice etc.

7. What is a crater?

Ans. An abrupt circular depression formed by extrusion of volcanic material, by collapse or by impact of a meteorite.

8. Name any four major types of landforms associated with volcanoes.

Ans. Four major landforms formed are:

Intrusive landforms:

(a) Batholith—Batholith rocks form the base of the mountains. They are large, coarse-grained igneous landmass which is formed after the erosion of upper lying landmass from part of hard rock.

(b) Laccoliths—This is a large sill of acid lava which solidifies slowly giving it a dome shape.

Extrusive landforms:

(a) Lava dome—It is formed when viscous lava solidifies quickly and forms a steep-sided cone. Lava solidifies in the spine or plug. Sometimes spine is exposed due to denudation.

(b) Lava shields—The Hawaiian volcanoes are the excellent examples of basalt domes or shield, for example, Mt Etna.

9. State three beneficial effects of volcanoes.

Ans. (i) Lava from plains are very fertile, e.g., in Java, North-west Deccan and parts of Brazil.

(ii) All precious stones are formed within volcanoes, for example, diamonds in South Africa, and nickel deposits in Sudbury in Canada.

(iii) Geysers and Spring, which are formed due to volcanic activity, are useful from health point of view as they contain sulphur and other useful minerals. These are important from a medical point of view also.

10. Mention three adverse effects of volcanoes.

Ans. (i) Most of the latest volcanic areas are absolutely barren and inhabitable by man. The high porosity leads to immediate percolation and disappearance of rain water. Thus no human activity is possible.

(ii) Volcanic eruptions are disastrous causing complete destruction. Eruptions often force people living near volcanoes to abandon their land and houses, sometimes forever.

(iii) Volcanic activity since 1700 AD has killed more than 260,000

people, destroying entire cities and forests and severely disturbed local economies for months to years.

11. Describe the distribution of volcanoes.

Ans. The following are the three belts of volcanic eruptions:

(a) The Circum-Pacific Belt (Ring of Fire):

This is the most important belt of volcanoes and is also called 'Ring of Fire'. It extends through the Andes of South America, Central America, Mexico, the mountains of western U.S.A., the Aleutian Islands, Kamchatka, the Kurile Islands, Sakhalin, Japan, Phillipines, Celebes, New Guinea, the Solomon Islands, New Caledonia and New Zealand.

(b) Mid-Atlantic Belt:

This belt includes the volcanoes of Mid-Atlantic ridge. Most of the volcanoes of this belt are of fissure-eruption type. It also includes the volcanoes of Lesser Antilles, Southern Antilles, Azores, St. Helena, etc.

(c) Mid-Continental Belt:

This belt includes the volcanoes of Alps mountains, Mediterranean Sea, volcanoes of Aegean Sea, Mt. Ararat (Turkey), Elburz, Hindukush and the Himalayas.

12. Explain in brief, how a volcanic eruption is caused.

Ans. (Same as 2nd)

13. Classify volcanoes on the basis of their intensity of eruption.

Ans. Based on intensity volcanoes are classified into:

- (i) Active volcanoes:** They constantly eject lava, gases, ashes, cinder, pumice, etc. There are several hundred active volcanoes in the world. Out of 1500 active volcanoes, 50 or so erupt every year, spewing steam, ash toxic gases and lava.
- (ii) Dormant volcanoes:** A volcano which although not extinct, has not been known to erupt within historic time is known as dormant volcano. The Vesuvius volcano is one of the best examples of a dormant volcano.
- (iii) Extinct volcano :** A volcano that erupted in the distant geological past and the remains of which occur in an area where there is no longer any active volcanicity is known as

extinct volcano. The crater is filled up with water, converting it into a lake known as Crater Lake.

14. Where do volcanic eruptions generally occur? Give one example.

Ans. The volcanic eruptions are closely associated with sea floor spreading, plate tectonics and mountain building processes. Circum-Pacific Belt (Bogosl of island peak) and the Mid-Atlantic Belt (St. Helena) and Mid-Continental Belt (Elburz) are characterised with active and violent volcanic eruptions.

15. Give one example of an active volcano.

Ans. Mt. St. Helena (USA), Stromboli and Etna (Mediterranean Sea) and Pinatubo (Phillipines) are some of the examples of active volcanoes. The Stromboli volcano emits so much fire that it has come to be known as the lighthouse of the Mediterranean Sea.

B. Explain the following terms :

1. Caldera

Ans. Caldera: A large, more or less circular depression or basin associated with a volcanic vent.

2. Ring of Fire

Ans. Ring of Fire: The Circum-Pacific Belt is also called as Ring of Fire. It extends through the Andes of South America, Central America, Mexico, Japan, New Zealand, etc.

3. Magma

Ans. Magma: It is a molten rock material consisting of liquid, gas and crystals.

4. Lava

Ans. Lava: Magma that reaches the earth's surface.

C. Distinguish between the following pairs :

1. Lopoliths and Phacoliths

<i>Lopoliths</i>	<i>Phacoliths</i>
When lava solidifies in shallow basins in the shape of a saucer it is called lopoliths.	These are dome shaped and are formed when acid lava solidifies on an anticline or on the base of a syncline.

2. Crater and Caldera

Crater	Caldera
A crater is almost always a vent for volcanic activity.	A caldera is formed when a large eruption of magma, or lava, leaves a gigantic empty chamber underground.
A crater is formed by sinking of the top of the volcano as lava weakens the rocks.	A caldera is formed when the overlying rocks collapse to fill an emptied huge chamber of magma.

3. Active and Extinct Volcano

Active	Extinct
They constantly eject lava, gases, ashes, cinder, pumice, etc.	A volcano that erupted in the distant geological past and the remains of which occur in an area where there is no longer any active volcanicity is known as extinct volcano.
E.g., Stromboli and Etna	E.g., Arthur's seat

D. Diagrams :

Draw a labelled self-explanatory diagram of a volcano.

Ans. Students to do it themselves.

E. Give reasons for the following :

1. Earthquakes are closely associated with volcanic belts.

Ans. Earthquakes are closely associated with volcanic belts because:

- Most earthquakes are along the edges of tectonic plates. This is where most volcanoes are too. However, most earthquakes are caused by the interaction of the plates not the movement of magma.
- Most earthquakes directly beneath a volcano are caused by the movement of magma. The magma exerts pressure on the rocks until it cracks the rock. Then the magma squirts into the crack and starts building pressure again. Every time the rock cracks it makes a small earthquake.

2. Lava activity is profitable to man.

Ans. Lava activity is profitable to man:

- The plains formed by lava are very fertile. E.g., in Java.
- Most of the precious stones are obtained E.g., diamonds
- They are also a good source of mineral wealth which provides raw material to industries.

3. The Circum-Pacific Belt is also called the 'Ring of Fire'.

Ans. The Circum-Pacific Belt is also called the 'Ring of Fire':

- Its edges mark a circle of high volcanic and seismic activity (earthquakes).
- Most of the active volcanoes on Earth are located on this circumference.

4. The Volcanoes have constructive effects in favour of man.

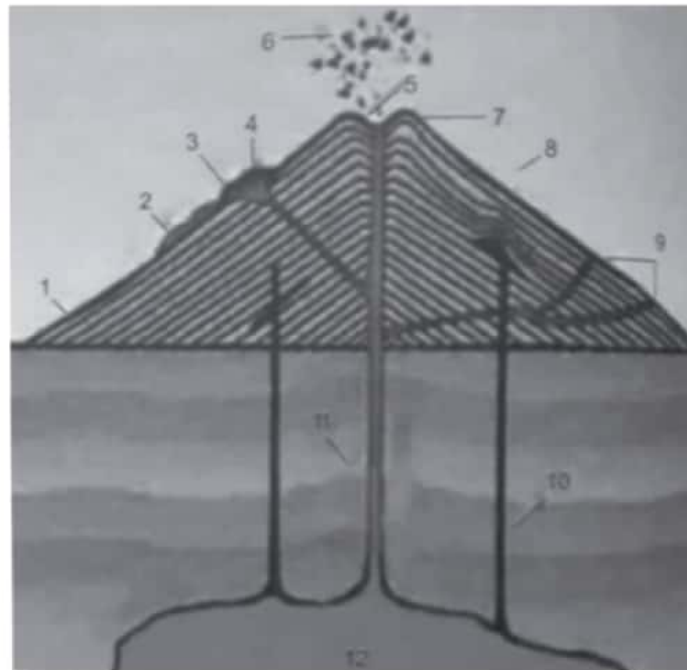
Ans. Constructive effects of volcanoes in favour of man

- (i) Sometimes, lava activity is profitable to man because lava from plains are very fertile, e.g., plains in Java, Malwa region in Deccan plateau (India) and parts of Brazil.
 - (ii) All precious stones are found within volcanoes, for example, diamonds in South Africa, and nickel deposits of Sudbury in Canada.
 - (iii) Geysers and Springs, which are formed due to volcanic activity are very useful from health point of view as they contain sulphur and other useful minerals. These are important from the medical point of view also.
 - (iv) The crater lakes serve as a great source of perennial rivers. For example, Lake Nyos in South Africa.
5. Mt. Vesuvius in Italy is a dormant volcano.

Ans. A volcano which although not extinct, has not been known to erupt within historic time is known as dormant volcano. The Vesuvius volcano is one of the best examples of a dormant volcano which erupted first in 79 AD. It remained dormant for over 1500 years and then suddenly erupted with great force in 1631 AD. The subsequent eruptions occurred in 1803, 1872, 1906, 1927, 1928 and 1929.

F. Choose the correct option.

1. Identify the parts of volcano which are marked as 5 & 7.
- | | |
|------------------|--------------------|
| (a) Lava & Ash | (b) Fissure & Dyke |
| (c) Lava & Magma | (d) Vent & caldera |



2. Hawaiian volcanoes are the excellent examples of _____.
 (a) Strato volcano (b) Lava domes
 (c) Lava Shields (d) Cinder cones
3. Which of the following is an extinct volcano?
 (a) Vesuvius volcano (b) Etna
 (c) Arthur's Seat (d) Stromboli
4. Which of the following belt of volcano is also known as the 'Ring of Fire'?
 (a) Mid – Continental belt (b) Circum-Pacific belt
 (c) Mid – Atlantic belt (d) None of these
5. It is an intrusive volcanic landform which is formed when the lava solidifies between the horizontal layers of parent rocks.
 (a) Dykes (b) Lopoliths (c) Phacoliths (d) Sills

Answers

1. d 2. c 3. c 4. b 5. d

