

Chapter-3

Interior of the Earth

1. Multiple choice questions

Question 1(i).

Which one of the following earthquake waves is more destructive?

- (a) P-waves**
- (b) S-waves**
- (c) Surface waves**
- (d) None of the above.**

Answer:

- (a) P-waves**

Question 1(ii).

Which one of the following is a direct source of information about the interior of the earth?

- (a) Earthquake waves**
- (b) Volcanoes**
- (c) Gravitational force**
- (d) Earth magnetism.**

Answer:

- (a) Earthquake waves**

Question 1(iii).

Which type of volcanic eruptions have caused Deccan Trap formations?

- (a) Shield**
- (b) Flood**
- (c) Composite**
- (d) Caldera.**

Answer:

(b) Flood

Question 1(iv).

Which one of the following describes the lithosphere?

(a) Upper and lower mantle

(b) Crust and upper mantle

(c) Crust and core

(d) Mantle and core.

Answer:

(b) Crust and upper mantle

2. Answer the following questions in about 30 words.

Question 2(i).

What are body waves?

Answer:

Body waves are generated due to the release of energy at the focus and move in all directions travelling through the body of the earth. Therefore, it has been named as body waves. These are of two types: P-waves and S-waves.

Question 2(ii).

Name the direct sources of information about the interior of the earth.

Answer:

Some of the direct sources are:-

1. Mining: It is a process by which commercially variable valuable mineral resources are extracted from Earth's surface which includes precious stones, rocks and solid fuels.
2. Drilling: Scientists world over are working on two major projects such as "Deep Ocean Drilling Projects" and "Integrated Ocean Drilling Project". The deepest drill at Kola, in Arctic Ocean, has so far reached a depth of 12 km.
3. Volcanic Eruptions: When molten material is thrown onto the surface of the earth during volcanic eruption it becomes available for analysis

Question 2(iii).

Why do earthquake waves develop shadow zone?

Answer:

Earthquake waves get recorded in seismographs located at far off locations. But there exist some specific areas where the waves are not reported. Such a zone is called the 'shadow zone'. The study of different events reveals that for each earthquake, there exists an altogether different shadow zone. It was observed that seismographs located at any distance within 105° from the epicentre, recorded the arrival of both P and S-waves.

However, the seismographs located beyond 145° from epicentre, record the arrival of P-waves, but not that of S-waves. Thus, a zone between 105° and 145° from epicentre was identified as the shadow zone for both the types of waves. The entire zone beyond 105° does not receive S-waves. The shadow zone of S-wave is much larger than that of the P-waves. The shadow zone of P-waves appears as a band around the earth between 105° and 145° away from the epicentre. The shadow zone of S-waves is not only larger in extent but it is also a little over 40 per cent of the earth surface.

Question 2(iv).

Briefly explain the indirect sources of information of the interior of the earth other than those of seismic activity.

Answer:

Analysis of properties of matter indirectly provides information about the interior

1. Meteors
2. Gravitation
3. Magnetic field
4. Seismic Activity.

3. Answer the following questions in about 150 words.

Question 3(i).

What are the effects of propagation of earthquake waves on the rock mass through which they travel?

Answer:

Earthquake waves are basically of two types: Body waves and surface waves. Body waves are generated due to the release of energy at the focus and move in all directions travelling through the body of the earth. Therefore these are called body waves. The body waves interact with the surface rocks and generate new set of

waves called surface waves. These waves move along the surface. The velocity of waves changes as they travel through materials with different densities. The denser the material, the higher is the velocity. The direction of vibrations of S-waves is perpendicular to the wave direction in the vertical plane. Hence, they create troughs and crests in the material through which they pass. Surface waves are considered to be the most damaging waves.

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Question 3(ii).

What do you understand by intrusive forms? Briefly describe various intrusive forms.

Answer:

The lava that cools within the crustal portions assumes different forms. These forms are called intrusive forms. Important intrusive forms are described below:

1. Batholiths: A large body of magmatic material that cools in the deeper depth of the crust develops in the form of large domes. Batholiths are the cooled portion of magma chambers.
2. Laccoliths: These are large dome-shaped intrusive bodies with a level base and connected by a pipe-like conduit from below. It resembles the surface volcanic domes of composite volcano, only these are located at deeper depths.
3. Lapolith: As and when the lava moves upwards, a portion of the same may tend to move in a horizontal direction wherever it finds a weak plane. It may get rested in different forms. In case it develops into a saucer shape, concave to the sky body, it is called lapolith.
4. Phacolith: A wavy mass of intrusive rocks, at times, is found at the base of synclines or at the top of anticline in folded igneous country. Such wavy materials have a definite conduit to source beneath in the form of magma chambers (subsequently developed as batholiths). These are called the phacoliths.
5. Sills: The near horizontal bodies of the intrusive igneous rocks are called sill or sheet, depending on the thickness of the material. The thinner ones are called sheets while the thick horizontal deposits are called sills.
6. Dykes: When the lava makes its way through cracks and the fissures developed in the land, it solidifies almost perpendicular to the ground. It

gets cooled in the same position to develop a wall-like structure. Such structures are called dykes.