Earthquakes

Exercises

I. Fill in the blanks below

1. Most earthquakes occur on account of the strain in the **earth's crust.**
2. **P (primary or push waves)** are the first earthquake waves to be recorded on a seismograph of an earthquake.
3. The last of the earthquake waves to arrive on the surface of the earth are **L (surface or long)** waves.
4. The giant sea waves caused by earthquakes in the oceans are called **Tsunamis.**
5. About 70 per cent of the earthquakes occur in the **Circum- Pacific-Mountain** Belt.

II. Short Answer Questions

Question 1.
What is called an earthquake ?
Answer:
An earthquake is defined as a tremor below the surface of the earth which causes shaking of the earth.

Question 2.
State two natural causes of an earthquake.
Answer:
Natural causes are the movement of tectonic plates and volcanic activities.

Question 3.
Name one man-made cause of an earthquake.
Answer:
Construction of large scale dams, thrust of rivers along fault lines, dumping of chemical wastes also cause earthquakes due to imbalance in isostatic balance of the earth's landforms, e.g. Koyna dam caused an earthquake in Maharashtra.

Question 4.
What are known as seismic focus and epiceptre with respect to an earthquake ?
Answer:
The point of origin of earthquake waves is called seismic focus and the centre vertically above the seismic focus nearest to the earth's crust is called epicentre.

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Question 5.
What is known as Richter scale ? State its uses.
Answer:
Ritcher scale is used to measure the intensity of earthquake through a scale, which is motivated by a needle attached to this instrument The zigzag wavelength of the earthquake comes on the screen and calculated from 1 to 9 scale measured in centimetres.

Question 6.
How are earthquakes useful ?
Answer:
Earthquakes cause energy release to put the earth in good shape; several landforms are uplifted to build large plains e.g. Sagami Bay uplifted 200 m, Landslides cause the formation of lakes in Himalayan region.

Question 7.
Give any two destructive effects of earthquakes ?
Answer:
Destructive effects are collapse of structures, submergence of coastal parts e.g. Dwarka submergence, these change the course of rivers, danger to human life and motivation of tsunami waves causing drastic calamities.

Question 8.
What is tsunami ? How is it caused ?
Answer:
Tsunami is a large furious destructive sea waves caused by the force of an earthquake along the moving tectonic plates, volcanic activity landslides and meteorite impact.

Question 9.
How do Japanese predict earthquakes ?
Answer:
Japanese use the methods of measuring changes in sea level and variations in Earth's magnetic field to predict earthquakes.

Question 10.
Name the two belts where most of the earthquakes occur.
Answer:
Two belts are the Circum-Pacific Mountain belt and the midworld mountain belt of high fold mountains like the Alps, Himalayas etc.

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III. Match the following

Column A	Column B
1. Tsunami	(a) The waves that make the inhabitants feel the ground motion.
2. Seismograph	(b) The instrument for measuring the intensity of an earthquake.
3. S-waves	(c) Harbour waves generated by oceanic earthquakes.
4. Richter scale	(d) The point on the earth surface directly above the seismic focus.
5. Epicentre	(e) An instrument for recording the movement of earthquake waves.

Answer:

Column A	Column B
1. Tsunami	(c) Harbour waves generated by oceanic earthquakes.
2. Seismograph	(e) An instrument for recording the movement of earthquake moves.
3. S-waves	(a) The waves that make the inhabitants feel the ground motion.
4. Richter scale	(b) The instrument for measuring the intensity of an earthquake.
5. Epicentre	(d) The point on the earth surface directly above the seismic focus.

IV. Long Answer Questions

Question 1.
Describe how earthquakes are caused on the surface of the earth.
Answer:
When the earth's crust is unable to accommodate itself to the strain due to isostatic imbalance, so sudden release of energy results in violent shock or an earthquake. The earthquakes are caused by severe tectonic movement of plates, volcanic eruption

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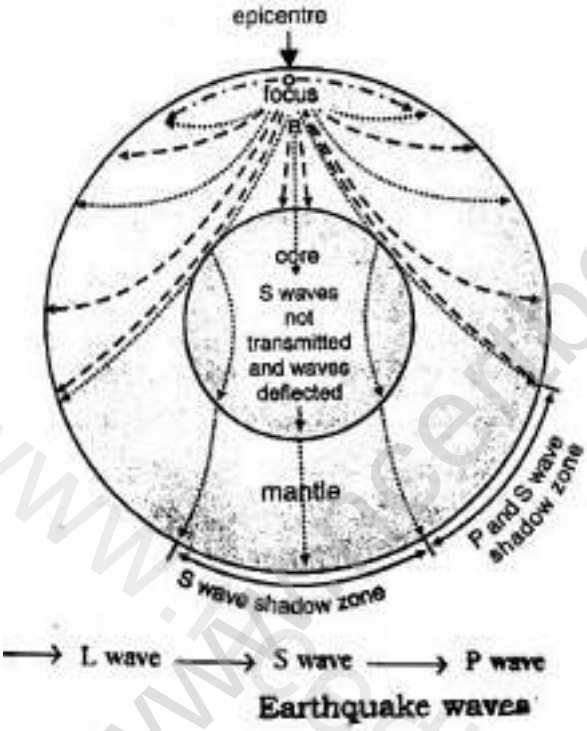
forces and isostatic imbalance often taking place due to diastrophism creating ups and downs in landform construction.

Question 2.
Explain the three types of earthquake waves. What is the difference between seismic focus and epicentre ?
Answer:
Three types of earthquake waves are :

1. P-primary waves,
2. S-Secondary (or Shear waves) and
3. L-Long waves (or Surface waves).



Earthquake waves

Seismic focus.is located in the interior of earth's crust from where the earthquake waves originate and the epicentre is the nearest point vertically below the region of earthquake effect.

P Q. What is the Tsunami ? How ist it produced ? What are its effects ?
Answer:
Tsunami is very destructive sea wave rising high upto several metres and jump furiously along the coastal areas like the hood of a snake. The name 'tsunami' is from the Japanese words : 'Tsu' and 'nami' meaning 'harbour' and 'wave' respectively. So tsunamis are harbour waves.
It is produced mainly by undersea earthquake along the gaps of tectonic plates, volcanic thrusts, great landslides and meteorite impact.

They can cause a lot of destruction on the shore. They are sometimes mistakenly called "tidal waves," but tsunamis have nothing to do with the tides.

Question 3.
Compare and contrast the constructive effects and the – destructive effects of an earthquake.
Answer:
Constructive effects :

1. Earthquakes help the earth release its stored up energy. The majority of the earthquake occur around. The plate margins. This energy release helps to keep the earth in good shape.
2. On account of both vertical and lateral displacement of the earth's crust, earth-quakes may raise or lower parts of earth especially near the seashore. Sagami Bay of Japan was uplifted 200 m in 1923.
3. Landslides triggered by earthquakes cause formation of lakes as has happened at many places in the Himalayan region.

Destructive effects :

1. Human beings have settlements in active earthquake zones. Most often the houses and other structures collapse causing great loss of property.
2. The forces of uplift and subsidence also cause submergence of coastal parts. For example: Dwarka in Gujarat which now lies submerged under the sea.
3. Earthquakes have changed the course of rivers in the past. They have thus rendered many areas unsuitable for irrigation and agriculture. They cause danger to human life.

Question 4.
Is it possible to predict an earthquake ? Give reasons to support your answer.
Answer:
No till now it is not possible to predict an earthquake. Earthquake prediction in the past was left to astrologers and mystics. Today it is a respectable scientific pursuit. The Russians were the first to discover P and S seismic waves in 1960s on the basis of which predictions were made. These waves still are the only means available to seismologists to predict earthquakes.
The theory of Plate Tectonics offers another means of prediction on scientific lines. Japanese use the methods of measuring changes in sea level and variations in Earth's magnetic field to predict earthquakes. However, no method is still foolproof as has been proved by recent earthquakes in Japan, India and the USA.

Question 5.
How are earthquakes distributed over the globe ?
Answer:
The earthquakes are common along the weak tectonic belts affected by continuous

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tremors due to the movement of plates one upon another. Main belts are Circum-Pacific Mountain belt and Mid-World Mountain belt of fold mountains which are still in the process of upthrust forces increasing their height.

Question 6.
How is the intensity of earthquakes measured ? What instruments are used ?
Answer:
Ritcher scale and Mercalli scale are used to measure the intensity of earthquakes. Ritcher scale measures through a graphical scale in zigzag graph from 1 to 9 and Mercalli scale observes it from 1 to 12 points scale.

Practice Questions (Solved)

Question 1.
(a) What is an Earthquake ?
(b) How it is caused ?
(c) Describe the world's distribution of earthquakes.
(d) What are the advantages and disadvantages of Earth quakes.
OR
What are the effects of Earthquakes ?
(e) Name the major earthquakes of India from 1991 to 1997.
Answer:
(a) The sudden mild or violent shaking of a part of the earth is called an earthquake. An earthquake is generally accompanied by a rumbling and tremors.
(b) Causes The chief known causes of earthquakes are believed to be as follows :

1. When a dormant volcano erupts into activity or an active volcano discharges matter with greater violence the surrounding areas feel tremors or earthquakes.
2. When the interior of the earth cools and contracts the outer crust in some places cracks and faults are caused. This movement causes earthquake.
3. Some time water percolates so deep down into the earth that it turns into steam on account of the internal heat. This steam expands and tries to force its way out. This pressure causes an earthquake.

(c) The earthquakes are distributed along two major belts namely circum Pacific earthquake belt (Ring of fire) and the Mid¬World, Mountain Earthquake belt along the great fold mountain zone.
(d) Earthquakes brings about changes on the surface of the earth which are very harmful to man.

Destructive Effects :

1. Many towns are destroyed and there is considerable loss of life and property.
2. They cause floods by uplifting of land in the' course of river.

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3. Some places are submerged under the sea.
4. Big cracks and fissures are formed on the surface of the river and they interrupt communications.
5. Some times rivers disappear or change their courses or get flooded. Railway lines are twisted.
6. They cause great tidal waves, which may bring havoc to the coastal areas.

Constructive Effects :

1. Precious metals and minerals come up to the surface for the use of man.
2. New lands for habitation above the surface of the sea are formed.
3. Some times new springs and water falls are formed which help in irrigation.
4. Violent earthquakes have led to the formation of hills and mountains.
5. Bays and gulfs are formed along the coastal land to provide new ports and harbours.

(e) Major earthquakes of India from 1991 to 1997

1. Latur -1991
2. Uttarkashi – 1993

Question 2.
Name the important Earthquake-belts of the world.
OR
Indicate two major belts of Earthquakes.
Answer:

1. **Circum – Pacific Earthquake Belt :-** i.e. round the Pacific Ocean. This belt goes along with the coast of America and East coast of Asia.
2. **Mid World Mountain Earthquake Belt :-** This belt runs through the middle of Asia from East and goes beyond the Mediterranean sea as far as the West Indies. This belt, however, is not so active as Pacific Belt.

Question 3.
Name the instrument used to record Earthquakes.
Answer:
The instrument used to record Earthquakes' is called Seismograph.

Question 4.
Name some Earthquakes which caused great damage.
Answer:
Some Earthquakes which caused serious damage to property and life are :

1. Lisbon Earthquake of 1755

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2. South Carolina Earthquake of August 1886
3. The Japan Earthquake of Oct. 28, 1891
4. Kanga (Himachal pradesh) Earthquake of April 1905
5. Tokyo (Japan) Sep. 1923
6. Quetta 1935
7. Bihar 1934
8. California Earthquake of April, 1966
9. Turkey Sep. 1975
10. Iran 1968
11. Peru 1970
12. Tangshan (China) Earthquake of July, 1976
13. Broach Earthquake of 1970 affected part of Gujrat.
14. Earthquake of 1988, had its epicentre near Darbhanga and affected parts of North Bihar, Nepal and Bangladesh.
15. The Bhuj earthquake of 2001 devastated many cities of Gujarat.

Question 5.
Earthquakes occur in the Mid-Atlantic belt.
Answer:
Earthquakes occur in the Mid-Atlantic belt because here the sea floor spreading is the main cause for earthquakes.

Question 6.
How do earthquakes affect landscape ?
Answer:
Earthquakes cause rise and fall of landmasses, create fault scarps, offset streams and other land features and cause landslides. Earthquakes waves also destroy houses and man-made structures, buckle and twist the railway lines electric and telegraph lines etc.

Question 7.
What was the cause of Koyna earthquake in India ?
Answer:
Koyna Dam is located in Maharashtra on the Deccan plateau. This part was considered a stable block free from earthquakes. But Koyna earthquake in 1986 was a big surprise. In the reservoir of the dam water gathered was more than its capacity. It disturbed the local isostatic balance. It caused an earthquake and caused cracks in the rocks. It may be called a man-made earthquake.

Question 8.
Describe the main type of Earthquake Waves.
Answer:
Earthquake Waves :- Earthquake waves travels in all directions from the Focus. There are three types of earthquake waves :

1. **Longitudinal Waves :** These are known as Primary Waves 'P'

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2. **Transverse Waves :** These are known as Secondary Waves ‘S’.
3. **Surface Waves :** These are called Long Waves or ‘L’ Waves.

Question 9.
Name the causes of earthquakes.
Answer:

1. Volcanic eruptions
2. Faulting
3. Elasticity of rocks
4. Local causes
5. Epeiro, Genetic events.

Question 10.
Why are earthquakes related to volcanoes ?
Answer:
There is a close relationship between an earthquake and a volcano. Earthquakes and volcanoes occur in small belts, i.e. Mid world belt and Circum pacific belt. Their distribution shows a similar pattern. Volcanic eruption lead to earthquakes. Volcanic eruptions are the local cause of earthquakes.

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