

9. Weathering and Denudation

EXERCISE

A. Answer the following questions :

1. Define weathering. How does it occur?

Ans. ● Weathering involves disintegration and decomposition of rocks where they exist. Therefore, it is a static process.
● It occurs by the action of heat and cold, wind , rainwater , biotic factors and frost.

2. Name the three types of weathering.

Ans. The three types of weathering are:

- Physical or mechanical weathering
- Chemical weathering in which the main agent is rainwater.
- Biotic or biological weathering.

3. What do you understand by denudation?

Ans. Denudation refers to all processes that cause degradation of landscape, weathering mass movement, erosion and transport.

4. How does frost cause weathering of rocks?

Ans. Frost is the most common agent of weathering in the temperate regions:

- When water enters the rocks and turns into ice, the volume increases.
- During the day the ice thaws and the water enters deep into rocks.
- When temperature drops during the night, the water again freezes, widening the crack.
- This repeated freezing and thawing results in breaking up of rocks.

5. In what ways does atmosphere assist in weathering?

Ans. The ways in which atmosphere assist in weathering are:

- Carbon dioxide is an atmospheric constituent that plays several vital roles in the environment.
- It is a greenhouse gas that traps infrared radiation heat in the atmosphere. It plays a crucial role in the weathering of rocks. e.g., Rainwater, when mixed with carbon dioxide in the atmosphere forms a weak solution of carbonic acid.
- It acts on rocks containing limestone and chalk.
- Weathering of limestone regions in this way gives rise to various landforms like stalactites and stalagmites in the limestone region.

6. What is meant by chemical weathering?

Ans. The decomposition of rocks in which the main agent is rainwater is called Chemical weathering.

- It involves the breaking down of rocks by altering or dissolving the rock minerals due to chemical action of changes.

7. How does biological weathering take place?

Ans. Biological weathering takes place by the biotic factors like plants, animals and human .

8. What do you understand by mechanical weathering? How does it take place?

Ans. Mechanical weathering is the breakdown of rock into smaller fragments by physical processes such as frost wedging.

- It is responsible for the disintegration of rocks by the elements of weather such as heat, frost, wind, plants, man and animals.
- The factors responsible for the mechanical weathering are:

The extremes of temperature, exfoliation, nature of rocks, structure of rocks, frost, wind and slope of the land.

9. How does composition of rock affect mechanical weathering?

Ans. Nature of rocks refers to the composition of rocks:

- Some rocks may be hard and some soft. Some may be soluble and some insoluble.
- Hence, the mechanical weathering takes place in the softer or soluble rocks more easily than in the hard and insoluble rocks.
- In case of sandy soil of desert, it is picked up by wind more easily while clay or loam cannot be lifted by air easily.

10. Name the factors responsible for chemical weathering.

Ans. The process of chemical weathering is governed by the following factors:

- (i) **Oxidation:** When oxygen in the air and water reacts with minerals in rocks, oxidation takes place.
- (ii) **Hydration:** The chemical reaction of water with minerals, changes the proportion and composition of rocks and minerals.
- (iii) **Carbonation:** Carbonation is the reaction of carbonic acid on minerals.
- (iv) **Solution:** When rainwater reacts with the minerals present in rocks it dissolves them. When it seeps below the ground through joints, gaps and crevices, it further dissolves the soluble minerals by forming a solution and separates the insoluble minerals, causing decomposition of rocks.

11. What is carbonation? Give two examples of the landforms formed by carbonation?

Ans. Carbonation is the reaction of carbonic acid on minerals.

For example, Rainwater, when mixed with carbon dioxide in the atmosphere forms a weak solution of carbonic acid

- It acts on rocks containing limestone and chalk.
- Weathering of limestone regions in this way gives rise to various landforms like stalactites and stalagmites in the limestone region.

12. How does chemical weathering take place?

Ans. Chemical weathering takes place due to the decomposition of rocks.

- It involves the breaking down of rocks by altering or dissolving the rock minerals due to chemical action or changes.
- The gradual decomposition of the rocks takes place due to exposure to air and water.

For example, water containing oxygen from the air may change iron in the rocks to iron oxide or iron compounds.

B. Define the following terms:

1. Oxidation

Ans. Oxidation: When oxygen in the air and water reacts with minerals in the rock, oxidation takes place.

2. Solution

Ans. Solution: When rainwater reacts with the minerals present in rocks it dissolves them. When it seeps below the ground through joints, gaps and crevices, it further dissolves the soluble minerals by forming a solution and separates the insoluble minerals, causing decomposition of rocks.

3. Exfoliation

Ans. Exfoliation: The changes in the temperature during summer and winter and in case of arid region, during day and night, cause expansion and contraction in the rock surfaces.

This causes the rocks to break up or peel off. This process is called exfoliation.

4. Weathering

Ans. Weathering: Weathering involves disintegration and decomposition of rocks where they exist. Therefore, it is a static process.

It occurs by the action of heat and cold, wind, rainwater, biotic factors and frost.

5. Denudation

Ans. Denudation: A general term that refers to all processes that cause degradation of landscape, weathering, mass movement, erosion and transport.

C. Distinguish between the following pairs :

1. Chemical and Mechanical Weathering

Chemical Weathering	Mechanical Weathering
Chemical weathering takes place due to the decomposition of rocks.	Mechanical weathering is the breakdown of rock into smaller fragments by physical processes such as frost wedging.

The factors responsible for the chemical weathering are oxidation, hydration, carbonation and solution.	The factors responsible for the mechanical weathering are: The extremes of temperature, exfoliation, nature of rocks, structure of rocks, frost, wind and slope of the land.
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2. Weathering and Denudation

Weathering	Denudation
Weathering involves disintegration and decomposition of rocks where they exist. Therefore, it is a static process.	Denudation refers to all processes that cause degradation of landscape, weathering mass movement, erosion and transport.
Weathering is one of the several processes of denudation.	Denudation itself includes several processes like weathering, erosion and mass wasting.
For example, biological weathering.	For example, the Aravali mountains have been denuded due to the action of the winds.

D. Give a reason for the following statements:

1. Wind is the main agent of gradation in the arid & semi arid regions.
Ans. Due to the absence of vegetation the soil is loose & exposed to the action of winds & scanty rainfall.
2. Erosion is the main work of river in the upper course.
Ans. In the upper course of the river the gradient of the slope is high, therefore, the velocity of the river is also high. So the main action of the river is erosion.
3. Weathering is a static phenomenon.
Ans. As there is no involvement in the movement of disintegrated rock fragments in weathering process.
4. Deposition is the main work of river in the lower course.
Ans. In this course the river flows sluggishly as the gradient of the land becomes gentle. Therefore, the load is deposited on the bed and bank of the river.
5. Chemical weathering may affect the farming activities.
Ans. Chemical weathering dissolves the soluble components of the soil and makes the soil infertile.

E. Choose the correct option.

1. Which of following work is active in the lower course of the river?

- (a) Erosion (b) Deposition
(c) Both erosion & deposition (d) Transportation

2. Identify the landform by studying the image.

- (a) Deflation Hollow
(b) Seif dune
(c) Barchans
(d) Sand Hill



3. Through which of the following chemical weathering Feldspar is converted to Keolin?

- (a) Carbonation (b) Oxidation
(c) Hydration (d) Solution

4. Which of the following weathering is also known as Onion Peeling?

- (a) Block disintegration (b) Exfoliation
(c) Granular disintegration (d) None of these

5. Which of the following weathering is also known as Mechanical weathering?

- (a) Chemical weathering (b) Physical weathering
(c) Biological weathering (d) None of these

6. Which of the following landform is formed in the lower course of the river?

- (a) V-shaped valley (b) Meander
(c) Delta (d) Waterfall

7. Which of the following is the erosional landform of wind?

- (a) Barchans (b) Seifs
(c) Deflation Hollows (d) Delta

8. In which of the course of the river the river erosion is more lateral than vertical?

- (a) Upper course (b) Middle course
(c) Lower course (d) All of these

9. The limestone topography is affected through which of the following weathering process?

- (a) Physical weathering
- (b) Biological weathering
- (c) Oxidation
- (d) Carbonation

10. Which of the following feature is observed in this image?

- (a) Delta
- (b) Meander
- (c) V shaped valley
- (d) Rapids



11. Waterfall is formed due to the erosion by which of the following agent?

- (a) Wind
- (b) Underground water
- (c) River
- (d) Glacier

12. Which of the following is a static process?

- (a) Erosion
- (b) Weathering
- (c) Denudation
- (d) Solution

Answers

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|------|-------|-------|-------|------|------|------|------|
| 1. b | 2. c | 3. c | 4. b | 5. b | 6. c | 7. c | 8. b |
| 9. d | 10. b | 11. c | 12. b | | | | |