

## PART I (30 Marks)

Choose the correct answer from the given options:

1. Which of the following is a chemical process of weathering?

- a) Frost action
- b) Exfoliation
- c) Carbonation
- d) Granular disintegration

**Answer:** (c) Carbonation

2. Which type of weathering is most common in desert regions where the diurnal temperature range is high?

- a) Exfoliation
- b) Frost action
- c) Hydration
- d) Solution

**Answer:** (a) Exfoliation

3. In which region is weathering by frost action **least** common?

- a) Polar regions
- b) Mountainous regions
- c) Temperate regions
- d) Desert regions

**Answer:** (d) Desert regions

4. In oxidation, which element combines with oxygen to form rust?

- a) Iron
- b) Copper
- c) Aluminum
- d) Magnesium

**Answer:** (a) Iron

5. In carbonation, which compound is produced as rainwater absorbs atmospheric carbon dioxide?

- a) Carbon monoxide
- b) Carbon trioxide
- c) Carbonic acid
- d) Calcium carbonate

**Answer:** (c) Carbonic acid

6. Which of the following activities facilitates soil erosion?

- a) Afforestation
- b) Crop rotation
- c) Overgrazing
- d) Plugging gullies

**Answer:** (c) Overgrazing

7. What is the name of the process where rocks break down **without** any chemical change?

- a) Chemical weathering
- b) Biological weathering
- c) Physical weathering
- d) Sedimentation

**Answer:** (c) Physical weathering

8. What is the vertical section of the soil from the surface to the parent rock called?

- a) Soil formation
- b) Soil profile
- c) Soil erosion
- d) Soil horizon

**Answer:** (b) Soil profile

9. Which layer of the soil contains the most **humus**?

- a) Bedrock
- b) Subsoil
- c) Topsoil
- d) Parent rock

**Answer:** (c) Topsoil

10. Which of the following methods helps in soil conservation?

- a) Deforestation
- b) Terracing of hill slopes
- c) Over-cultivation
- d) Burning of vegetation

**Answer:** (b) Terracing of hill slopes

## **PART II (50 Marks)**

1. With reference to weathering, answer the following:

a) Define weathering.

**Answer:** Weathering is the process of breaking down rocks into smaller fragments due to physical, chemical, or biological factors **in situ** (at the same place).

b) Mention the three types of weathering.

**Answer:** The three types of weathering are **Physical Weathering, Chemical Weathering, and Biological Weathering.**

**2. Differentiate between physical and chemical weathering.**

| Feature | Physical Weathering  | Chemical Weathering   |
|---------|--|---|
| Process | Breakdown due to physical forces like temperature, wind, water | Breakdown due to chemical reactions with air, water, or acids |
| Example | Exfoliation, frost action                                      | Oxidation, carbonation  |
| Region  | Common in deserts, polar areas                                 | Common in humid regions                                       |

**3. Explain the process of oxidation and carbonation.**

**Answer:**

- **Oxidation:** Oxygen reacts with minerals in rocks, particularly iron, to form iron oxide (rust), which weakens the rock and causes it to break down.
- **Carbonation:** Carbon dioxide in the air dissolves in rainwater, forming **carbonic acid**. This weak acid reacts with limestone and dolomite, leading to the formation of caves and sinkholes.

**4. Explain the factors affecting weathering.**

**Answer:** The factors influencing weathering include:

- **Temperature changes:** Expansion and contraction cause mechanical weathering.
- **Water availability:** Moisture speeds up chemical weathering.
- **Mineral composition:** Soft minerals weather faster than hard minerals.
- **Vegetation:** Roots break rocks apart, aiding biological weathering.
- **Human activities:** Mining, deforestation, and construction accelerate weathering.

**5. Describe the layers of a soil profile.**

**Answer:**

A **soil profile** has four main layers:

- **O Horizon (Organic Layer):** Contains decomposed plant material and humus.
- **A Horizon (Topsoil):** Rich in humus and minerals, essential for plant growth.
- **B Horizon (Subsoil):** Contains clay and minerals leached from the topsoil.
- **C Horizon (Weathered Rock):** Composed of broken rocks from which soil is formed.
- **R Horizon (Bedrock):** The solid rock layer beneath all other layers.

## 6. What is soil erosion? Mention two types of soil erosion.

**Answer:** Soil erosion is the process of removal and displacement of the topsoil by wind, water, or human activities.

### Types of Soil Erosion:

- **Sheet Erosion:** The top layer of soil is washed away due to rainfall over large areas.
- **Gully Erosion:** Deep channels or gullies are formed on slopes due to heavy water flow.

## 7. How can soil erosion be prevented?

**Answer:** Soil conservation methods include:

- **Afforestation:** Planting trees to bind the soil.
- **Terracing:** Constructing step-like terraces on slopes.
- **Crop Rotation:** Growing different crops to maintain soil fertility.
- **Contour Ploughing:** Ploughing along natural land contours to reduce runoff.

## Mapping Questions:

Shade and mark the following on the world map:

1. A region where **exfoliation** occurs – **Sahara Desert**
2. A region where **frost action** is common – **Canada / Greenland**
3. A region known for **karst topography due to carbonation** – **Limestone caves in China**
4. An area in India where **sheet erosion** is a problem – **Gangetic Plains**
5. A major region affected by **gully erosion** in India – **Chambal Valley, Madhya Pradesh**