Chapter – 11

Air Around Us

2marks:

1. What is the composition of air?

Answer:

Air comprises water vapour, oxygen, nitrogen, carbon dioxide, dust and smoke.

2. Which gas in the atmosphere is essential for respiration?

Answer:

Oxygen in the atmosphere is essential for respiration.

3. How will you prove that air supports burning?

Answer:

Place two candles of the same length on a table. Light both candles. Cover one of the candles with an inverted glass tumbler. We can observe that the candle covered with the glass tumbler got extinguished after some time, whereas the other candle continued burning. The candle gets extinguished because the air component inside of the glass tumbler, which supports burning, is limited. Most of the component is used up by the burning candle. However, the

other candle is getting a continuous supply of air. This component of air, which supports burning, is known as oxygen.

4. How will you show that air is dissolved in water?

Answer:

Take some water in a container. Heat it slowly on a tripod stand. Before the water begins to boil, look at the inner surface of the container. We observe tiny bubbles inside.

These bubbles come from the air dissolved in water. When you heat the water, to begin with, the air dissolved in it escapes. This experiment concludes that air is present in the water.

5. Why does a lump of cotton wool shrink in water?

Answer:

The lump of cotton wool shrink in water because the air inside the cotton lumps is replaced by water which makes the layer stick together.

6. List five activities that are possible due to the presence of air.

Answer:

The five activities that are possible due to air are as follows:

1. Photosynthesis

2. Cloud formation

3. Respiration

4. Transpiration

5. Winnowing

7. How do plants and animals help each other in the exchange of gases in the atmosphere?

Answer:

During the process of respiration, animals and plants consume oxygen from the air and release carbon dioxide gas into the air. Besides, green plants also release oxygen gas by utilising carbon dioxide during the process of photosynthesis. Hence, in this way, plants and animals help each other in the exchange of gases in the atmosphere.

5marks:

1.Explain the composition of air and its significance in supporting life.

Answer:

Air is composed of a mixture of gases, primarily nitrogen (78%), oxygen (21%), carbon dioxide (0.04%), and trace amounts of other gases. The presence of oxygen is crucial for the survival of most living organisms. It is involved in the process of respiration, which releases energy from food. Nitrogen is essential for the growth of plants. Carbon dioxide, although present in small amounts, is vital for photosynthesis in plants.

2.Describe the process of respiration and its role in the utilization of air by living organisms.

Answer:

Respiration is the process by which living organisms take in oxygen and release carbon dioxide. In humans and animals, respiration involves breathing, where oxygen from the air is taken into the body and used to break down glucose in cells, releasing energy. The waste product, carbon dioxide, is then expelled from the body during exhalation. This process is crucial for the release of energy required for various life processes.

3.Discuss the role of air in the water cycle.

Answer:

Air plays a vital role in the water cycle. It is involved in the processes of evaporation, condensation, and precipitation. When water on the Earth's surface is heated, it evaporates and turns into water vapor, which rises into the atmosphere. As the air cools, the water vapor condenses to form clouds. Eventually, precipitation occurs when the water droplets in clouds combine and fall to the Earth as rain, snow, sleet, or hail. Thus, air is a key component in the continuous movement of water in the water cycle.

4.Explain the concept of air pressure and its variations at different altitudes.

Answer:

Air pressure is the force exerted by the air molecules on a given surface. It decreases with increasing altitude. At sea level, air pressure is higher due to the weight of the air column above. As one goes higher in the atmosphere, there are fewer air molecules, leading to lower pressure. This is why atmospheric pressure is lower at high altitudes. It is essential to note that changes in weather conditions can also affect air pressure.

5.Elaborate on the role of air in the dispersal of seeds and pollination.

Answer:

Air plays a crucial role in the dispersal of seeds and pollination. Some plants have adaptations for wind dispersal, where seeds are lightweight and equipped with structures like wings or hairs that help them be carried away by the wind. In pollination, air can carry pollen from the male reproductive organ (stamen) to the female reproductive organ (pistil) of flowers. This movement of pollen is essential for the fertilization of many plants.

6.Discuss the impact of human activities on air quality and the environment.

Answer:

Human activities, such as industrial processes, vehicle emissions, and deforestation, contribute to air pollution. The release of pollutants like carbon dioxide, sulfur dioxide, and nitrogen oxides can harm air quality and have detrimental effects on the environment. These pollutants can lead to respiratory problems in humans, damage ecosystems, and contribute to climate change. Sustainable practices and environmental awareness are crucial to mitigate these impacts.

7.Explain the role of the ozone layer in protecting life on Earth.

Answer:

The ozone layer is a region in the Earth's stratosphere that contains a high concentration of ozone (O3) molecules. It plays a crucial role in protecting life on Earth by absorbing the majority of the sun's harmful ultraviolet (UV) radiation. UV radiation can cause skin cancer, cataracts, and other health issues in humans, as well as harm ecosystems. The ozone layer acts as a shield, preventing most of these harmful rays from reaching the Earth's surface.

8.Describe the process of combustion and its connection to the presence of oxygen in the air.

Answer:

Combustion is a chemical process that involves the rapid reaction between a substance and oxygen, usually accompanied by the release of heat and light. For combustion to occur, three essential elements are needed: fuel, heat, and oxygen. The presence of oxygen in the air is crucial for sustaining combustion. In the absence of oxygen, combustion cannot take place. This process is fundamental in activities like burning wood, fossil fuels, and other materials for various purposes.

9.Discuss the role of air in weather phenomena such as winds, cyclones, and tornadoes.

Answer:

Air is a major factor in the creation of weather phenomena. Winds are the horizontal movement of air, driven by differences in air pressure. Cyclones and tornadoes are intense wind systems. Cyclones are large-scale rotating atmospheric systems that form over warm ocean waters, while tornadoes are smaller, localized whirlwinds that form during severe thunderstorms. These phenomena are driven by the movement and interactions of air masses, emphasizing the dynamic nature of the Earth's atmosphere.

10.Explain the importance of maintaining air quality for the well-being of living organisms.

Answer:

Maintaining air quality is essential for the well-being of living organisms. Clean air supports the respiratory processes of humans and animals, ensuring the intake of oxygen and the removal of carbon dioxide. Air quality also affects plant growth and the health of ecosystems. Poor air quality, characterized by high levels of pollutants, can lead to respiratory diseases, environmental degradation, and disruptions in the balance of ecosystems. Therefore, it is crucial to adopt measures that promote clean air and sustainable practices.

Fill in the blanks:

1.Air is a _____ of gases, including nitrogen, oxygen, carbon dioxide, and others.

Answer:

mixture

2.The process by which living organisms take in oxygen and release carbon dioxide is known as _____.

Answer:

respiration

3.The primary gas responsible for supporting combustion is _____.

Answer:

oxygen

4.In the water cycle, water vapor in the air undergoes _____ to form clouds.

Answer:

condensation

5.Air pressure _____ with increasing altitude, and it is

lower at high altitudes.

Answer:

decreases

6.The ozone layer in the Earth's _____ absorbs harmful ultraviolet radiation from the sun.

Answer:

stratosphere

7.Combustion is a chemical process that requires three elements: fuel, heat, and _____.

Answer:

oxygen

8.The horizontal movement of air is known as _____, driven by differences in air pressure.

Answer:

winds

9.Cyclones are large-scale rotating atmospheric systems that form over warm _____ waters.

Answer:

ocean

10.Poor air quality, characterized by high levels of pollutants, can lead to respiratory diseases and environmental _____.

Answer:

Degradation

Multiple choice:

1.What is the most abundant gas in the Earth's atmosphere?

a) Carbon dioxide

b) Nitrogen

c) Oxygen

d) Hydrogen

Answer:

b) Nitrogen

2.Which process involves the exchange of oxygen and carbon dioxide between living organisms and the environment?

a) Photosynthesis

b) Respiration

c) Combustion

d) Evaporation

Answer:

b) Respiration

3.What is the primary role of the ozone layer in the Earth's atmosphere?

a) Producing oxygen

b) Absorbing ultraviolet radiation

c) Regulating air pressure

d) Facilitating combustion

Answer:

b) Absorbing ultraviolet radiation

4.What is the term for the vertical movement of air, usually accompanied by the formation of rain clouds?

a) Wind

b) Cyclone

c) Updraft

d) Convection

Answer:

d) Convection

5.What is the main function of oxygen in the process of combustion?

a) Providing heat

b) Supporting the fire

c) Initiating the reaction

d) Suppressing flames

Answer:

c) Initiating the reaction

6.Which atmospheric layer contains the ozone layer?

a) Troposphere

b) Stratosphere

c) Mesosphere

d) Thermosphere

Answer:

b) Stratosphere

7.What process involves the conversion of water vapor into liquid water or ice crystals in the atmosphere?

a) Condensation

b) Evaporation

c) Precipitation

d) Transpiration

Answer:

a) Condensation

8.What is the primary gas responsible for supporting the process of respiration in living organisms?

a) Nitrogen

b) Oxygen

c) Carbon dioxide

d) Hydrogen

Answer:

b) Oxygen

9.Which phenomenon involves the rapid movement of air in a rotating column, often causing destructive winds?

a) Tornado

b) Cyclone

c) Hurricane

d) Typhoon

Answer:

a) Tornado

10What is the term for the weight of the air pressing down on the Earth's surface?

a) Atmospheric density

b) Air resistance

c) Atmospheric pressure

d) Air buoyancy

Answer:

c) Atmospheric pressure

Summary:

The concept of "Air Around Us" focuses on the composition and significance of the Earth's atmosphere. Air is a mixture of gases, primarily nitrogen, oxygen, and trace amounts of others, essential for supporting life. The process of respiration, where living organisms take in oxygen and release carbon dioxide, is crucial for energy production. Air also plays a pivotal role in the water cycle, influencing processes like evaporation, condensation, and precipitation. The atmospheric pressure varies with altitude, and the ozone layer in the stratosphere protects life on Earth by absorbing harmful ultraviolet radiation. Combustion, a chemical process requiring oxygen, is explored in the context of its role in various activities. Additionally, air contributes to weather phenomena, such as winds, cyclones, and tornadoes.

Understanding and maintaining air quality are emphasized, as human activities can impact air composition and lead to environmental and health consequences. Overall, the study of "Air Around Us" provides a comprehensive understanding of the dynamic interactions between air and living organisms, ecosystems, and the Earth's processes.