Chapter	10 Human Respiratory System	Class	1st Year	Subject	Biology

Give Short Answers of the Following Questions

1. Define respiratory surface and list properties.

Ans. A respiratory surface is a specialized area where gas exchange (oxygen and carbon dioxide) occur between an organism and its environment.

Properties:

- **Moist:** Facilitates diffusion of gases.
- **Thin:** Minimize diffusion distance (e.g., one-cell thick in alveoli).
- **Large Surface Area:** Enhances gas exchange efficiency.
- **Ventilated:** Ensures continuous supply of fresh air.

2. How nasal cavity functions in filtering the inhaled air?

Ans. Function of Nasal Cavity:

- **Hairs (Vibrissae):** Trap large particles like dust.
- **Mucus:** Captures smaller particles and pathogens.
- **Ciliated Epithelium:** Sweeps mucus and trapped debris toward the throat.
- **Warms and Humidifies Air:** Blood vessels in nasal mucosa adjust air temperature and moisture.

3. Trace the path of pair of air through different parts of the respiratory system.

Ans. Path of air through Different Parts of the Respiratory System:

- **Nasal Cavity/Oral Cavity:** Air enters.
- **Pharynx:** Shared pathway for air and food.
- **Larynx:** Contains vocal cords; directs air trachea.
- **Trachea:** Windpipe reinforced with cartilage rings.
- **Bronchi**: Branched into left and right lungs.
- **Bronchioles:** Smaller branches within lungs.
- **Alveoli:** Site of gas exchange.

4. Describe the structure and function of alveoli,

Ans. Structure and Functions of Alveoli.

- Tiny, grape-like sacs surrounding by capillaries.
- Thin walls (one-cell thick) composed of squamous epithelium.

Function:

- Oxygen diffuses into blood from alveoli.
- Carbon dioxide diffuses out blood into alveoli for exhalation.

5. What is the role diaphragm during inhalation and exhalation?

Ans. Role of Diaphragm During inhalation and Exhalation:

Inhalation: Diaphragm contracts, flattens, and moves downward, expanding the thoracic cavity. Create negative pressure, pulling air into lungs.

Exhalation: Diaphragm relaxes, domes upward reducing thoracic cavity volume. Increases pressure, forcing air out.

6. What the three ways of the transport of carbon dioxide in blood?

Ans. (i) As Bicarbonate Ions [72%]:

- Approximately 72% of carbon dioxide is carried in the blood as bicarbonate ions.
- **Formation of H_2CO_3:** CO_2 enters the RBCs and combines with water to form carbonic acid (H_2CO_3) in the presence of enzyme carbonic anhydrase.
- Carbonic acid (H_2CO_3) disassociates form hydrogen ions (H^+) and bicarbonate ions (HCO_3^-).
- **Dissociation of H+ and HCO^-_3 Ions:** The hydrogen ion readily associates with oxyhaemoglobin and oxygen of oxyhaemoglobin is released to the tissue.
- While the bicarbonate ions (HCO_3^-) moves out from RBCs into plasma.

(ii) As Carbonxhyaemoglobin [20%]:

- About 20% of CO_2 is carried as carboxhyaemoglobin.
- When partial pressure of CO_2 is higher in blood than tissues, CO_2 combines with globin chains of haemoglobin and forms carboxyhaemoglobin.

(iii) As dissolved CO_2 in plasma [08%]:

- When CO_2 enters blood, a little amount dissolves in the water of blood plasma. About 8% of CO_2 is carried this way**.**

7. What are the advantages of having million of alveoli rather than a pair of simple balloon-like lungs?

Ans. Advantages of Having Millions of Alveoli:

- **Increased Surface Area:** Millions of alveoli provide ~70 m^2 surface area for efficient gas exchange.
- **Optimal Diffusion:** Thin walls and proximity to capillaries maximize diffusion rate.
- **Reduced Dead Space:** Alveoli prevent air stagnation, unlike large, hollow balloons.

8. Differentiate between:

Ans. Internal and External respiration:

Internal: Cellular process; oxygen used to produce ATP, CO_2 generated as waste.

External: Exchange of gases between lungs and blood (alveoli and capillaries).

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9. Differentiate between:

(ii) Upper and Lower respiratory tract:

Ans. Upper: Nose, nasal, cavity, pharynx, (filters/warms air).

Lower: Larynx, trachea, bronchi, lungs, (conducts air to alveoli).

10. Differentiate between:

(iii) Bronchi vs. Bronchioles:

Ans. Bronchi: Larger, cartilage-supported tubes entering lungs.

Bronchioles: Smaller, smooth muscles-lined branches ending in alveoli.

11. Differentiate between:

Hemoglobin vs. Myoglobin:

Ans. Hemoglobin: In red blood cells; transports O_2 from lungs to tissues.

Myoglobin: In muscle cells; stores O_2 for use during muscle contraction.