**Pakistan School , Kingdom of Bahrain**

**E- Support and Learning Material / Session 2020-2021**

**Subject: Biology Grade : 12**

**Book: Biology Grade 12 (NBF) FIRST TERM**

***NOTE: FOR HSSC CLASSES PRESCRIBED TEXTBOOKS ARE THE MAIN SOURCE OF INFORMATION. FOLLOW THE TEXTBOOK ACCORDING TO ONLINE LECTURES. SAMPLE NOTES ARE PROVIDED FOR YOUR ASSISSTANCE.***

**Chapter 14: Respiration**

**Q.1 What is respiratory surface? Write the properties of respiratory surface.**

**Ans:** The area where gaseous exchange with the environment actually takes place is called respiratory surface. Gaseous exchange takes place in all organisms by the physical process of diffusion.

For effective diffusion respiratory surface must have following properties

1. It must be permeable so the gas so that the gases can pass through it.
2. It must be thin for efficient diffusion.
3. It should possess a large surface area so that sufficient amounts of gases are able to be exchanged according to the organisms need.
4. It should possess a good supply
5. There should be a good ventilation mechanism to main a steep diffusion gradient across the respiratory surface

**Q. 2 Which organs constitute the respiratory system?**

**Ans. Respiratory system consists of**

1. Nose ii. Nasal Cavity iii. Pharynx iv. Larynx

 v. Trachea vi. Bronchi vii. Bronchioles viii. Alveoli

 ix. Lungs

**Q. 3 How nose and nasal cavity function in filtering the incoming air?**

Ans . Nose and nasal cavity filter the incoming air in three ways

1. **Hair**: Hair are present on the inside of the nostrils that help in filtering the harmful pathogens and solid particulate matter from air.
2. **Mucus:** Both nostrils and the nasal cavities are lined by mucous membrane that secretes a sticky substance that is called mucus. It traps foreign particles like microorganisms and dust etc. and prevents their entry to the respiratory system.
3. **Cilia:** Cilia remove the trapped substances to the pharynx for their removal.

**Q. 4 What is the role of pharynx in human respiration**

**Ans: T**he **pharynx's respiratory** role is mainly to allow inhaled air entering the nasal cavity to make its way to the **respiratory tract** – which includes the larynx, the **trachea** or “windpipe” and finally the lungs' bronchioles and alveoli where **respiration** takes place.

**Q. 5 Describe the structure and function of human larynx.**

Ans: Larynx, also called voice box, a hollow, tubular structure connected to the top of the windpipe (**trachea**); air passes through the larynx on its way to the lungs. The larynx also produces vocal sounds and prevents the passage of food and other foreign particles into the lower respiratory tracts.

**Q. 6 Describe the structure and function of alveoli.**

**Ans.** Alveoli are an important part of the respiratory system whose function it is to exchange oxygen and carbon dioxide molecules to and from the bloodstream. These tiny, balloon-shaped air sacs sit at the very end of the respiratory tree and are arranged in clusters throughout the lungs.

**Q. 7 Describe the structure and function of pleura.**

**Ans.** The pleura is a serous membrane which folds back onto itself to form a two-layered membrane structure. The thin space is known as the pleural cavity and contains a small amount of pleural fluid. It reduces friction during respiration.

**Q. 8 How does the contraction and relaxation of lungs takes place?**

**Ans.** Humans have two lungs , a right and a left which are located in the thoracic cavity. The lungs neither draw in air nor push it out. The diaphragm, abdominal muscles and the intercostal muscles provide help in contraction and relaxation.

**Q. 9 What is respiratory volume?**

**Ans.**

**Q. 10 What is chloride shifts?**

**Ans.** The phenomenon of balancing of ions in two opposite directions by the help of proteins, which result in maintenance of balance of ions on either side is called shifts or Hamburgers phenomenon.

For example: from inside the erythrocytes (RBC) negatively charged HCO-3 ions diffuse to plasma. This is balanced by the diffusion of the chloride ions in opposite direction. This is achieved by special bicarbonate chloride carrier proteins that are present in RBC membrane.

**Q. 11 What are the differences between myoglobin and hemoglobin?**

**Ans.**

|  |  |  |  |
| --- | --- | --- | --- |
|  | **Haemoglobin**  |  | **Myoglobin** |
| **1** | It consists of 4 polypeptide chains. | **1** | It consists of one polypeptide chain. |
| **2** | Each molecule possesses four iron containing haem groups. | **2** | Each molecule possesses one iron containing haem group. |
| **3** | Four oxygen molecules can bind to each haemoglobin molecule. | **3** | One oxygen molecule can bind to each haemoglobin molecule. |
| **4** | It is found in RBCs. | **4** | It is found in muscles. |
| **5** | It transports oxygen. | **5** | It stores oxygen. |
| **6** | It has less affinity with oxygen. | **6** | It has more affinity with oxygen. |
| **7** | It loses oxygen at PO2 60 mmHg | **7** | It loses oxygen at PO2 20 mmHg |

**Q. 12 What is the role of respiratory pigments?**

**Ans.** A respiratory pigment molecule that involves in transport or storage of respiratory gases. In humans, haemoglobin that increases the oxygen carrying capacity of blood and myoglobin that stores oxygen in muscles are referred as respiratory pigments.

**Q. 13 What are the causes of lung cancer?**

**Ans.**  Smoking is the main cause of lung cancer because tobacco smoke contains many carcinogens (cancer causing substances). In addition to this, asbestos, arsenic, radiations such as gamma and x-rays, the sun, and compounds in car exhaust fumes are all examples of carcinogens.

**Q. 14 What are the advantages of having millions of alveoli rather than a pair of simple balloon like lungs?**

**Ans.**

**a.** The alveoli form the gas exchange surface.

**b.** The wall of each alveolus is only 0.1 micrometer thick.

**c.** On the outside of the alveoli there is a dense network of blood capillaries.

**d.** Lining of each alveolus is moist which increases the absorption ability of alveolus.

Over 700 million alveoli are present in the lungs representing a total surface area of 70-90 m thus, making the exchange efficient.

**MCQs:**

1. **When blood leaves the capillary bed, most of the carbon dioxide is in the form of:**

A) Carbonate ions.

B) Bicarbonate ions.

C) Hydrogen ions.

D) Hydroxyl ions.

1. **Which of the following is the respiratory surface in human:**

A) larynx.

B) trachea.

C) bronchi.

D) alveoli.

1. **How is most of the oxygen transported in the blood?**

A) dissolved in plasma.

B) bound to haemoglobin

C) as bicarbonate.

D) dissolved in water.

1. **Breathing is an example of:**

A) counter current exchange.

B) cellular respiration.

C) ventilation.

D) diffusion.

1. **Respiratory pigments**:

A) combine reversibly only with oxygen.

B) all have four haem groups.

C) attached to the alveolar wall.

D) none of them.