

# **CHAPTER NO.3**

# **RESPIRATORY**

# **SYSTEM OF A**

# **MAN**

**(Review Exercise)**

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# Short Question And Answers

What is respiratory surface? Write the properties of respiratory surface.

Respiratory surface is the part where exchange of gases ( $O_2$  and  $CO_2$ ) takes place between body and environment. It must be thin, moist, and richly supplied with blood vessels. It should also have a large surface area. In humans, alveoli act as respiratory surface.

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What organs constitute the respiratory system?

The human respiratory system includes nose, nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles, and lungs. Inside the lungs are alveoli which are the main sites of gas exchange. Diaphragm and intercostal muscles help in breathing movements.

How nose and nasal cavity function in filtering the incoming air?

Nose hairs trap dust and larger particles from air. The nasal cavity is lined with mucus that catches smaller particles and germs. Cilia move the trapped dust towards throat to be swallowed or expelled. Thus, incoming air becomes cleaner and moist.

What is the role of 'pharynx' in human respiration?

Pharynx is a common passage for air and food. During breathing, it allows air from nasal cavity to pass towards larynx and trachea. It also helps in producing sound by acting as a resonating chamber.

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Describe function of human larynx.

The larynx is also called the voice box. It allows passage of air into the trachea and lungs. Vocal cords in the larynx produce sound when air passes through them. It also prevents entry of food into the trachea by the action of epiglottis.

Describe the structure and function of alveoli.

Alveoli are tiny balloon-like sacs present in clusters at the end of bronchioles. They have very thin walls (one-cell thick) and are surrounded by capillaries. Their large number provides a wide surface area. They exchange oxygen and carbon dioxide between blood and air.

How the contraction and relaxation of human lungs take place?

During inspiration, diaphragm contracts and moves downward, while intercostal muscles lift the ribs up, expanding chest cavity. This increases lung volume and air enters. During expiration, diaphragm relaxes, ribs move down, chest cavity reduces and air goes out.

What is chloride shift?

Chloride shift is the exchange of chloride ions ( $\text{Cl}^-$ ) with bicarbonate ions ( $\text{HCO}_3^-$ ) across red blood cell membrane. It helps in transport of carbon dioxide in blood. This maintains ionic balance and allows efficient  $\text{CO}_2$  removal from body.

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

Millions of alveoli provide a very large surface area for gas exchange. This ensures maximum oxygen absorption and carbon dioxide removal. Thin alveolar walls and rich blood supply make exchange faster. Simple balloon-like lungs would not meet oxygen demand of body.

# Multiple Choice Questions

## (MCQ's)

### Section I: Multiple Choice Questions

Select the correct answer:

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
2. When you inhale, the diaphragm
  - ☒ A. relaxes and moves upward
  - B. relaxes and moves downward
  - ~~C. contracts and moves upward~~
  - ~~D. contracts and moves downward~~
3. With which other system do specialised respiratory systems most closely interface exchanging gases between the cells and the environment?
  - A. the skin
  - B. the excretory system
  - ☒ C. the circulatory system
  - D. the muscular system
4. Which of the following is the respiratory surface in human respiratory system:
  - A. larynx
  - B. trachea
  - C. bronchi
  - ☒ D. alveoli

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5. How is most of the oxygen transported in the blood?

- A. dissolved in plasma
- C. as bicarbonate

- ☒ D. bound to haemoglobin
- D. dissolved in water

6. The lateral walls of the chest cavity of man are composed of the:

- A. ribs

- B. intercostal muscles

- ☒ C. ribs and intercostal muscles

- D. ribs, intercostal muscles and diaphragm

7. Which of the following factors is the most effective in accelerating the rate of breathing in man?

- A. a lack of oxygen in the blood

- B. a lack of oxygen in the tissues

- C. an excess of carbon dioxide in the lungs

- ☒ D. an excess of carbon dioxide in the blood

8. Which of the following changes will increase the body's rate of carbon dioxide excretion into the alveoli?

- A. holding the breath

- B. the breakdown of alveolar tissue as a result of disease

- ☒ C. a decrease in the partial pressure of carbon dioxide in the alveolar air

- D. a decrease in the pulmonary circulation

9. Breathing is an example of

- A. counter current exchange

- B. cellular respiration

- ☒ C. ventilation

- D. diffusion

10. Which sequence most accurately describes the sequence of airflow in the human respiratory system?

1. pharynx

2. bronchus

3. trachea

4. larynx

5. alveolus

6. bronchiole

- A. 4, 1, 3, 2, 5, 6

- B. 1, 4, 3, 2, 5, 6

- C. 4, 1, 3, 2, 6, 5

- ☒ D. 1, 4, 3, 2, 6, 5

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11. Which one of the following changes takes place during inspiration?

- A. Decrease in thoracic cavity
- B. Relaxation in diaphragm
- C. Relaxation in external intercostal muscles

☒ D. Sternum moves towards ventral and anterior direction

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12. The volume of air that can be exhaled after normal exhalation is the

- A. tidal volume
- B. residual volume

C. inspiratory reserve volume ☒ D. expiratory reserve volume

13. Hemoglobin

- A. combine reversely with only oxygen
- C. attach to the alveolar wall

☒ B. all have four heme group

- D. none of them

14. The maximum volume of air contained in the lung by a full forced inhalation is called \_\_\_\_\_.

- A. Tidal volume
- B. Vital capacity

C. Ventilation rate ☒ D. Total lung capacity

Dissociation of  $O_2$  from oxyhaemoglobin is facilitated by:

- A. decreased temperature
- C. decreased  $PO_2$

- B. decreases  $H^+$
- D. exercise

16. Which of these correctly orders the structures through which air passes during inhalation?

- A. pharynx → trachea → larynx → bronchi
- B. pharynx → larynx → trachea → bronchi
- C. larynx → pharynx → bronchi → trachea
- D. larynx → pharynx → trachea → bronchi

17. The pharynx is also known as the:

- A. windpipe
- C. voice box

- B. trachea
- D. throat

18. What is the correct path air takes when it enters the trachea on its way to the lungs?

- A. bronchi / bronchioles / pulmonary capillaries / alveoli
- B. bronchioles / bronchi / alveoli / pulmonary capillaries
- C. bronchi / pulmonary capillaries / alveoli / bronchioles
- D. bronchi / bronchioles / alveoli / pulmonary capillaries

19. Which of the following is correct for the partial pressure of oxygen in alveoli?

- A. less than carbon dioxide
- B. less than the blood
- C. more than the blood
- D. equal to that of the blood

20. Which of the following is the respiratory surface in human respiratory system?

- A. larynx
- C. bronchi

- B. trachea
- D. alveoli

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