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Biology Grade 12 — Chapter 3

Respiratory System of Man

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Independent practice MCQs from the supplied Class 12 Biology notes pack. Total: 50 questions.

A. Important / Main Topics

1. The area where gaseous exchange with the environment actually takes place is called the:

(A) Respiratory surface
(B) Respiratory tract
(C) Alveolar duct
(D) Bronchus

Correct Answer: A

Explanation: The area where gaseous exchange with the environment actually takes place is called the respiratory surface.

2. The human respiratory system is divided into:

(A) Central and peripheral tracts
(B) Upper and lower respiratory tracts
(C) Thoracic and abdominal tracts
(D) Internal and external tracts

Correct Answer: B

Explanation: The human respiratory system can be divided into two regions: the upper respiratory tract and the lower respiratory tract.

3. The upper respiratory tract includes:

(A) Larynx, trachea, and bronchi
(B) Trachea, bronchi, and lungs
(C) Nostrils, nasal cavity, and pharynx
(D) Alveoli and bronchioles

Correct Answer: C

Explanation: The upper respiratory tract includes Nostrils, nasal cavity, and pharynx.

4. The opening of the larynx is called the:

(A) Epiglottis
(B) Pharynx
(C) Trachea
(D) Glottis

Correct Answer: D

Explanation: The opening of the larynx is called the glottis.

5. The trachea is reinforced with:

(A) 15–20 C-shaped pieces of cartilage
(B) Complete rings of cartilage
(C) No cartilage
(D) Bone

Correct Answer: A

Explanation: The trachea consists of dense regular tissue and smooth muscle reinforced with 15–20 C-shaped pieces of cartilage.

6. The site of gas exchange in the lungs is the:

(A) Bronchi
(B) Alveoli

(C) Bronchioles
(D) Trachea

Correct Answer: B

Explanation: The alveolar ducts end at tiny air-filled chambers called alveoli, which are the sites of gas exchange between the air and the blood.

7. How many alveoli are present in the lungs?

(A) Over 700 thousand
(B) Over 7 million
(C) Over 700 million
(D) Over 70 million

Correct Answer: C

Explanation: There are over 700 million alveoli present in the lungs.

8. The wall of each alveolus is only:

(A) 1.0 µm thick
(B) 0.01 µm thick
(C) 10 µm thick
(D) 0.1 µm thick

Correct Answer: D

Explanation: The wall of each alveolus is only 0.1 µm thick, reducing the distance over which diffusion must occur.

9. During inspiration, the diaphragm:

(A) Contracts and moves downward
(B) Relaxes and moves upward
(C) Relaxes and moves downward
(D) Contracts and moves upward

Correct Answer: A

Explanation: During inspiration, the diaphragm Contracts and moves downward.

10. Approximately what percentage of oxygen is carried by red blood cells as oxyhaemoglobin?

(A) 3%
(B) 97%
(C) 23%
(D) 70%

Correct Answer: B

Explanation: Approximately 97% of oxygen is carried by the red blood cells as oxyhaemoglobin, while 3% is transported as dissolved oxygen in the plasma.

11. The enzyme that catalyzes the reaction between carbon dioxide and water is:

(A) Acetylcholinesterase
(B) Monoamine oxidase
(C) Carbonic anhydrase
(D) Catalase

Correct Answer: C

Explanation: Carbon dioxide combines with water to form carbonic acid in the presence of enzyme carbonic anhydrase.

12. Most carbon dioxide is transported in the blood as:

(A) Carbaminohaemoglobin
(B) Dissolved in plasma
(C) Carbonic acid
(D) Bicarbonate ions

Correct Answer: D

Explanation: Approximately 70% of carbon dioxide is carried in the blood as bicarbonate ions.

13. Which respiratory pigment is found in muscles?

(A) Myoglobin
(B) Haemoglobin
(C) Chlorophyll
(D) Melanin

Correct Answer: A

Explanation: Myoglobin is found in skeletal muscles and stores oxygen.

14. The maximum oxygen carrying capacity of arterial blood is:

(A) 5 ml/100 ml of blood
(B) 20 ml/100 ml of blood
(C) 10 ml/100 ml of blood
(D) 30 ml/100 ml of blood

Correct Answer: B

Explanation: Maximum oxygen carrying capacity of arterial blood is 20 ml/100 ml of blood (100% saturated).

15. The chloride shift is also called:

(A) Bohr effect
(B) Haldane effect
(C) Hamburger's phenomenon
(D) Starling's law

Correct Answer: C

Explanation: The exchange of bicarbonate ions out of the red blood cell and chloride ions into the red blood cell is called the chloride shift or Hamburger's phenomenon.

16. What is the function of the epiglottis?

(A) To produce sound
(B) To warm the air
(C) To filter dust particles
(D) To prevent food from entering the air passages

Correct Answer: D

Explanation: During swallowing, the epiglottis partially covers the opening into the larynx and helps to prevent foods and liquids from entering the air passages.

17. What is the function of surfactant in the alveoli?

(A) To lower surface tension and prevent alveoli from closing
(B) To increase surface tension
(C) To produce mucus
(D) To filter blood

Correct Answer: A

Explanation: Surfactant is a film of lipoprotein that lowers the surface tension and prevents alveoli from closing.

18. Which muscles are responsible for expanding the thoracic cavity during inspiration?

(A) Internal intercostals and abdominal muscles
(B) Diaphragm and external intercostals
(C) Diaphragm and internal intercostals
(D) Abdominal muscles and external intercostals

Correct Answer: B

Explanation: Diaphragm and external intercostals — this correctly answers the question.

19. What is the role of the breathing center in the medulla?

(A) To control heart rate
(B) To produce sound
(C) To carry out involuntary control of breathing
(D) To filter air

Correct Answer: C

Explanation: To carry out involuntary control of breathing — this correctly answers the question.

20. What is the function of the inspiratory center?

(A) To inhibit inspiration
(B) To stimulate expiration
(C) To control heart rate
(D) To increase the rate and depth of inspiration

Correct Answer: D

Explanation: The ventral portion of the breathing center acts to increase the rate and depth of inspiration and is called the inspiratory center.

21. What is the function of the expiratory center?

(A) To inhibit inspiration and stimulate expiration
(B) To increase inspiration
(C) To control heart rate
(D) To produce sound

Correct Answer: A

Explanation: To inhibit inspiration and stimulate expiration — this correctly answers the question.

22. What is the function of haemoglobin?

(A) To store oxygen in muscles
(B) To transport oxygen in the blood
(C) To produce carbon dioxide
(D) To digest food

Correct Answer: B

Explanation: Haemoglobin is the respiratory pigment found in red blood cells that transports oxygen from the lungs to the tissues.

23. What is the function of myoglobin?

(A) To transport oxygen in the blood
(B) To produce carbon dioxide
(C) To store oxygen in muscles
(D) To digest food

Correct Answer: C

Explanation: Myoglobin is found in skeletal muscles and serves as an intermediate compound for the transfer of oxygen from haemoglobin to aerobic metabolic processes of the muscle cells.

24. What is the Bohr effect?

(A) Increased oxygen binding at high pH
(B) Increased carbon dioxide transport at high pH
(C) Decreased carbon dioxide transport at low pH
(D) Decreased oxygen affinity at low pH

Correct Answer: D

Explanation: The Bohr effect describes how decreased pH reduces the affinity of haemoglobin for oxygen, enhancing oxygen delivery to tissues.

25. What is the function of the vestibular hairs in the nasal cavity?

(A) To filter large dust particles
(B) To produce mucus
(C) To warm the air
(D) To detect odors

Correct Answer: A

Explanation: The anterior part of nasal cavities that contain hairs is called vestibule, and these hairs filter the large dust particles of the inhaled air.

B. Less Important / Secondary Topics

26. What is the function of the ciliated mucous epithelium in the respiratory tract?

(A) To trap fine dust particles and microbes
(B) To produce sound
(C) To produce red blood cells
(D) To digest food

Correct Answer: A

Explanation: To trap fine dust particles and microbes — this correctly answers the question.

27. What is the function of the tonsils?

(A) To produce sound
(B) To protect against infection
(C) To filter blood
(D) To produce red blood cells

Correct Answer: B

Explanation: Tonsils are lymphoid tissue located in the throat that help protect against infection.

28. What is the function of the thymus?

(A) To produce red blood cells
(B) To filter blood
(C) To produce T lymphocytes
(D) To produce sound

Correct Answer: C

Explanation: The thymus is a lymphoid organ that produces T lymphocytes.

29. What is the function of the chloride shift?

(A) To increase oxygen transport
(B) To decrease carbon dioxide transport
(C) To produce bicarbonate
(D) To maintain electrical neutrality

Correct Answer: D

Explanation: To maintain electrical neutrality — this correctly answers the question.

30. What is the function of carbonic anhydrase?

(A) To catalyze the reaction between CO□ and water
(B) To transport oxygen
(C) To produce ATP
(D) To digest proteins

Correct Answer: A

Explanation: To catalyze the reaction between CO□ and water — this correctly answers the question.

31. What is the function of the pleural fluid?

(A) To increase friction
(B) To lubricate the pleural membranes
(C) To produce red blood cells
(D) To digest food

Correct Answer: B

Explanation: To lubricate the pleural membranes — this correctly answers the question.

32. What is the function of the diaphragm?

(A) To produce sound
(B) To filter air
(C) To separate the thoracic cavity from the abdominal cavity
(D) To produce red blood cells

Correct Answer: C

Explanation: The diaphragm is a large dome of skeletal muscle that separates the thoracic cavity from the abdominal cavity.

33. What is the function of the intercostal muscles?

(A) To produce sound
(B) To filter air
(C) To produce red blood cells
(D) To move the rib cage during breathing

Correct Answer: D

Explanation: To move the rib cage during breathing — this correctly answers the question.

34. What is the function of the trachea?

(A) To conduct air to the bronchi
(B) To produce sound
(C) To filter blood
(D) To produce red blood cells

Correct Answer: A

Explanation: The trachea is a membranous tube that conducts air to the bronchi.

35. What is the function of the bronchi?

(A) To produce sound
(B) To conduct air to the lungs
(C) To filter blood
(D) To produce red blood cells

Correct Answer: B

Explanation: To conduct air to the lungs — this correctly answers the question.

36. A patient has a condition that reduces the surface area of the alveoli. Which of the following would be the most likely consequence?

(A) Increased gas exchange
(B) Increased oxygen production
(C) Decreased gas exchange
(D) Increased carbon dioxide production

Correct Answer: C

Explanation: The alveolar surface area is essential for gas exchange; reducing it would decrease the efficiency of gas exchange.

37. A patient has a thickened alveolar wall. Which of the following would be most affected?

(A) Carbon dioxide production
(B) Red blood cell production
(C) Heart rate
(D) Oxygen diffusion

Correct Answer: D

Explanation: Oxygen diffusion — this correctly answers the question.

38. A patient has a blockage in the pulmonary artery. Which of the following would be the most likely consequence?

(A) Decreased blood flow to the lungs
(B) Increased blood flow to the lungs
(C) Increased oxygen levels in the blood
(D) Decreased carbon dioxide levels in the blood

Correct Answer: A

Explanation: The pulmonary artery carries deoxygenated blood from the right ventricle to the lungs; blockage would decrease blood flow to the lungs.

39. Which of the following would increase the rate of oxygen diffusion across the alveolar membrane?

(A) Increased membrane thickness
(B) Increased concentration gradient
(C) Decreased surface area
(D) Decreased blood supply

Correct Answer: B

Explanation: The rate of diffusion is proportional to the concentration gradient; increasing it would increase the rate of oxygen diffusion.

40. A patient has a condition that causes excessive mucus production in the airways. Which of the following would be most affected?

(A) Red blood cell production
(B) Heart rate
(C) Airflow
(D) Digestion

Correct Answer: C

Explanation: Airflow — this correctly answers the question.

41. A patient has a deficiency of surfactant. Which of the following would be the most likely consequence?

(A) Alveoli would overinflate
(B) Increased gas exchange
(C) Increased oxygen production
(D) Alveoli would collapse

Correct Answer: D

Explanation: Surfactant lowers surface tension and prevents alveoli from closing; deficiency would cause alveoli to collapse.

42. Which of the following correctly describes the chloride shift?

(A) HCO□□ moves out of RBC; Cl□ moves in
(B) HCO□□ moves into RBC; Cl□ moves out
(C) Na□ moves out of RBC; K□ moves in
(D) O□ moves out of RBC; CO□ moves in

Correct Answer: A

Explanation: HCO□□ moves out of RBC; Cl□ moves in — this correctly answers the question.

43. A patient has a condition that causes increased carbon dioxide in the blood. Which of the following would most likely occur?

(A) Increased oxygen binding to haemoglobin
(B) Decreased oxygen binding to haemoglobin
(C) Increased pH
(D) Decreased respiratory rate

Correct Answer: B

Explanation: Increased carbon dioxide increases H□ concentration (decreased pH), which reduces haemoglobin's affinity for oxygen (Bohr effect).

44. Which of the following would occur if the respiratory surface were dry?

(A) Increased gas exchange
(B) Increased oxygen production
(C) Decreased gas exchange
(D) Increased carbon dioxide production

Correct Answer: C

Explanation: The respiratory surface must be moist so that gases can dissolve before diffusing across; dryness would impair gas exchange.

45. A patient has a tumor in the medulla oblongata. Which of the following would most likely be affected?

(A) Voluntary control of breathing
(B) Oxygen transport
(C) Carbon dioxide transport
(D) Involuntary control of breathing

Correct Answer: D

Explanation: The breathing center is located in the medulla and carries out involuntary control of breathing.

46. Which of the following correctly describes the sequence of structures through which air passes during inhalation?

(A) Nasal cavity → pharynx → larynx → trachea → bronchi → bronchioles → alveoli
(B) Nasal cavity → larynx → pharynx → trachea → bronchi → bronchioles → alveoli
(C) Nasal cavity → pharynx → trachea → larynx → bronchi → bronchioles → alveoli
(D) Nasal cavity → pharynx → larynx → bronchi → trachea → bronchioles → alveoli

Correct Answer: A

Explanation: Air passes from the nasal cavity to the pharynx, larynx, trachea, bronchi, bronchioles, and finally alveoli.

47. Which of the following would increase the oxygen carrying capacity of blood?

(A) Decreased haemoglobin
(B) Increased haemoglobin
(C) Decreased red blood cells
(D) Decreased PO□

Correct Answer: B

Explanation: The oxygen carrying capacity of blood is directly proportional to the amount of haemoglobin.

48. A patient has a condition that causes increased carbon monoxide in the blood. Which of the following would be most affected?

(A) Carbon dioxide transport
(B) Red blood cell production
(C) Oxygen transport
(D) Heart rate

Correct Answer: C

Explanation: Carbon monoxide binds to haemoglobin with 249 times greater affinity than oxygen, preventing oxygen uptake.

49. Which of the following correctly describes the role of the pulmonary surfactant?

(A) It increases surface tension
(B) It produces mucus
(C) It filters blood
(D) It lowers surface tension and prevents alveolar collapse

Correct Answer: D

Explanation: Surfactant is a film of lipoprotein that lowers surface tension and prevents alveoli from closing.

50. A patient has a condition that causes decreased blood pH. Which of the following would most likely occur?

(A) Decreased oxygen binding to haemoglobin
(B) Increased oxygen binding to haemoglobin
(C) Increased carbon dioxide transport
(D) Decreased respiratory rate

Correct Answer: A

Explanation: Decreased blood pH reduces haemoglobin's affinity for oxygen (Bohr effect), enhancing oxygen release to tissues.