## **CLASS XI BIO CH 14**

## Set 3: Conceptual / NEET-Style MCQs

- 1. When you ascend to high altitude, breathing rate increases primarily because:
- A) Atmospheric CO<sub>2</sub> decreases
- B) Atmospheric pressure decreases leading to low pO2
- C) Temperature is low
- D) Air is dry
- 2. The amount of air remaining in lungs after a normal expiration is functionally useful because:
- A) It prevents lung collapse
- B) It maintains continuous exchange of gases
- C) It reduces work of breathing
- D) All of these
- 3. If diaphragm is damaged, which process is immediately affected?
- A) Digestion
- B) Inspiration
- C) Expiration
- D) Circulation
- 4. When thoracic volume increases, what happens to intrapulmonary pressure?
- A) Increases
- B) Decreases
- C) Becomes equal to atmospheric pressure
- D) Remains constant
- 5. During vigorous exercise, which of the following increases most significantly?
- A) Tidal volume
- B) Residual volume
- C) Inspiratory reserve volume
- D) Functional residual capacity
- 6. If alveolar walls thicken due to disease, the rate of diffusion will:
- A) Increase
- B) Decrease
- C) Remain unchanged
- D) Double
- 7. At tissue level, the low pO<sub>2</sub> and high pCO<sub>2</sub> help in:
- A) Binding of oxygen to haemoglobin
- B) Release of oxygen from oxyhaemoglobin
- C) Increasing pH of blood
- D) Formation of oxyhaemoglobin
- 8. The Bohr effect refers to:
- A) Effect of CO<sub>2</sub> concentration on oxygen binding
- B) Effect of pO<sub>2</sub> on CO<sub>2</sub> transport

- C) Carbonic anhydrase activity D) Role of haemoglobin in buffering 9. A rightward shift of oxygen dissociation curve indicates: A) Increased oxygen affinity B) Decreased oxygen affinity C) No change D) Reduced temperature A) High temperature B) Low pCO<sub>2</sub>
- 10. Which factor shifts the oxygen dissociation curve to the right?
- C) High pH
- D) Low H<sup>+</sup> concentration
- 11. A person at rest has a tidal volume of 500 mL and respiratory rate of 15/min. The minute volume
- A) 7.5 L/min
- B) 5.0 L/min
- C) 10 L/min
- D) 8.5 L/min
- 12. Which statement about gas exchange is correct?
- A) O2 diffuses into alveoli from blood
- B) CO<sub>2</sub> diffuses into blood from alveoli
- C) O2 diffuses from alveoli to blood
- D) CO<sub>2</sub> diffuses from alveoli to tissues
- **13.** The partial pressure difference of oxygen between alveolar air and blood ensures:
- A) Active transport
- B) Simple diffusion
- C) Osmosis
- D) Bulk flow
- 14. The main driving force for diffusion of gases is:
- A) Temperature
- B) Partial pressure gradient
- C) Blood pressure
- D) Enzyme activity
- **15.** During expiration, the diaphragm:
- A) Contracts and flattens
- B) Relaxes and becomes dome-shaped
- C) Contracts and moves upward
- D) Stiffens and elongates
- **16.** The presence of residual volume in lungs:
- A) Decreases efficiency of diffusion
- B) Increases efficiency by preventing alveolar collapse
- C) Has no physiological role
- D) Reduces total lung capacity

- 17. Why is CO<sub>2</sub> transport more efficient than O<sub>2</sub>?
  A) CO<sub>2</sub> is less soluble
  B) CO<sub>2</sub> is 20–25 times more soluble
  C) CO<sub>2</sub> binds irreversibly to Hb
- 18. At the alveolar end, the reaction catalyzed by carbonic anhydrase proceeds in which direction?
- A) Formation of H<sup>+</sup> and HCO₃<sup>-</sup>
- B) Formation of CO<sub>2</sub> and H<sub>2</sub>O
- C) Formation of H<sub>2</sub>CO<sub>3</sub>

D) O<sub>2</sub> forms carbonates

- D) No reaction
- 19. Which statement best explains why O2 is released at tissues?
- A) Tissues have high pCO2 and low pO2
- B) Tissues have high pO<sub>2</sub>
- C) Blood temperature is lower
- D) Hb concentration decreases
- 20. Which factor does NOT influence diffusion rate directly?
- A) Partial pressure difference
- B) Solubility
- C) Membrane thickness
- D) Heart rate
- 21. During heavy exercise, the oxygen dissociation curve:
- A) Shifts right due to high CO2 and temperature
- B) Shifts left due to high O<sub>2</sub>
- C) Becomes flat
- D) Disappears
- 22. The combination of haemoglobin and CO<sub>2</sub> forms:
- A) Carboxyhaemoglobin
- B) Carbaminohaemoglobin
- C) Carbonic acid
- D) Oxyhaemoglobin
- 23. In the lungs, CO<sub>2</sub> diffuses out because:
- A) pCO<sub>2</sub> in alveolar air > pCO<sub>2</sub> in blood
- B) pCO<sub>2</sub> in blood > pCO<sub>2</sub> in alveolar air
- C) pCO<sub>2</sub> is equal in both
- D) Blood pressure forces it out
- **24.** The exchange part of the respiratory system includes all except:
- A) Alveoli
- B) Alveolar ducts
- C) Terminal bronchioles
- D) Secondary bronchi
- **25.** An increase in H<sup>+</sup> concentration in blood leads to:
- A) Stimulation of chemosensitive area
- B) Depression of respiration
- C) Decrease in breathing rate
- D) No effect

26. The pO <sub>2</sub> in oxygenated blood is about 95 mm Hg because:  A) O <sub>2</sub> diffuses into blood until equilibrium  B) O <sub>2</sub> completely saturates Hb  C) O <sub>2</sub> binds more at higher pCO <sub>2</sub> D) None of these
<ul> <li>27. The respiratory rhythm is primarily under control of:</li> <li>A) Medulla oblongata</li> <li>B) Pons</li> <li>C) Cerebellum</li> <li>D) Hypothalamus</li> </ul>
28. Which of the following inhibits the respiratory rhythm centre?  A) High CO <sub>2</sub> B) Low CO <sub>2</sub> C) High H <sup>+</sup> D) High temperature
<ul> <li>29. The respiratory centre adjusts breathing mainly in response to:</li> <li>A) pO<sub>2</sub> changes</li> <li>B) pCO<sub>2</sub> and H<sup>+</sup> concentration</li> <li>C) Nitrogen level</li> <li>D) Temperature</li> </ul>
<ul> <li>30. Pneumotaxic centre acts by:</li> <li>A) Increasing duration of inspiration</li> <li>B) Reducing duration of inspiration</li> <li>C) Increasing residual volume</li> <li>D) Stimulating diaphragm</li> </ul>
31. Which respiratory volume cannot be measured directly by spirometer?  A) Tidal volume  B) Inspiratory reserve volume  C) Residual volume  D) Expiratory reserve volume
<ul> <li>32. The efficiency of gaseous exchange is maintained because:</li> <li>A) Alveoli have thick walls</li> <li>B) Diffusion membrane is thin and moist</li> <li>C) Blood flow is slow</li> <li>D) None of these</li> </ul>
<ul> <li>33. If the pneumotaxic centre is damaged, what happens?</li> <li>A) Inspiration becomes prolonged</li> <li>B) Expiration becomes prolonged</li> <li>C) Breathing stops</li> <li>D) Diaphragm collapses</li> </ul>
34. The percentage saturation of Hb in venous blood is about:  A) 97%  B) 75%  C) 50%  D) 25%

<b>35.</b> Which condition increases dissociation of oxygen from oxyhaemoglobin? A) Low CO₂ B) High CO₂ and H⁺ C) Low temperature D) Low pH	
<b>36.</b> Carbonic anhydrase is important because it:	
A) Converts bicarbonate into CO <sub>2</sub> rapidly	
B) Oxidizes CO <sub>2</sub>	
C) Forms carbamino compound	
D) Helps O <sub>2</sub> bind Hb	

- 37. A high concentration of CO2 in tissues will:
- A) Increase oxygen binding
- B) Decrease oxygen binding (Bohr effect)
- C) Have no effect
- D) Stop diffusion
- 38. Which statement about the transport of CO2 is false?
- A) 70% transported as bicarbonate
- B) 25% as carbamino compound
- C) 3% dissolved in plasma
- D) 70% bound to haemoglobin
- **39.** If both diaphragm and intercostal muscles stop functioning, it results in:
- A) Shallow breathing
- B) Cessation of breathing
- C) Increased tidal volume
- D) None
- 40. The respiratory centre receives signals from:
- A) Aortic arch and carotid body receptors
- B) Heart valves
- C) Liver
- D) Cerebellum
- 41. Hypoxia is a condition where:
- A) pCO<sub>2</sub> in blood rises
- B) Oxygen supply to tissues is deficient
- C) CO<sub>2</sub> is not exhaled
- D) Blood pH increases
- 42. During hypoventilation, what happens to CO<sub>2</sub> level in blood?
- A) Increases
- B) Decreases
- C) Remains same
- D) None
- **43.** The alveolar pO<sub>2</sub> remains relatively constant because:
- A) Continuous ventilation and diffusion balance each other
- B) O<sub>2</sub> is not used by lungs
- C) Lungs store O<sub>2</sub>
- D) Diffusion is slow

<ul> <li>44. In alveolar air, pO₂ is less than atmospheric because:</li> <li>A) Dead space mixing and humidification</li> <li>B) CO₂ addition</li> <li>C) O₂ consumption by alveoli</li> <li>D) Low ventilation rate</li> </ul>
45. The respiratory quotient (RQ) for carbohydrate oxidation is:  A) 0.7  B) 1.0  C) 0.9  D) 0.5
<ul> <li>46. Which statement about O<sub>2</sub> transport is correct?</li> <li>A) O<sub>2</sub> is mainly dissolved in plasma</li> <li>B) O<sub>2</sub> transport depends on Hb concentration</li> <li>C) CO<sub>2</sub> transport is independent of O<sub>2</sub></li> <li>D) All are correct</li> </ul>
47. A person suffering from emphysema will have:  A) Increased alveolar surface area  B) Decreased alveolar surface area  C) Increased vital capacity  D) Normal diffusion
48. Cigarette smoking damages alveoli because:  A) It reduces elasticity of lungs  B) It thickens diffusion membrane  C) It destroys alveolar walls  D) All of these
<ul> <li>49. The percentage of CO<sub>2</sub> transported dissolved in plasma is about:</li> <li>A) 3%</li> <li>B) 7%</li> <li>C) 10%</li> <li>D) 20%</li> </ul>
50. The term "pulmonary ventilation" refers to:  A) Exchange of gases in tissues  B) Inspiration and expiration  C) Transport of gases  D) Cellular respiration

## Answer Key (Set 3)

1-B, 2-D, 3-B, 4-B, 5-A, 6-B, 7-B, 8-A, 9-B, 10-A, 11-A, 12-C, 13-B, 14-B, 15-B, 16-B, 17-B, 18-B, 19-A, 20-D, 21-A, 22-B, 23-B, 24-D, 25-A, 26-A, 27-A, 28-B, 29-B, 30-B, 31-C, 32-B, 33-A, 34-B, 35-B, 36-A, 37-B, 38-D, 39-B, 40-A, 41-B, 42-A, 43-A, 44-A, 45-B, 46-B, 47-B, 48-D, 49-B, 50-B.