## **Breathing and Exchange of Gases**

**1. Assertion (A):** Larynx is a cartilaginous box which helps in sound production.

**Reason (R):** Epiglottis flap covers the glottis during swallowing and prevents the entry of food into the larynx.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 2. Assertion (A): The anatomical setup of lungs in thorax is such that any change in the volume of the thoracic cavity will be reflected in the lung cavity. (Pulmonary cavity)

**Reason (R):** Lungs have no muscles to directly alter the pulmonary volume.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **3. Assertion (A):** Inspiration can occur if intra pulmonary pressure is less than the atmospheric pressure.

**Reason (R):** Inspiration is initiated by the relaxation of diaphragm and external intercostal muscle.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **4. Assertion (A):** The volume of air a person can expire after normal inspiration is TV + ERV.

**Reason (R):** Volume of air that will remain in the lungs after a normal expiration is ERV + RV

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

5. Assertion (A): The amount of  $CO_2$  that can diffuse through the diffusion membrane per unit difference in partial pressure in much higher compared to that of  $O_2$ .

**Reason (R):** The solubility of  $CO_2$  is 20-25 times higher than that of  $O_2$  solubility.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **6.** Assertion (A): In the tissue high  $P_{o_2}$ ,

low  $\mathbf{P}_{\mathbf{co}_2}$ , higher  $\mathbf{H}^\oplus$  concentration conditions are favourable for dissociation of oxygen from the oxyhaemoglobin.

**Reason (R):** Every 100ml of oxygenated blood can deliver around 5ml of  $O_2$  to the tissues under normal physiological conditions.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **7. Assertion (A):** A chemosensitive area is situated adjacent to the rhythm centre which is highly sensitive to CO<sub>2</sub> and hydrogen ions.

**Reason (R):** The role of oxygen in the regulation of respiratory rhythm is quiet insignificant.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false







**8. Assertion (A):** Pneumotaxic centre can moderate the functions of the respiratory rhythm centre.

**Reason (R):** Neural signal from pneumotoxic centre can reduce the duration of inspiration and thereby the alter the respiratory rate.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **9. Assertion (A):** Strong pneumotoxic signal results complete filling of lungs.

**Reason (R):** Strong pneumotaxic signal increases the duration of inspiration as well as expiration.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **10. Assertion (A):** Major part of CO<sub>2</sub> is transported in the form of sodium bicarbonate.

**Reason (R):** 7% of CO<sub>2</sub> is transported in dissolved state in plasma if blood in dissolved state in plasma of blood.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **11. Assertion (A):** Emphysema is a chronic disorder in which alveolar walls are damaged due to which respiratory surface decreases.

**Reason (R):** One of the major cause of emphysema is inflammation of bronchi and bronchioles.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**12. Assertion (A):** In the alveoli, dissociation of CO<sub>2</sub> from carbamino-haemoglobin takes place.

**Reason (R):** In the alveoli  $P_{CO_2}$  is low and

 $P_{o_{3}}$  is high.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **13. Assertion (A):** The blood transports carbondioxide comparatively easily.

**Reason (R):** During CO<sub>2</sub> transport chloride ions diffuse from plasma into the erythrocytes to maintain the ionic balance.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **14. Assertion (A):** Low concentration of oxygen allow dissociation of oxyhaemoglobin.

**Reason (R):** CO has more affinity with Haemoglobin as compares to oxygen.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **15. Assertion (A):** More carbonic acid is formed inside the RBC's than the plasma.

**Reason (R):** An enzyme carbonic anhydrase is present more inside the RBC's.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false



**16. Assertion (A):** When body temperature rise oxyhaemoglobin dissociation curve will shift towards right.

**Reason (R):** In normal condition haemoglobin release 25% oxygen to tissues.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **17. Assertion (A):** Rate of breathing is regulated by respiratory centres present in the medulla oblongata.

**Reason (R):** Changes in the CO<sub>2</sub> level of the arterial blood control the rate of breathing.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **18. Assertion (A):** A bony flap epiglottis prevents the entry of food into the glottis.

**Reason (R):** The glottis is the common opening of food pipe & wind pipe.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **19. Assertion (A):** Aerobic animals are not truely aerobic.

**Reason (R):** They produce lactic acid anaerobically.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false

**20. Assertion (A):** During inspiration, pressure of air falls in the thorax.

**Reason (R):** There is a rise in volume of thorax during inspiration.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 21. Assertion (A): Symptoms of mountain sickness develops when a person living on plains ascends and stays on a mountain.

**Reason (R):** Air pressure and partial pressure of oxygen falls with the rise in altitude.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- **22. Assertion (A):** Ventilation process includes both active and passive mechanisms during inhalation.

**Reason (R):** Respiratory muscle contraction is ATP independent process, while gaseous exchange is a passive process

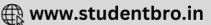
- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false
- 23. Assertion (A): The anatomical setup of lungs in thorax is such that any change in the volume of the thoracic cavity will be reflected in the lungs cavity.

**Reason (R):** The thoracic chamber is formed dorsally by the vertebral column, ventrally by sternum, laterally by the ribs and on the lower side by diaphragm.

- (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
- (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
- (3) (A) is true but (R) is false
- (4) Both (A) and (R) are false







- 24. Assertion (A): It is essential for breathing that the anatomical setup of lungs in thorax is such that any change in the volume of the thoracic cavity will be reflected in the lung (pulmonary)

  Reason (R): We cannot directly alter the pulmonary volume.
  - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
  - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
  - (3) (A) is true but (R) is false
  - (4) Both (A) and (R) are false

- **25. Assertion (A):** An increase in pulmonary volume will cause inspiration.
  - **Reason (R):** An increase in pulmonary volume increases the intra-pulmonary pressure to more than the atmospheric pressure.
  - (1) Both (A) & (R) are true and the (R) is the correct explanation of the (A)
  - (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
  - (3) (A) is true but (R) is false
  - (4) Both (A) and (R) are false



**Directions:** In the following questions, a statement of assertion is followed by a statement of reason.

Mark the correct choice as:

- (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.
- (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion.
- (c) If Assertion is true but Reason is false.
- (d) If both Assertion and Reason are false.
- 26. **Assertion :** Aerobic animals are not truely aerobic.

**Reason:** They produce lactic acid anaerobically.

27. **Assertion :** If there is no air in trachea, it will not collapse.

**Reason :** Trachea is having the cartilaginous ring.

28. **Assertion**: Aerobic respiration involves the exchange of respiratory gases twice.

**Reason:** Exchange occurs from lung to heart and then heart to lung.

29. **Assertion:** Tracheae, primary, secondary and tertiary bronchi are supported by incomplete cartilaginous rings.

**Reason:** These rings of cartilage make the wall non-collapsible.

30. **Assertion:** Oxyhaemoglobin dissociates near the organ tissue due to Bohr effect and oxygen is released.

**Reason :** Increased CO<sub>2</sub> concentration reduces the affinity of haemoglobin for oxygen.

31. **Assertion:** Inspiration occurs when there is a negative pressure in the lungs with respect to the atmospheric pressure.

**Reason:** During inspiration, a decrease in pulmonary volume increases the intrapulmonary pressure than atmospheric pressure which forces the air from outside to move into the lungs.

**32. Assertion:** The role of oxygen in the regulation of respiratory rhythm is quite insignificant.

**Reason:** Increased pCO<sub>2</sub> and H<sup>+</sup> concentration inputs from chemoreceptors can activate respiratory rhythm centre to make necessary adjustments.

33. **Assertion:** 70 percent of CO<sub>2</sub> formed from catabolism is trapped as bicarbonate in the RBCs at the tissue level.

**Reason:** At tissue level, carbonic anhydrase in RBCs facilitates the formation of CO<sub>2</sub> and H<sub>2</sub>O from bicarbonate.

34. **Assertion :** Severve Acute Respiratory Syndrome (SARS) originated in China.

**Reason:** China is the most populated country of the world.

35. **Assertion:** In mammals, complex respiratory system has developed.

**Reason:** Mammalian skin is impermeable to gases.

**36. Assertion:** The lungs are situated in thoracic chamber which is anatomically an air-tight chamber.

**Reason:** Such an arrangement is essential to avoid any change in pulmonary volume.

**37. Assertion:** Vocal cords consist of three pairs of mucous membrane that extend into the lumen of the larynx.

**Reason:** Only two pairs of cords are responsible for production of sound.

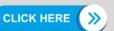
**38. Assertion**: Histamine is involved in allergic and inflammatory reactions.

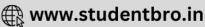
**Reason:** Histamine is a vasodilator.

**39. Assertion:** Carbonic anhydrase is present in the erythrocytes.

**Reason:** In erythrocytes carbon dioxide combines with water and is transported.







	ANSWER KEY																			
Que.	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
Ans.	2	1	3	2	1	4	2	1	4	2	3	1	2	2	1	2	2	4	1	1
Que.	21	22	23	24	25															
Ans.	1	4	1	1	3															

26.	27.	28.	29.	30.	31.	32.	33.	34.	35.	36.	37.	38.	39.		
Α	Α	C	Α	Α	C	Α	C	В	В	C	D	Α	a		

