

Breathing and Exchange of Gases

- 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
- 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
- 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
- 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
- Assertion (A):** The amount of CO_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is 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
- Assertion (A):** In the tissue high P_{O_2} , low P_{CO_2} , higher H^+ 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
- Assertion (A):** A chemosensitive area is situated adjacent to the rhythm centre which is highly sensitive to CO_2 and hydrogen ions.
Reason (R): The role of oxygen in the regulation of respiratory rhythm is quite 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 pneumotaxic centre can reduce the duration of inspiration and thereby 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 pneumotaxic 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_2 is transported in the form of sodium bicarbonate.

Reason (R): 7% of CO_2 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_2 from carbamino-haemoglobin takes place.

Reason (R): In the alveoli P_{CO_2} is low and P_{O_2} 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_2 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 CO₂ 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 truly 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 truly 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_2 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_2 and H^+ concentration inputs from chemoreceptors can activate respiratory rhythm centre to make necessary adjustments.

33. **Assertion:** 70 percent of CO_2 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_2 and H_2O from bicarbonate.

34. **Assertion :** Severe 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.			
A	A	C	A	A	C	A	C	B	B	C	D	A	a			