

**QB365 Question Paper Software**  
**11th Standard - Biology**

**Breathing and Exchange of Gases Assertion and reason**

Exam Time: 00:20 Hrs

Date: 2025-10-10

Total Marks: 10

**Questions:**

**Assertion and reason**

1.**Assertion:** Respiratory rhythm centre is moderated by pneumotaxic centre, located in the medulla region of the brain.

**Reason:** Pneumotaxic centre controls the switch 'ON' point of inspiration.

**Codes:**

- (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.

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

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

**Codes:**

- (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.

3.**Assertion:** Respiratory rhythm centre is moderated by pneumotaxic centre, located in the medulla region of the brain.

**Reason:** Pneumotaxic centre controls the switch 'ON' point of inspiration.

**Codes:**

- (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.

4.**Assertion :** Most fish when out of water, die of suffocation.

**Reason :** Atmospheric air contains far less oxygen content than the dissolved oxygen in water.

**Codes:**

- (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

5. **Assertion :** Inspiration occurs due to muscular relaxation.

**Reason :** During inspiration, the diaphragm and external intercostal muscle contract simultaneously.

**Codes:**

- (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

6. **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.

**Codes:**

- (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):** Low concentration of oxygen allow dissociation of oxyhaemoglobin.

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

**Codes:**

- (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):** 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.

**Codes:**

- (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:** 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 intra-pulmonary pressure than atmospheric pressure which forces the air from outside to move into the lungs.

**Codes:**

- (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.

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

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

**Codes:**

(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.

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## Answers Key:

### Assertion and reason

1. (d) If both Assertion and Reason are false.

**Explanation:**

Pneumotaxic centre in the pons region of the brain can moderate functions of the respiratory rhythm centre. Neural signals from this centre can reduce the duration of inspiration and thereby alter the respiratory rate. A chemosensitive area is situated adjacent to the rhythm centre to make necessary adjustments in the respiratory process. Receptors associated with aortic arch and carotid artery also can recognize changes in  $\text{CO}_2$  and  $\text{H}^+$  concentration and send necessary signals to the rhythm centre for remedial actions. The role of oxygen in the regulation of respiratory rhythm is quite insignificant.

2. (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

**Explanation:**

The cartilage rings are present in the trachea to prevent it from collapsing. This enables the lumen of trachea to stay open during breathing.

3. (d) If both Assertion and Reason are false.

**Explanation:**

Pneumotaxic centre in the pons region of the brain can moderate functions of the respiratory rhythm centre. Neural signals from this centre can reduce the duration of inspiration and thereby alter the respiratory rate. A chemosensitive area is situated adjacent to the rhythm centre to make necessary adjustments in the respiratory process. Receptors associated with aortic arch and carotid artery also can recognize changes in  $\text{CO}_2$  and  $\text{H}^+$  concentration and send necessary signals to the rhythm centre for remedial actions. The role of oxygen in the regulation of respiratory rhythm is quite insignificant.

4. (c) If Assertion is true but Reason is false.

**Explanation:**

Although atmospheric air contains far more oxygen content than the water (air contains 21% oxygen and water contains 0.5-0.9% oxygen by volume depending on the temperature), still most fish when out of water die of suffocation due to lack of oxygen. When fish is taken out of water the gills stick together thereby reducing the surface area. Reduced surface area lowers gas exchange and so death occurs.

5. (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

**Explanation:**

Inspiration is the result of muscular contraction. The diaphragm and external intercostal muscle contracts simultaneously. The lateral thoracic wall moves outward and upward.

6. (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
7. (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
8. (2) Both (A) & (R) are true but the (R) is not the correct explanation of the (A)
9. (c) If Assertion is true but Reason is false.

**Explanation:**

The movement of air into and out of the lungs is carried out by creating a pressure gradient between the lungs and the atmosphere. Inspiration occurs when the pressure within the lungs (intra-pulmonary pressure) is less than the atmospheric pressure, i.e., there is a negative pressure in the lungs with respect to atmospheric pressure.

Inspiration is initiated by the contraction of diaphragm which increases the volume of thoracic chamber in the antero-posterior axis. The contraction of external intercostal muscles lifts up the ribs and the sternum causing an increase in the volume of the thoracic chamber in the dorso-ventral axis. The overall increase in the thoracic volume causes a similar increase in pulmonary volume. This increase in pulmonary volume decreases the intra-pulmonary pressure, which becomes less than the atmospheric pressure forcing the air from outside to move into the lungs.

10. (a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

**Explanation:**

Carbonic anhydrase enzyme found in R.B.Cs catalyzes the interconversion of  $\text{CO}_2$  and  $\text{H}_2\text{CO}_3$ . It plays an important role in respiration by influencing  $\text{CO}_2$  transport in the blood.