

**Topic :-Breathing and Exchange of Gases**

- 1 (c)  
Four molecules of O<sub>2</sub>  
Each haemoglobin molecule can carry a maximum of four molecules of O<sub>2</sub>  
 $Hb_4 + 4O_2 \rightarrow Hb_4O_8$   
Binding of oxygen with haemoglobin is primarily related to the partial pressure of O<sub>2</sub>, partial pressure of CO<sub>2</sub>, hydrogen ion concentration and temperature
- 2 (d)  
*Hypoxia is the shortage of oxygen supply to the body due to*  
(i) less air at mountains  
(ii) anaemia  
(iii) cyanide poisoning which inactivates the enzymes of the cells involved in cellular respiration
- 3 (c)  
Due to low oxygen tension and high carbon dioxide tension, oxyhaemoglobin at the tissue level liberates the oxygen to the cells. This oxyhaemoglobin after reaching tissue dissociates into oxygen and haemoglobin because the amount of oxygen in tissue is low. Oxygen dissociates from the haemoglobin and diffuses into the tissue.
- 4 (d)  
Mechanism of breathing varies among the different groups of animals depending mainly on their habitats and level of organization. Lower invertebrates like sponges, coelenterates, flatworms, etc., exchange of O<sub>2</sub> with CO<sub>2</sub> by simple diffusion over their entire body surface
- 5 (c)  
A-inspiration; B-expiration
- 6 (a)  
Respiration is an intracellular catabolic process of oxidation reduction, in which the complex organic food materials are broken down to form CO<sub>2</sub>, H<sub>2</sub>O and energy. If a large number of people are enclosed in a room the O<sub>2</sub> of room is utilized in respiration and CO<sub>2</sub> released.
- 7 (b)

In man, the total number of lobe present in both the lungs is 5 of which three lobes, *i.e.*, anterior, posterior, and azygous are present in right lung and two lobes called left anterior and left posterior in the left lung. The basic functional units of lungs are alveoli. The number of alveoli in human beings is 300 million.

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(c)

Haemoglobin has 250 times more affinity for carbon monoxide than oxygen.

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(d)

CO<sub>2</sub> and O<sub>2</sub> both are carried by haemoglobin

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(a)

Nearly 20-25% of carbon dioxide is transported by RBCs. It is carried by haemoglobin as carbamino haemoglobin. 70% of carbon dioxide is carried as bicarbonates. About 97% of oxygen is transported by RBCs in the blood. The remaining 3% of oxygen is carried in dissolved state through the plasma.

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(b)

Respiratory centre is stimulated when there is more CO<sub>2</sub> in the arterial blood. In normal conditions, there is less amount of CO<sub>2</sub> in the arterial blood

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(a)

Breathing gets accelerated when the person opens his nose after holding the breath by closing his nose due to increase CO<sub>2</sub> in arterial blood

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(c)

Respiratory Capacity	Respiratory Volume
Residual volume	1200mL
Vital capacity	4600mL
Inspiratory reserve volume	3000 mL
Inspiratory capacity	3500 mL

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(a)

Exchange of gases in lungs is called external respiration. In this gaseous exchange, oxygen passes from alveoli to pulmonary capillary blood and carbon dioxide, come to alveoli from pulmonary capillary. Exchange of gases through alveocapillary membrane is a purely physical diffusion phenomenon. No chemical reaction is involved.

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(b)

A-45, B-95, C-45.

Partial pressure of respiratory gases in-mm Hg

Respiratory gases	Inspired air on atmospheric air	Alveolar air	Deoxygenated blood	Oxygenated blood	Expired air	Tissue cells
$pO_2$	158	100	40	95	116	40
$pCO_2$	0.3	40	45	40	32	45

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(d)

Usually, there are 12 pairs of ribs in humans. The first seven pairs of ribs are known as true ribs, 8th, 9th and 10th pairs are called false ribs and last two pairs (11th and 12th pairs) are known as floating ribs.

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(a)

Trachea is a straight tube extending upto the mid thoracic cavity, which divides at the level of 5th thoracic vertebra into the right and left bronchi. Each bronchi undergoes repeated division to form secondary and tertiary bronchi ending up to very thin terminal bronchioles

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(c)

The partial pressure of oxygen in the alveolar air is 100-105 mm Hg.

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(b)

Inspiration is initiated by the contraction of diaphragm, which increases the volume of thoracic chamber in the antero-posterior axis. The contraction of the external inter-costal muscles lifts up the ribs and the sternum causing an increase in the volume of thoracic chamber in the dorso-ventral axis. The overall increase in the thoracic volume causes a similar increase in the pulmonary volume

<b>zANSWER-KEY</b>										
Q.	1	2	3	4	5	6	7	8	9	10
A.	C	D	C	D	C	A	B	C	D	A
Q.	11	12	13	14	15	16	17	18	19	20
A.	B	C	A	C	A	B	D	A	C	B

PE