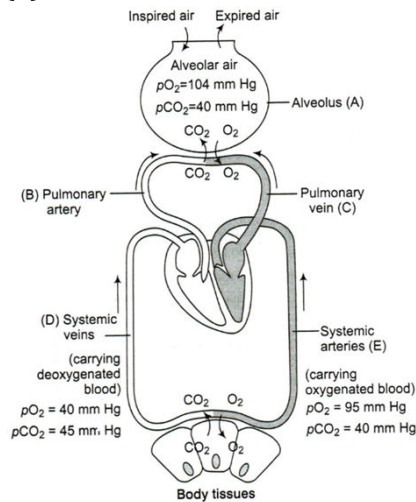


### Topic :- Breathing and Exchange of Gases

- 1 (c)  
Every 100 mL of deoxygenated blood delivers approximately 4 mL of CO<sub>2</sub> to alveoli under the normal physiological conditions
- 2 (d)  
In the alveoli, there is  
(i) High  $\rho O_2$   
(ii) Low  $\rho CO_2$   
(iii) Lesser H<sup>+</sup> concentration  
All these factors are favourable for the formation of oxyhaemoglobin
- 3 (b)  
Due to rise in temperature, decrease in pH and increase in carbon dioxide concentration, the rate of oxyhaemoglobin dissociation is also increased. So, the oxygen dissociation curve shifts to right, while left shift of oxyhaemoglobin curve is noticed under low carbon dioxide concentration, low temperature and high pH.
- 4 (c)
- | Brain Part          | Control/Function                  |
|---------------------|-----------------------------------|
| Cerebellum –        | Coordination of muscular movement |
| Cerebrum –          | Voluntary function                |
| Medulla oblongata – | Respiration                       |
| Hypothalamus –      | Temperature                       |

5

(a)



Diagrammatic representation of exchange of gases at the alveolus and the body tissues with blood and transport of oxygen and carbon dioxide

6

(d)

### Chemical Control of Respiration

A chemosensitive area is situated near the respiratory centre, medulla. It is highly sensitive to the change of  $CO_2$  concentration or change in blood pH as blood  $CO_2$  concentration influences its pH by forming  $HCO_3^-$ , within the RBCs using the enzyme, carbonic anhydrase

7

(b)

Vocal cords occur in larynx (sound box).

8

(d)

**Total Lung Capacity** Total volume of the air accommodated in the lungs at the end of forced inspiration. This includes RV, ERV, TV and IRV. It is the sum of vital capacity and the residual volume

9

(d)

A – **Alveolar cavity** through which the diffusion of oxygen to blood takes place. From blood,  $CO_2$  goes to the alveolar cavity

B – **Blood** transports  $O_2$  and  $CO_2$  from all over the body

C – **Capillary wall** is the actual site through which the exchange of  $O_2$  and  $CO_2$  takes place. It lies close to the alveolar wall

10

(c)

Carbonic anhydrase is found in the blood and the minute quantity of same is in plasma

11

(c)

A- $CO_2$ , B-Breathing, C-Respiration

- 12 **(c)**  
Breathing centre initiates the ventilation in response to  
(i) High  $\text{CO}_2$  in arterial blood  
(ii) Less pH in arterial blood  
(iii) High  $\text{H}^+$  concentration in arterial blood
- 13 **(a)**  
Pressure/Concentration gradient.  
Alveoli are the primary site of exchange of gases. Exchange of gases also occur between the blood and tissue.  $\text{O}_2$  and  $\text{CO}_2$  are exchanged in these sites by simple diffusion, mainly based on pressure concentration gradient
- 14 **(d)**  
All of these  
In the alveoli, there is  
(i) High  $\rho\text{O}_2$   
(ii) Low  $\rho\text{CO}_2$   
(iii) Lesser  $\text{H}^+$  concentration  
All these factors are favourable for the formation of oxyhaemoglobin
- 15 **(c)**  
Sea diver feels fatigued and drowsy because of the diffusion of more nitrogen into blood and then from blood, nitrogen diffuses into muscles and body fats.
- 16 **(c)**  
Chloride shift occurs in response, to  $\text{HCO}_3^-$ . To maintain electrostatic neutrality of plasma many chloride ions diffuse from plasma into RBCs and bicarbonate ions pass out. The chloride content of RBCs increases when oxygenated blood become deoxygenated. This is called chloride shift or Hamburger shift.
- 17 **(c)**  
Hiccups is the spasmodic contraction of the diaphragm followed by a spasmodic closure of the glottis, *i.e.*, a sharp inspiratory sound. Stimulus is usually irritation of sensory nerve endings of digestive tract.
- 18 **(b)**  
Dead space is the air that inhaled by the body in breathing but does not take part in gas exchange. In man, it is 150 mL.
- 19 **(c)**  
Neural system in humans regulates and modulates the respiratory rhythm.  
**Respiratory centre** is located in the medulla oblongata and pons varoli. These centre regulates the rate and the depth of breathing by controlling the contraction of diaphragm

and other respiratory muscles

**Medulla oblongata** contains inspiratory rhythm centre in the dorsal portion of the respiratory centre or in ventral portion of the brain

20

**(a)**

Expiratory reserve volume is the extra amount of air that can be expired forcibly after a normal expiration. It is about 1000-1500 mL. Inspiratory Reserve Volume = 2000 mL.

Vital capacity = 4000mL

Total lung capacity = 5000mL

PE

<b>ANSWER-KEY</b>										
<b>Q.</b>	<b>1</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>	<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>
<b>A.</b>	<b>c</b>	<b>d</b>	<b>b</b>	<b>c</b>	<b>a</b>	<b>d</b>	<b>b</b>	<b>d</b>	<b>d</b>	<b>c</b>
<b>Q.</b>	<b>11</b>	<b>12</b>	<b>13</b>	<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>A.</b>	<b>c</b>	<b>c</b>	<b>a</b>	<b>d</b>	<b>c</b>	<b>c</b>	<b>c</b>	<b>b</b>	<b>c</b>	<b>a</b>

**P E**