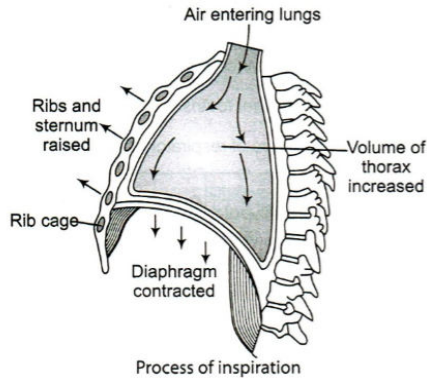


### Topic :- Breathing and Exchange of Gases

- 1 (b)  
**Nasal Cavity** It is the first part of the respiratory system. It opens to the exterior through nostrils. The small hairs present in the cavity helps to filter the particles of dust and other foreign matter. The air in the nasal cavity gets warmed (because nasal cavity has very good blood supply) and moistened before it enters to the lungs
- 2 (b)  
Haemoglobin is an iron containing deep red coloured respiratory pigment. It becomes bright red when combined with oxygen.
- 3 (b)  
Alveoli are the primary sites of exchange of gases. The exchange of gases ( $O_2$  and  $CO_2$ ) between the alveoli and the blood capillary occurs by simple diffusion.
- 4 (d)  
Each haemoglobin molecule has four iron atoms, each of which can combine with a molecule of oxygen through coordinate bond. Hence, total four molecules of oxygen can bind (or combine) with one molecule of haemoglobin.
- 5 (d)  
Trachea
- 7 (b)  
*Pulmonary volume increases by the following steps*  
(i) Contraction of the diaphragm  
(ii) Contraction of intercostal muscle  
(iii) Lifting of the ribs  
(iv) Sternum causing an increase in the volume of thoracic chamber in dorso ventral axis



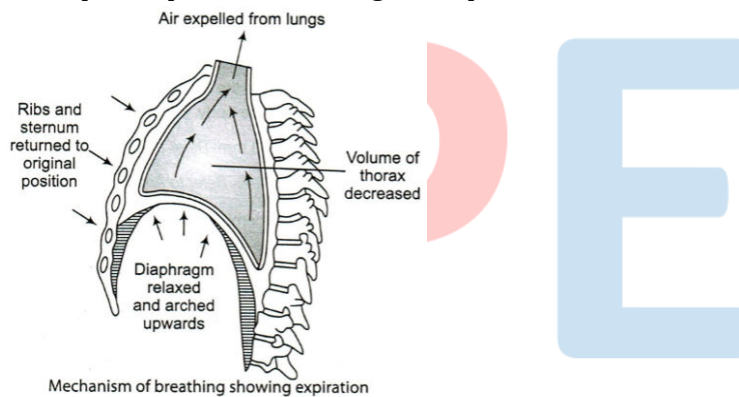
- 8 (c)  
Deoxygenated blood and tissues both have the same partial pressure of  $O_2$  and  $CO_2$
- 9 (b)  
A-epiglottis, B-mid thoracic, C-bronchi
- 10 (b)  
**Tidal volume** is the volume of air inspired or expired or expired with each normal breath. This is about 500 mL in adult person.
- 11 (d)  
Residual volume (1200mL) is greater than tidal volume (500mL).
- 12 (c)  
Medulla region.  
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
- 13 (a)  
Volume of the air inspired or expired. **Pulmonary volume** is the volume of air present in the lungs it is divided into four different types according to the volume of air present in the lungs  
(i) **Tidal Volume** (TV) The volume of the air inspired or expired involuntarily in each normal breath. It is about 500 mL of air in average young adult man  
(ii) **Inspiratory Reserve Volume** (IRV) The maximum volume of the air, which a person can inhale over and above tidal volume by deepest, possible voluntary inspiration. It is about 3000 mL  
(iii) **Expiratory Reserve Volume** (ERV) The volume of the air which can be expired over and above the tidal volume with maximum effort. It is about 1100 mL

(iv) **Residual Volume (RV)** The volume of the air left in the lungs even after the maximum forceful expiration. It is about 1200 mL

14 (c) **Diaphragm** is a characteristic of mammals. It is highly muscular and fibrous partition, elevated towards the thorax like a dome. Its important function is to aid in respiration. It separates the thoracic and abdominal cavities. It is also called phrenic muscle

15 (b) Haemoglobin is having 250 times more affinity for carbon monoxide as compared to oxygen, forming a cherry-red compound carboxyhaemoglobin.

16 (b) Relaxation of the diaphragm and intercostal muscles returns the diaphragm and sternum to their normal positions and reduces the thoracic volume and thereby the pulmonary volume. This leads to an increase in intra-pulmonary pressure to slightly above the atmospheric pressure, causing the expulsion of air from the lungs, *i.e.*, expiration



17 (d) Pressure/Concentration gradient, solubility of gases as well as the thickness of the membranes involved in diffusion are some important factors that affects the rate of diffusion

18 (c) Workers in grinding and stone breaking industries may suffer for lung disease. **Occupational Respiratory Disorders** In certain industries, especially those involving grinding or stone breaking, so much dust is produced. In that condition, the respiratory diseases like, silicosis, fibrosis and asbestoses occurs. Long exposure can give rise to inflammation leading to fibrosis and thus, causing serious lung damage

19 (d) Humans have two lungs, which are covered by a double layered pleura with pleural fluid between them. Pleural fluid reduces the friction on the lung-surface. The outer pleural

membrane is in close contact with the thoracic lining whereas, the inner pleural membrane is in the contact with the lung surface

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**(d)**

Diaphragm is very useful in both expiration and inspiration. On an average, a healthy human breathes 12-16 times/minute. The volume of the air involved in breathing movements can be estimated by using a spirometer, which helps in the clinical assessment of pulmonary functions

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>b</b>	<b>b</b>	<b>b</b>	<b>d</b>	<b>d</b>	<b>c</b>	<b>b</b>	<b>c</b>	<b>b</b>	<b>b</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>d</b>	<b>c</b>	<b>a</b>	<b>c</b>	<b>b</b>	<b>b</b>	<b>d</b>	<b>c</b>	<b>d</b>	<b>d</b>

**PE**