

Topic :- Breathing and Exchange of Gases

- 1 (b)
TV (500 mL) < ERV (1100 mL) < RV (1200 mL) < VC (4600 mL).
- 2 (a)
Chloride shift occurs in response to 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 becomes deoxygenated. This is called chloride shift or Hamburger shift.
- 3 (b)
Increased temperature dissociates the O_2 from oxyhaemoglobin and low temperature favours the binding of O_2 to haemoglobin
- 4 (c)
Blood do not become acidic due to the buffering action of bicarbonates
 $\text{H}_2\text{O} + \text{CO}_2 \rightleftharpoons \text{H}_2\text{CO}_3 \rightleftharpoons \text{H}^+ + \text{HCO}_3^-$
- 5 (a)
On high mountains, difficulty in breathing is due to decrease in partial pressure of oxygen. Partial pressure of gases decreases with height.
- 6 (a)
Bohr's effect A rise in ρCO_2 or fall in pH decreases the oxygen affinity of haemoglobin, raising the P_{50} value and shifts the curve to the right. This is called Bohr's effect. Conversely, a fall in ρCO_2 and rise in the pH increases oxygen affinity of haemoglobin. (P_{50} value is the value of ρO_2 at which haemoglobin is 50% saturated with oxygen to form haemoglobin
- 7 (c)
Cigarette smoking
- 8 (d)
Zebra, lizard and rabbit respire through the lungs

Frog – Respiration

(i) Gills Respiration from the gills takes place in tadpole stage of frog

(ii) Cutaneous Respiration It is also called skin respiration. It takes place when the frog lives in water

(iii) Lung Respiration When frog comes on the terrestrial surface it performs respiration from the lungs

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(a)

In hypoxia, oxygen supply to the tissue is inadequate.

11

(c)

I. False, II. True

Respiration is a passive process, which creates a pressure gradient with the lungs and the atmosphere

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(d)

When carbon dioxide concentration in blood increases, breathing becomes faster and deeper. The effect of increased carbon dioxide is to decrease the affinity of haemoglobin for oxygen. Thus, due to Bohr's effect, the carbon dioxide released in respiring tissue accelerates the delivery of oxygen by faster and deeper breathing.

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(c)

Both I and II.

The movement of the air into and out of the lungs is carried out by creating a pressure gradient between the lungs and the atmosphere. Inspiration can occur if 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 the atmospheric pressure.

Expiration takes place when the intra pulmonary pressure is higher than the atmospheric pressure, *i.e.*, there is positive pressure in the lungs with respect to the atmospheric pressure

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(d)

In the tissues, there is

(a) Low ρO_2 (b) High ρCO_2

(c) High H^+ (d) High temperature

All these conditions are favourable for the dissociation of oxygen from oxyhaemoglobin

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(c)

A – Air entering lungs

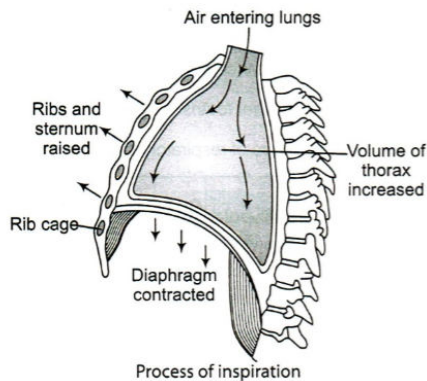
B – Ribs and sternum raised

C – Volume of thorax increased

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



- 16 **(d)**
None of the above
- 17 **(d)**
Inside the lungs, each bronchus divides into numerous bronchioles, each of which terminates into an elongated saccule called the alveolar duct, which bears air sacks or alveoli on its surface. Alveoli provides a large surface for gaseous exchange. The number of alveoli in the human lungs has been estimated to be approximately 750 million
- 18 **(b)**
Nasopharynx is a portion of pharynx. It is the common passage for food and air. Nasopharynx opens through the glottis into the trachea
- 19 **(d)**
Pneumonia is an infection of lungs by *Diplococcus pneumoniae* which leads to the accumulation of mucous and lymph in alveoli, impairing gaseous exchange
- 20 **(d)**
In tissues, dissociation of oxyhaemoglobin and the formation of carboaminohaemoglobin takes place.
In lungs, dissociation of carboxy amino haemoglobin and the formation of haemoglobin takes place

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

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