

YAKEEN NEET 2.0

2026

BODY FLUIDS AND CIRCULATIONS

ZOOLOGY

Lecture - 1

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10.7.2025





Topics to be covered

1

TAPASYA, BLOOD-1



2

3

4

MY TELEGRAM



#Langkiryree



Taswīr^a

101. Match List-I with List-II.

- | List-I | List-II |
|------------------------|--|
| A. Emphysema | I. Rapid spasms in muscle due to low Ca^{++} in body fluid |
| B. Angina Pectoris | II. Damaged alveolar walls and decreased respiratory surface |
| C. Glomerulo-nephritis | III. Acute chest pain when not enough oxygen is reaching to heart muscle |
| D. Tetany | IV. Inflammation of glomeruli of kidney |

2025

167. Which of the following factors are favourable for the formation of oxyhaemoglobin in alveoli?

- (1) Low pCO_2 and High H^+ concentration
- (2) Low pCO_2 and High temperature
- (3) High pO_2 and High pCO_2
- (4) High pO_2 and Lesser H^+ concentration

$pO_2 \uparrow$
 $pCO_2 \downarrow$ $H^+ \downarrow$
temp \downarrow

2024

Q-2

4

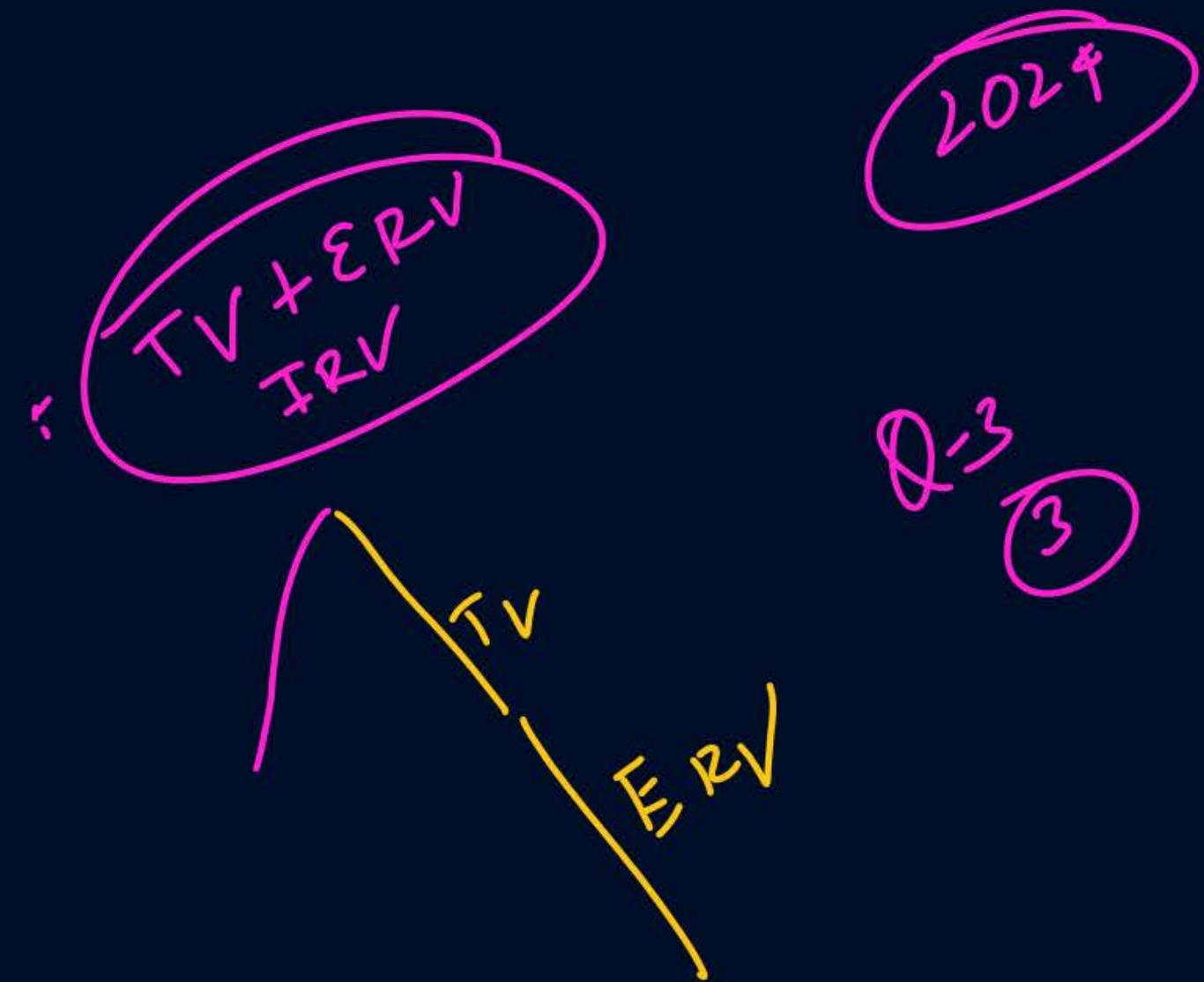
163. Match List I with List II:

	List I		List II
A.	Expiratory capacity	I.	Expiratory reserve volume + Tidal volume + Inspiratory reserve volume
B.	Functional residual capacity	II.	Tidal volume + Expiratory reserve volume
C.	Vital capacity	III.	Tidal volume + Inspiratory reserve volume
D.	Inspiratory capacity	IV.	Expiratory reserve volume + Residual volume

Choose the correct answer from the options given below:

- (1) A-II, B-I, C-IV, D-III
- (2) A-I, B-III, C-II, D-IV
- (3) A-II, B-IV, C-I, D-III
- (4) A-III, B-II, C-IV, D-I

164. Which one of the following factors will not affect the



Vital capacity of lung is _____.

- (1) $\text{IRV} + \text{ERV} + \text{TV} - \text{RV}$
- (3) $\text{IRV} + \text{ERV}$

- (2) $\text{IRV} + \underline{\text{ERV}} + \underline{\text{TV}}$
- (4) $\text{IRV} + \text{ERV} + \text{TV} + \text{RV}$

2023

V+IRT

Q4 2

Select the sequence of steps in Respiration.

- (A) Diffusion of gases (O_2 and CO_2) across alveolar membrane.
- (B) Diffusion of O_2 and CO_2 between blood and tissues.
- (C) Transport of gases by the blood.
- (D) Pulmonary ventilation by which atmospheric air is drawn in and CO_2 rich alveolar air is released out.
- (E) Utilisation of O_2 by the cells for catabolic reactions and resultant release of CO_2 .

Q-5

3

Choose the **correct** answer from the options given below :

- (1) (B), (C), (E), (D), (A)
- (2) (A), (C), (B), (E), (D)
- (3) (D), (A), (C), (B), (E)
- (4) (C), (B), (A), (E), (D)

167. Under normal physiological conditions in human being every 100 ml of oxygenated blood can deliver 5ml ml of O₂ to the tissues.

- (1) 10 ml
- (2) 2 ml
- (3) 5 ml
- (4) 4 ml

Q-6 (3)

169. Which of the following is not the function of conducting part of respiratory system?

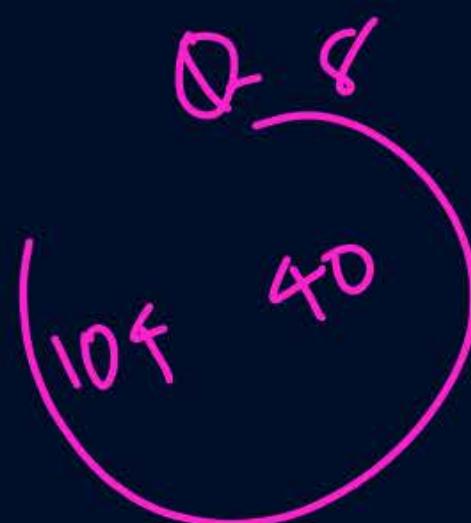
- (1) Provides surface for diffusion of O₂ and CO₂
- (2) It clears inhaled air from foreign particles
- (3) Inhaled air is humidified
- (4) Temperature of inhaled air is brought to body temperature

Q-7 (1)

The partial pressures (in mm Hg) of oxygen (O_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are :

- (1) $pO_2 = 104$ and $pCO_2 = 40$
- (2) $pO_2 = 40$ and $pCO_2 = 45$
- (3) $pO_2 = 95$ and $pCO_2 = 40$
- (4) $pO_2 = 159$ and $pCO_2 = 0.3$

①



Select the favourable conditions required for the formation of oxyhaemoglobin at the alveoli.

- (1) High pO_2 , low pCO_2 , less H^+ , lower temperature
- (2) Low pO_2 , high pCO_2 , more H^+ , higher temperature
- (3) High pO_2 , high pCO_2 , less H^+ , higher temperature
- (4) Low pO_2 , low pCO_2 , more H^+ , higher temperature

②



- 118.** The Total Lung Capacity (TLC) is the total volume of air accommodated in the lungs at the end of a forced inspiration. This includes :
- (1) RV; IC (Inspiratory Capacity);
EC (Expiratory Capacity); and ERV
 - (2) RV; ERV; IC and EC
 - (3) RV; ERV; VC (Vital Capacity) and
FRC (Functional Residual Capacity)
 - (4) RV (Residual Volume);
ERV (Expiratory Reserve Volume);
TV (Tidal Volume); and
IRV (Inspiratory Reserve Volume)

TV + IRV
+ ERV + RV

Q-10

✓ 4

Identify the wrong statement with reference to transport of oxygen.

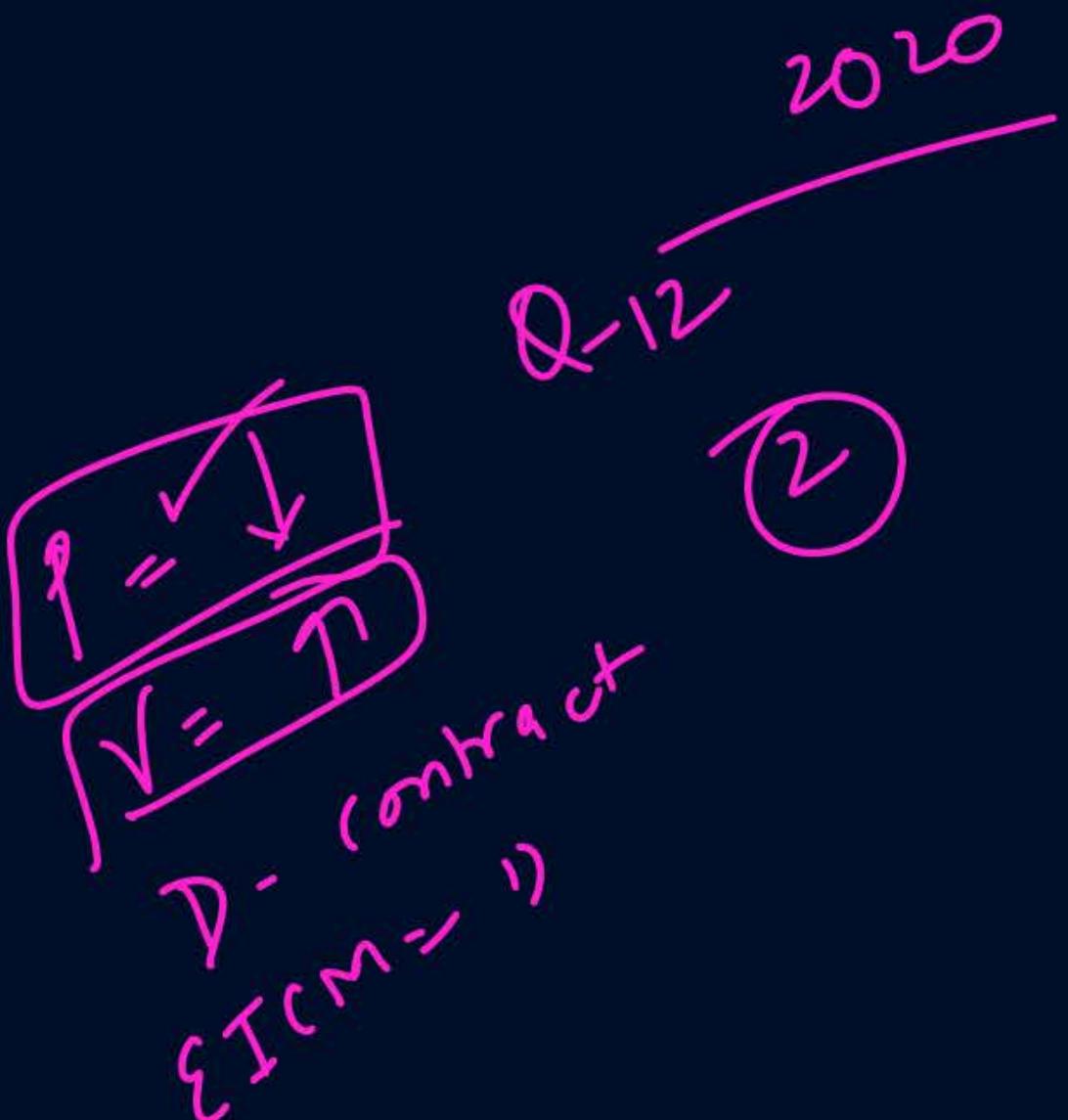
- (1) Low $p\text{CO}_2$ in alveoli favours the formation of oxyhaemoglobin.
- (2) Binding of oxygen with haemoglobin is mainly related to partial pressure of O_2 .
- (3) Partial pressure of CO_2 can interfere with O_2 binding with haemoglobin.
- (4) Higher H^+ conc. in alveoli favours the formation of oxyhaemoglobin.

Q-11

x

Select the correct events that occur during inspiration.

- (a) Contraction of diaphragm ✓
 - (b) Contraction of external inter-costal muscles ✓
 - (c) Pulmonary volume decreases ✗
 - (d) Intra pulmonary pressure increases ✗
- (1) only (d)
 - (2) (a) and (b)
 - (3) (c) and (d)
 - (4) (a), (b) and (d)



Due to increasing air-borne allergens and pollutants,
many people in urban areas are
suffering from respiratory disorder causing wheezing due
to

- (1) benign growth on mucous lining of nasal cavity
- (2) inflammation of bronchi and bronchioles
- (3) proliferation of fibrous tissues and damage of the alveolar walls
- (4) reduction in the secretion of surfactants by pneumocytes.

Q-13
C

Tidal Volume and Expiratory Reserve Volume of an athlete is 500 mL and 1000 mL, respectively. What will be his Expiratory Capacity if the Residual Volume is ~~1200~~ mL?

- (1) ~~1500~~ mL
- (2) 1700 mL
- (3) ~~2200~~ mL
- (4) 2700 mL

$$EC = TV + ERV$$

DK

①

Other

QUESTION

Which of the following causes an increase in the volume of the thoracic chamber in the dorso-ventral axis?

- 1 Contraction of external inter-costal muscles.

- 2 Relaxation of external inter-costal muscles. ~~X~~

- 3 Contraction of diaphragm. ~~X~~

- 4 Relaxation of diaphragm. ~~X~~

Q-15

①

How many animals in the given list perform branchial Gill
respiration?

Earthworm, Fish, Frog (adult), Land insects, Reptiles, Tadpole
Aquatic arthropods, Flatworm, aquatic Molluscs, Birds

- (1) Six
- (2) Four
- (3) Three
- (4) Five

Q. 11
2

Every 300 mL of oxygenated blood can deliver around _____ of O₂ to the tissues under normal physiological conditions.

- (A) 5 mL
- (B) 15 mL
- (C) 25 mL
- (D) 35 mL

$$\begin{array}{c} \text{100 mL} = 5 \text{ mL O}_2 \\ \text{100 mL} = \times 3 \\ \text{300 mL} = 15 \text{ mL O}_2 \end{array}$$

Q-17

2

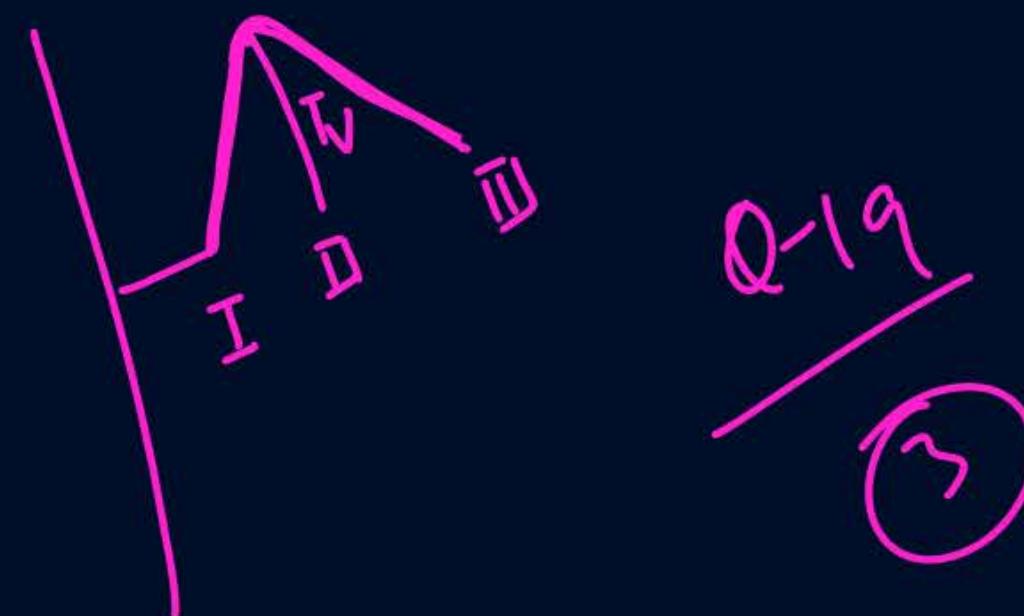
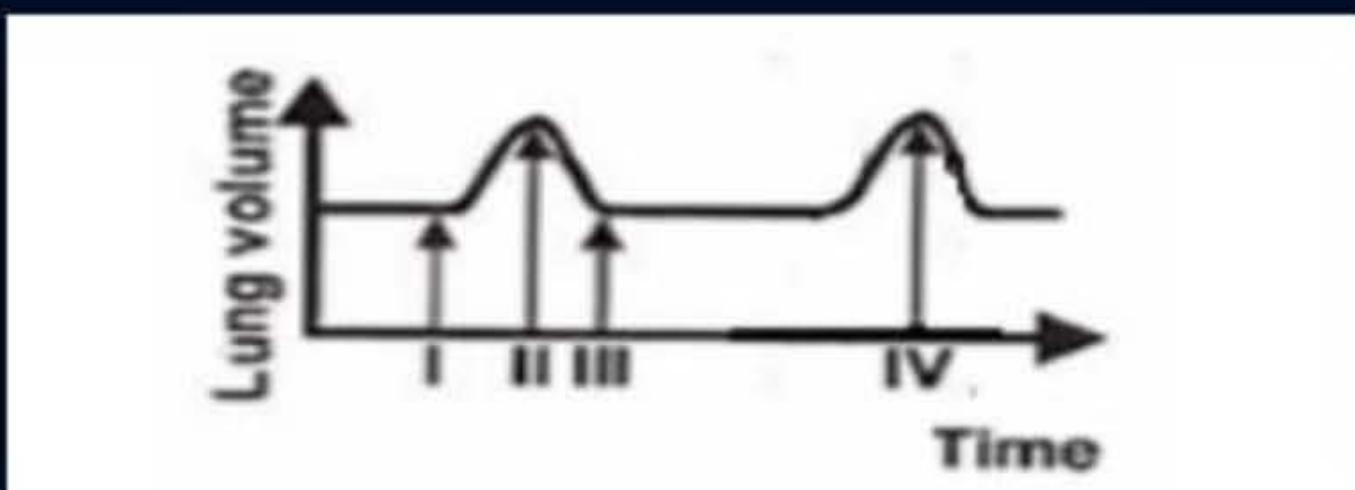
Medulla → CSF = CO_2, H^+

The central chemoreceptors are directly affected by

- (A) H^+ concentration in blood X
- (B) Oxygen concentration in blood X
- (C) H^+ concentration in CSF
- (D) Oxygen in trachea

Q-18
3

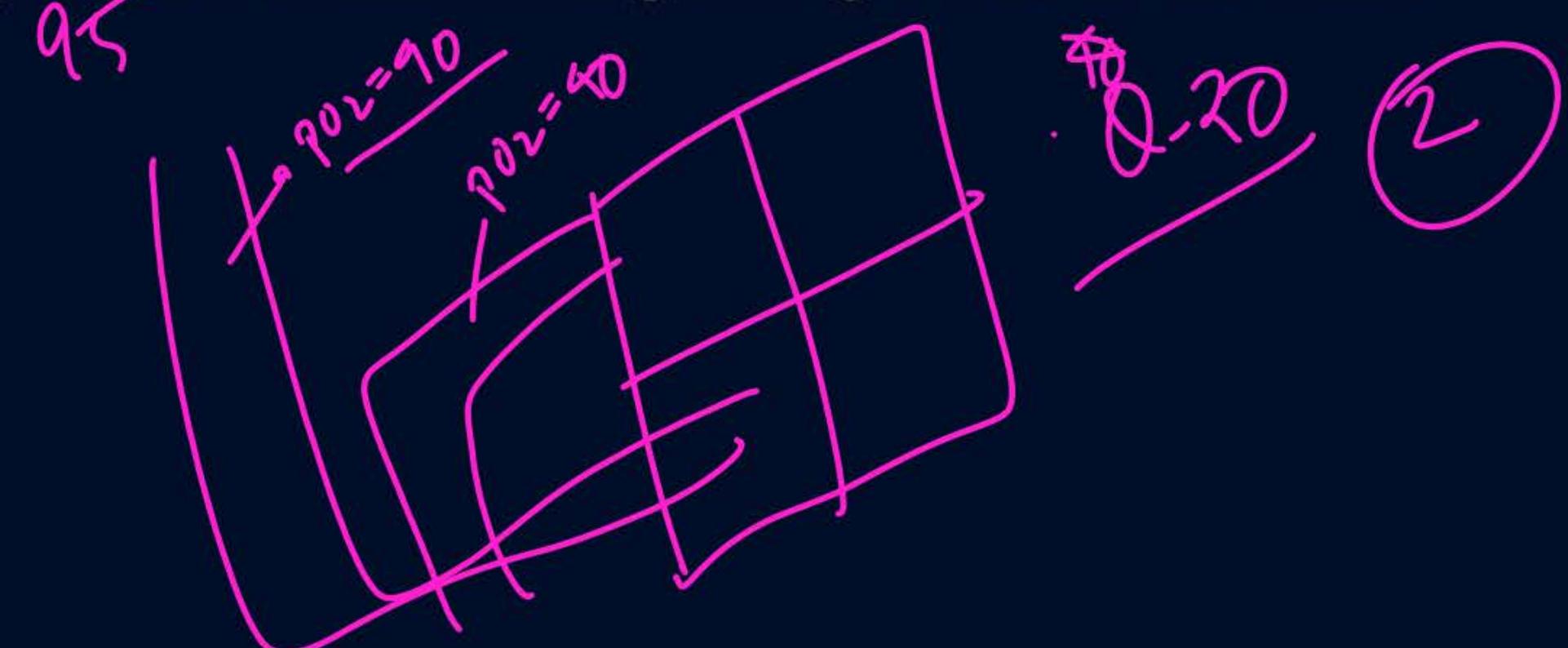
The given figure illustrates the changes in lung volume during the process of breathing. The change from II to III indicates the:



- (A) movement of diaphragm away from the lungs. X
- (B) expansion of the thoracic cavity. X
- (C) Movement of air out of lungs
- (D) expansion of ribs

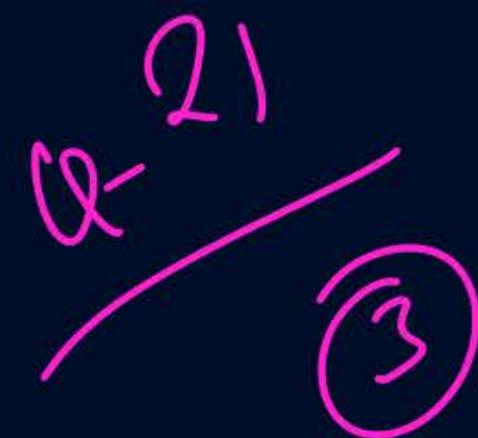
Which of the following would have the same O₂ content?

- (A) Blood entering the lungs – Blood leaving the lungs X
- (B) Blood entering the right side of the heart – Blood leaving the right side of the heart
- (C) Blood entering the right side of the heart – Blood leaving the left side of the heart X
- (D) Blood entering the tissue capillaries- Blood leaving the right side of the heart



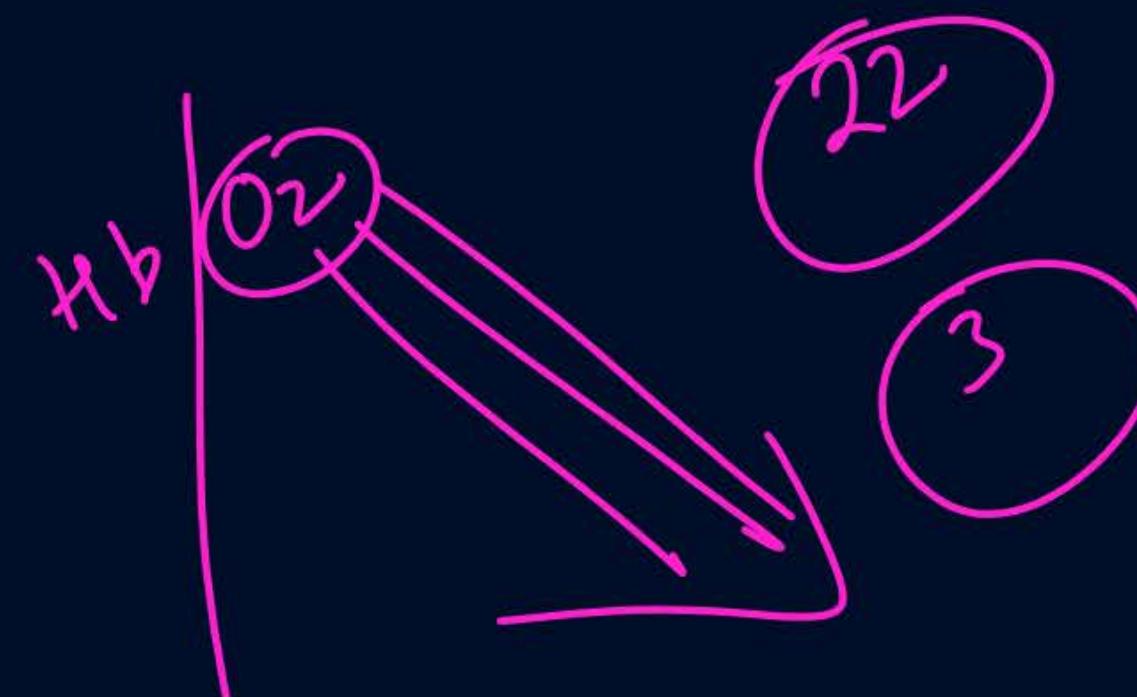
During inspiration, the outer pleural membrane moves in close contact with the:

- A. Lung surface
- B. Diaphragm
- C. Thoracic lining
- D. Mediastinum



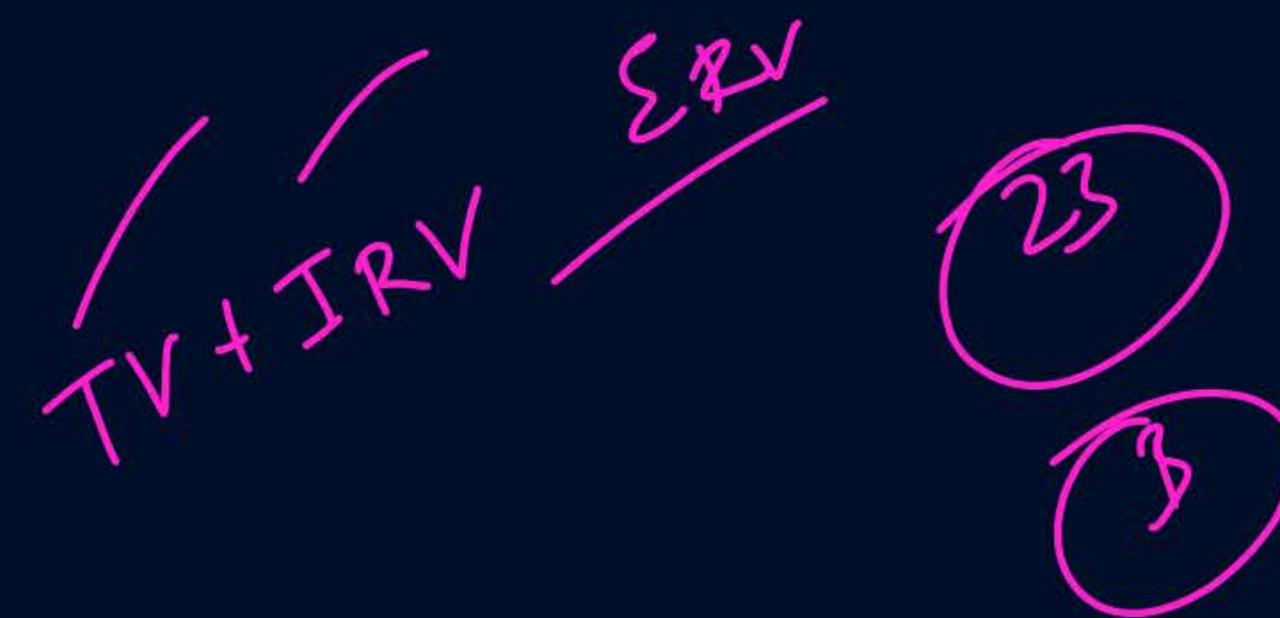
A right shift in the Oxygen Dissociation Curve indicates:

- A. Increased affinity of haemoglobin for oxygen.
- B. Decreased oxygen delivery to tissues.
- C. Conditions favorable for oxygen dissociation from haemoglobin.
- D. Higher oxygen saturation at a given pO_2 .



The maximum volume of air forcefully exhaled after taking the deepest possible breath is called:

- (A) tidal volume
- (B) vital capacity
- (C) residual volume
- (D) total respiratory volume

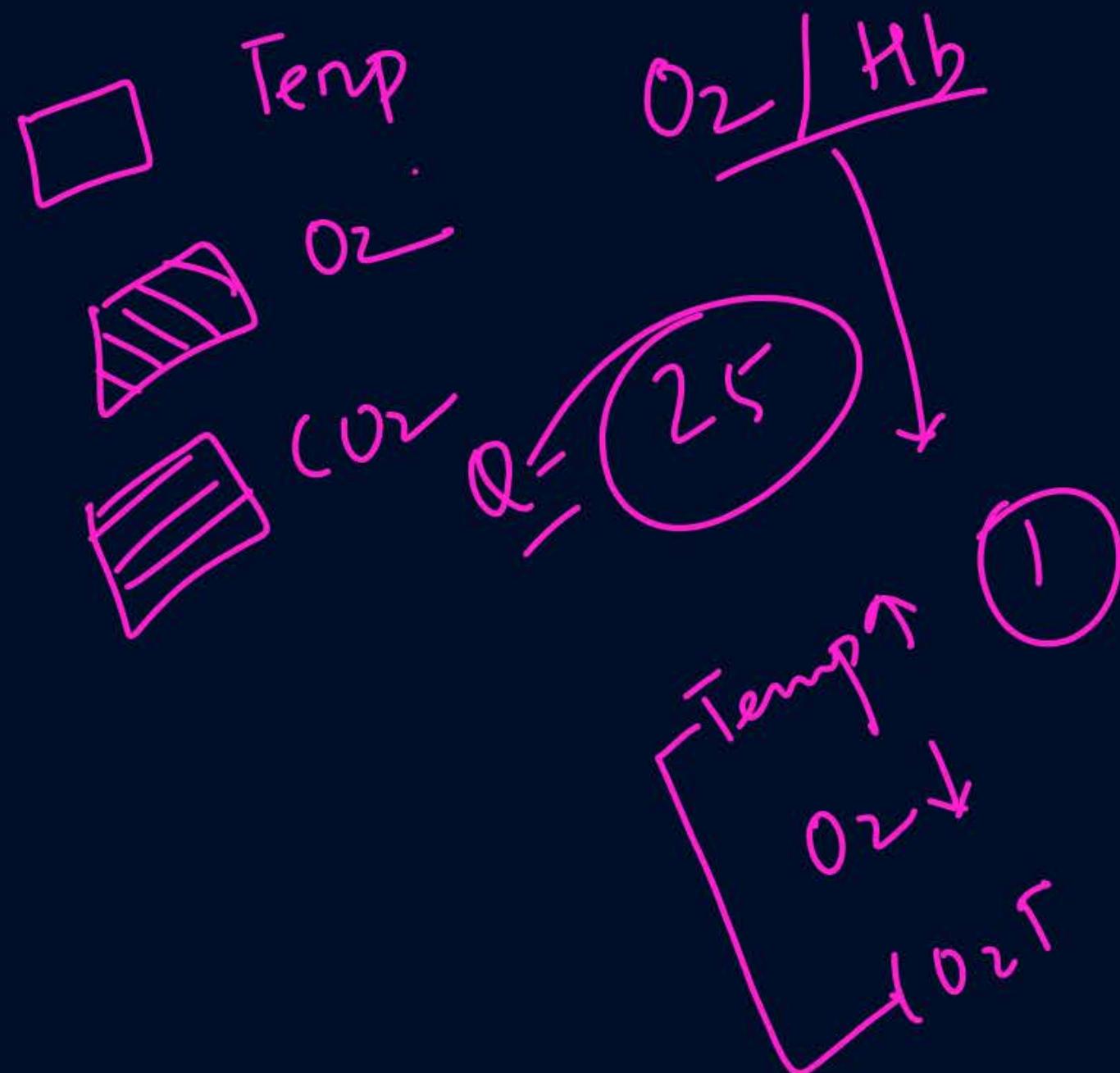
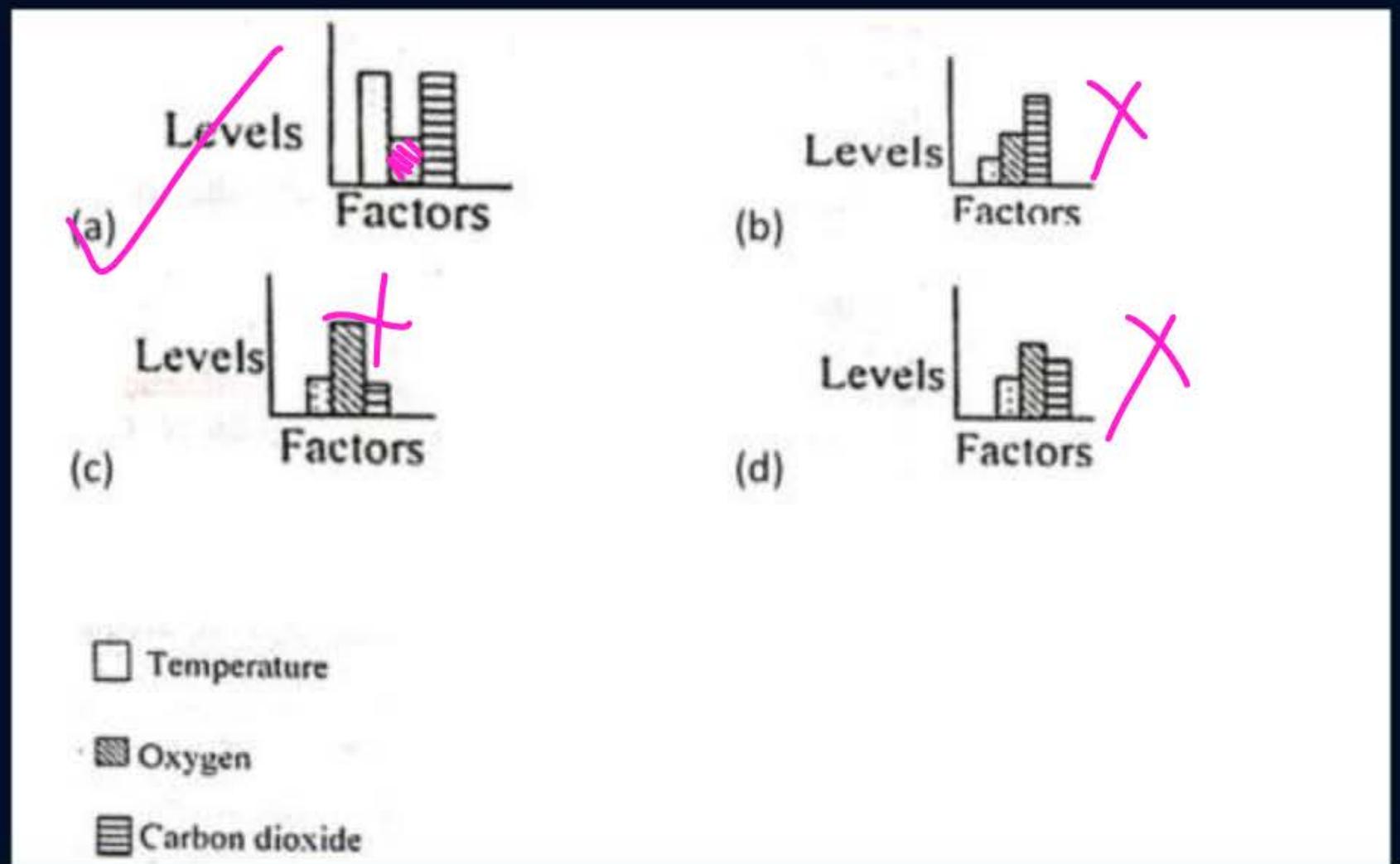


Gaseous exchange is a __X__ process. It is primarily driven by __Y__.
Choose the options which fill the blanks **correctly**.

- | X | Y |
|----------------|-------------------------|
| A. active | ATP hydrolysis |
| B. passive | concentration gradients |
| C. facilitated | carrier proteins |
| D. osmotic | pressure differences |

24
2

Choose the combination of conditions in a tissue that would influence the most rapid dissociation of oxyhaemoglobin.



QUESTION

Spirometer can assess all of these lung volumes, except;

- 1 inspiratory reserve volume.
- 2 expiratory reserve volume.
- 3 residual volume.
- 4 tidal volume.

Q-26
3

QUESTION

The partial pressure of CO_2 is highest at;

- 1 at alveolar level. 40
- 2 at tissue level. 45
- 3 in atmosphere. 0.3
- 4 in oxygenated blood. 40

$$\begin{aligned}P_x &= 0.3 \\ \text{Alveoli} &= 40 \\ \text{Blood} &= 45 \\ \text{Oxygenated blood} &= 45\end{aligned}$$

2²

2²

QUESTION

Which enzyme converts carbon dioxide and water into carbonic acid in red blood cells?

- 1 Carbonic anhydrase
- 2 Catalase
- 3 Amylase
- 4 Lipase



Q-28
1

QUESTION

What is the approximate partial pressure of oxygen (pO_2) in systemic arteries?

- 1 40 mmHg
- 2 45 mmHg
- 3 80 mmHg
- 4 95 mmHg

O₂

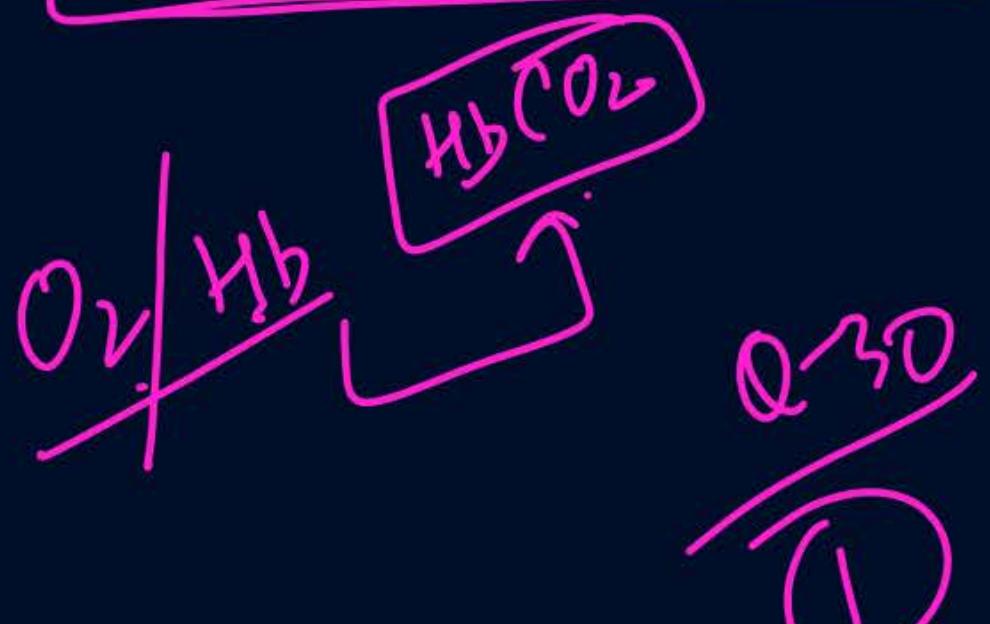
O₂9

④

QUESTION

Which of the following factors favours the formation of carbaminohaemoglobin in tissue?

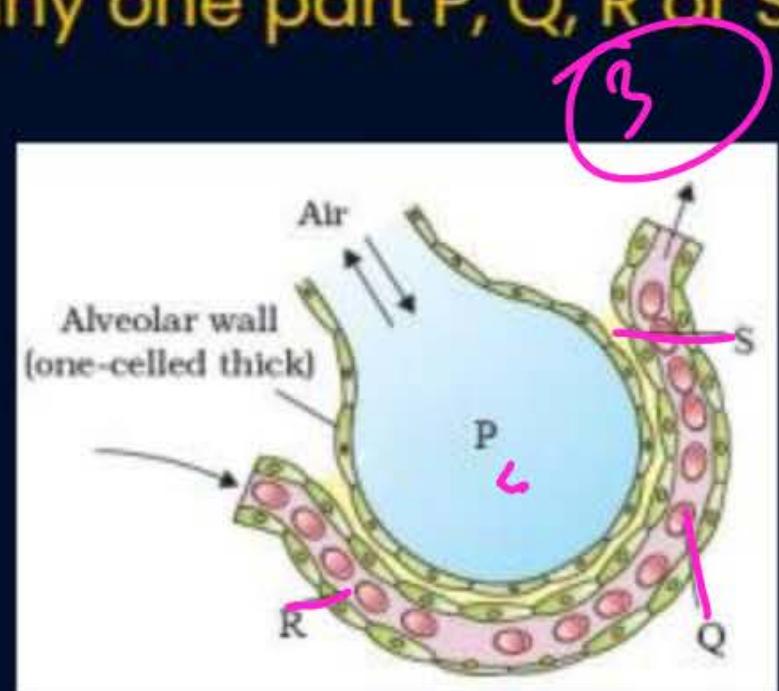
- 1 $pO_2 \downarrow, pCO_2 \uparrow, H^+ \uparrow, \text{Temperature} \uparrow$
- 2 $pO_2 \uparrow, pCO_2 \uparrow, H^+ \downarrow, \text{Temperature} \uparrow$
- 3 $pO_2 \uparrow, pCO_2 \downarrow, H^+ \downarrow, \text{Temperature} \downarrow$
- 4 $pO_2 \downarrow, pCO_2 \uparrow, pH \uparrow, \text{Temperature} \downarrow$



QUESTION

The figure given below shows a small part of the human lung where the exchange of gases takes place. In which one of the options given below, the any one part P, Q, R or S is correctly identified along with its function?

- 1 Q: Red blood cell – transport of CO₂ mainly X
- 2 R: Arterial capillary – passes oxygen to tissues X
- 3 P: Alveolar cavity – the main site of exchange of respiratory gases ✓
- 4 S: Capillary wall – exchange of O₂ and CO₂ takes place here (3)



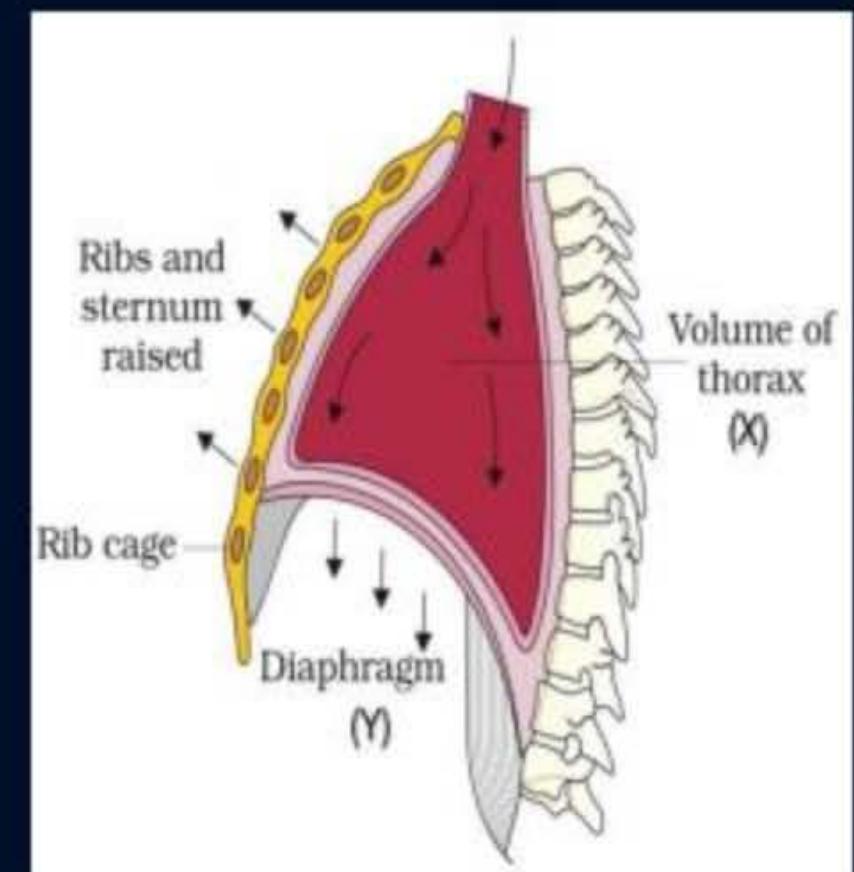
(3)

QUESTION

Q32

Breathing involves two stages: inspiration during which atmospheric air is drawn in and expiration by which the alveolar air is released out. The diagram below shows mechanism of inspiration. Identify 'X' and 'Y'.

- 1 (x): Volume of thorax decreased, (y): Diaphragm relaxes
- 2 (x): Volume of thorax increased, (y): Diaphragm relaxes
- 3 (x): Volume of thorax decreased, (y): Diaphragm contracts
- 4 (x): Volume of thorax increased, (y): Diaphragm contracts



QUESTION

Besides RBC, blood plasma also carries O₂ in solution. The percentage is ~~33~~-----.

1 ~~3%~~

2 97%

3 49%

4 25%

~~33~~



QUESTION

Select the option with the **correct** statements.

- I. Asthma causes wheezing sound. (T)
- II. Emphysema is a chronic disorder. (T)
- III. One of the major causes of emphysema is cigarette smoking. (T)
- IV. Bronchioles are damaged in emphysema. (F)

1 I, II and III only

2 I, III and IV only

3 II and III only

4 I, II, III and IV

QX 34

1

QUESTION

Following are the statements with reference to the regulation of respiration.

- (I) Neural signal from pneumotaxic centre can reduce the duration of inspiration. T
- X (II) A chemosensitive area is less sensitive to CO_2 and hydrogen ions.
- (III) Receptors associated with aortic arch and carotid artery also can recognise changes in CO_2 and H^+ concentration. P
- (IV) The role of oxygen in the regulation of respiratory rhythm is quite significant.

Choose the option with the correct statements.

1 II and III

2 I and IV

3 I and III

4 I, III and IV

Q-25

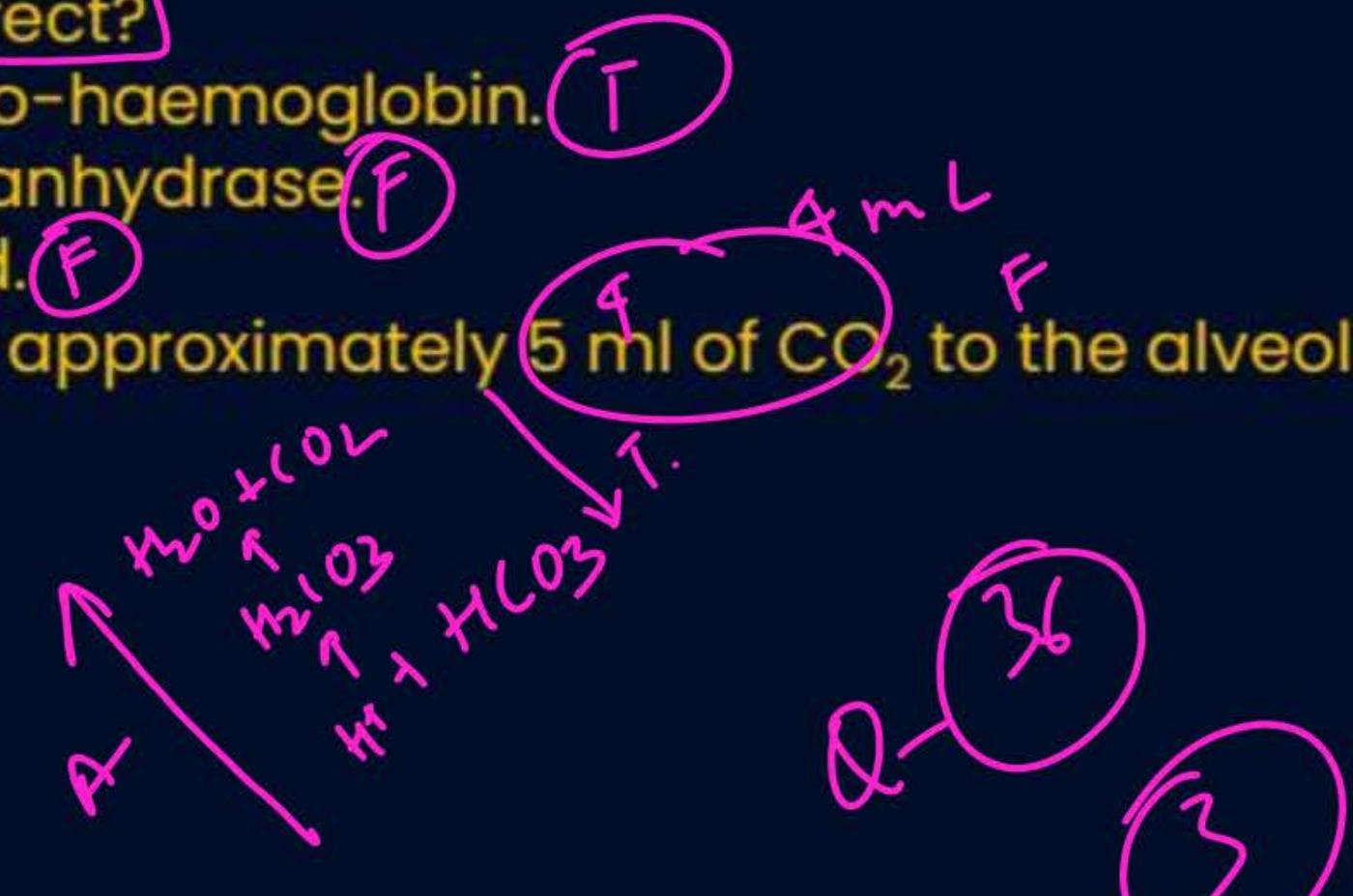
3

QUESTION

How many of the following statements are **incorrect?**

- (a) CO_2 is carried by haemoglobin as carbamino-haemoglobin. **T**
- (b) RBCs contain minute quantities of carbonic anhydrase. **F**
- (c) At the alveolar site, HCO^{3-} and H^+ are formed. **F**
- (d) Every 100 ml of deoxygenated blood delivers approximately 5 ml of CO_2 to the alveoli. **F**

- 1** One
- 2** Two
- 3** Three
- 4** Four



QUESTION

Which of the following statements are true or false?

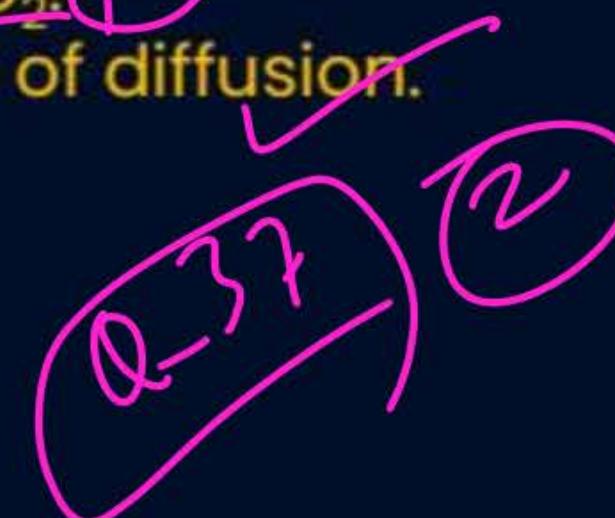
- I. The diffusion membrane is made up of squamous epithelium of alveoli and the basement substance alone. F
- II. The total thickness of diffusion membrane is much less than a millimetre. T
- III. The solubility of CO_2 is 20-25 times higher than that of O_2 . T
- IV. The amount of O_2 that can diffuse through the diffusion membrane per unit difference in partial pressure is much higher compared to that of CO_2 . F
- V. Solubility of the gases is an important factor that can affect the rate of diffusion.

1 I and V are true, but II, III and IV are false.

2 II, III and V are true, but I and IV are false.

3 I, II and III are true, but IV and V are false.

4 I, II, IV and V are false, but only III is true.



QUESTION

Which of the following are **incorrect?**

- I. Inspiration can occur if there is a negative pressure in the lungs with respect to atmospheric pressure.
- II. Inspiration is initiated by the relaxation of diaphragm.
- III. The contraction of external inter-costal muscles lifts up the ribs.
- IV. On an average, a healthy human breathes 2-6 times/minute.

1 I and III



2 II and III

12-16



3 II and IV

4 I and IV



QUESTION

Match List-I with List-II to find out the correct option.

039

2

1 a- (I), b- (IV), c- (III), d- (II)

2 a- (II), b- (III), c- (IV), d- (I)

3 a- (I), b- (IV), c- (II), d- (III)

4 a- (III), b- (I), c- (IV), d- (II)

	List-I		List-II
(a)	Total lung capacity	(I)	Total volume of air a person can expire after a normal inspiration.
(b)	Vital capacity	(II)	Total volume of air accommodated in the lungs at the end of a forced inspiration.
(c)	Functional residual capacity	(III)	The maximum volume of air a person can breathe in after a forced expiration.
(d)	Expiratory capacity	(IV)	Volume of air that will remain in the lungs after a normal expiration.

QUESTION

Statement-I: alveoli gets inflamed in asthma ~~X~~ F

Statement-II: In asthma, patient has difficulty in breathing and produces a wheezing sound

T

- 1 Statement I and Statement II both are correct.
- 2 Statement I is correct, but Statement II is incorrect.
- 3 Statement I is incorrect, but Statement II is correct.
- 4 Statement I and Statement II both are incorrect.

Q-40

3

QUESTION

Statement-I: Exchange of O₂ and CO₂ at the alveoli and tissues occur by diffusion.

Statement-II: In the tissues, pO₂ is high. *pO₂ is low*

1

Q-41

2

- 1 Statement I and Statement II both are correct.

- 2 Statement I is correct, but Statement II is incorrect.

- 3 Statement I is incorrect, but Statement II is correct.

- 4 Statement I and Statement II both are incorrect.

QUESTION

Statement-I: Earthworms have tracheal tubes to transport atmospheric air within the body.

Statement-II: Flatworms exchange O₂ with CO₂ by simple diffusion over their entire body surface.

Cuticle

P

T

0-42

1 Statement I and Statement II both are correct.

2 Statement I is correct, but Statement II is incorrect.

3 Statement I is incorrect, but Statement II is correct.

4 Statement I and Statement II both are incorrect.

3

QUESTION

Statement-I: Trachea divides at the level of 7th thoracic vertebra.

Statement-II: Terminal bronchioles are supported by incomplete cartilaginous rings.

58h

(F)

- 1 Statement I and Statement II both are correct.
- 2 Statement I is correct, but Statement II is incorrect.
- 3 Statement I is incorrect, but Statement II is correct.
- 4 Statement I and Statement II both are incorrect.

Q-43

(F)

QUESTION

Statement-I: Lungs are covered by a double layered pleura.

(T)

Statement-II: parietal pleura towards the lung surface and visceral towards the thoracic lining

(F)

- 1 Statement I and Statement II both are correct.
- 2 Statement I is correct, but Statement II is incorrect.
- 3 Statement I is incorrect, but Statement II is correct.
- 4 Statement I and Statement II both are incorrect.

(4x)

✓

QUESTION

Assertion (A): An increase in the partial pressure of carbon dioxide (pCO_2) in blood leads to increased breathing rate.

Reason (R): High pCO_2 levels stimulate the chemoreceptors.

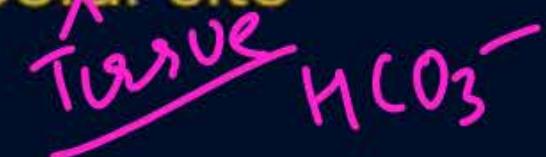
- 1 Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).
- 2 Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A).
- 3 Assertion (A) is true, and Reason (R) is false.
- 4 Assertion (A) is false, and Reason (R) is true.

65 1

QUESTION

Assertion (A): CO₂ travels as bicarbonate dissolved in the plasma to alveoli

Reason (R): bicarbonate is formed at alveolar site



- 1 Both Assertion (A) and Reason (R) are the true, and Reason (R) is a correct explanation of Assertion (A).
- 2 Both Assertion (A) and Reason (R) are the true, but Reason (R) is not a correct explanation of Assertion (A).
- 3 Assertion (A) is true, and Reason (R) is false.
- 4 Assertion (A) is false, and Reason (R) is true.

(4) ③

QUESTION

Assertion (A): Occupational respiratory disorders can cause serious lung damage T

Reason (R): Long exposure to the dust produced by grinding and stone breaking industries can give rise to inflammation, leading to fibrosis and thus causing lung damage. T

- 1 Both Assertion (A) and Reason (R) are true, and Reason (R) is a correct explanation of Assertion (A).
- 2 Both Assertion (A) and Reason (R) are true, but Reason (R) is not a correct explanation of Assertion (A). 4x 1
- 3 Assertion (A) is true, and Reason (R) is false.
- 4 Assertion (A) is false, and Reason (R) is true.

Body Fluids & its Circulation:

Constantly supplied with O_2 , Nutrients



CO_2 & other↑ products should be constantly eliminated

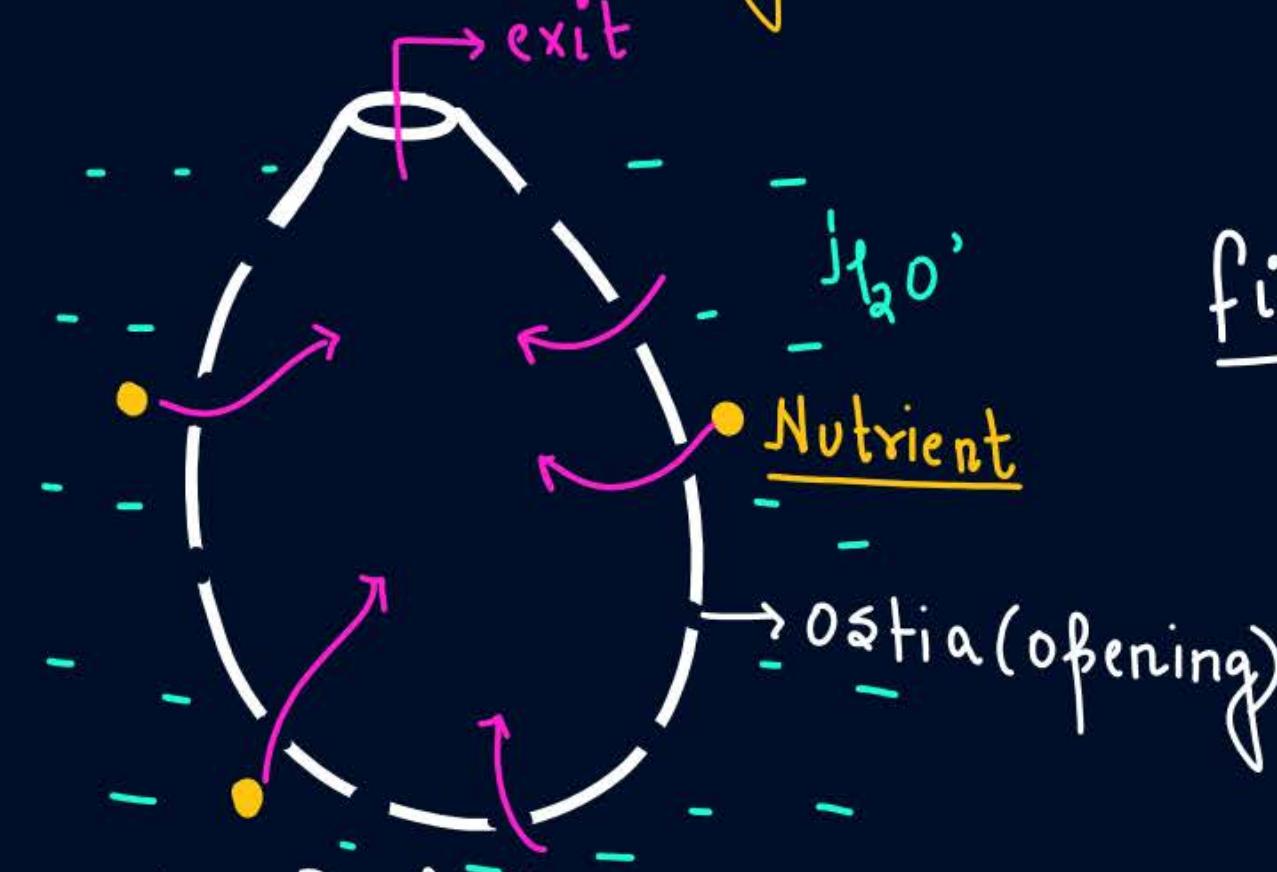


fig: sponges

- Lower invertebrates like sponges (Porifera), Hydra ((coelentrata), uses surrounding H_2O to circulate O_2 , Nutrients through Body Cavity as well as for elimination of excretory Products.

- Higher Vertebrates

↓
uses specialised 'FLUIDS' to do the same

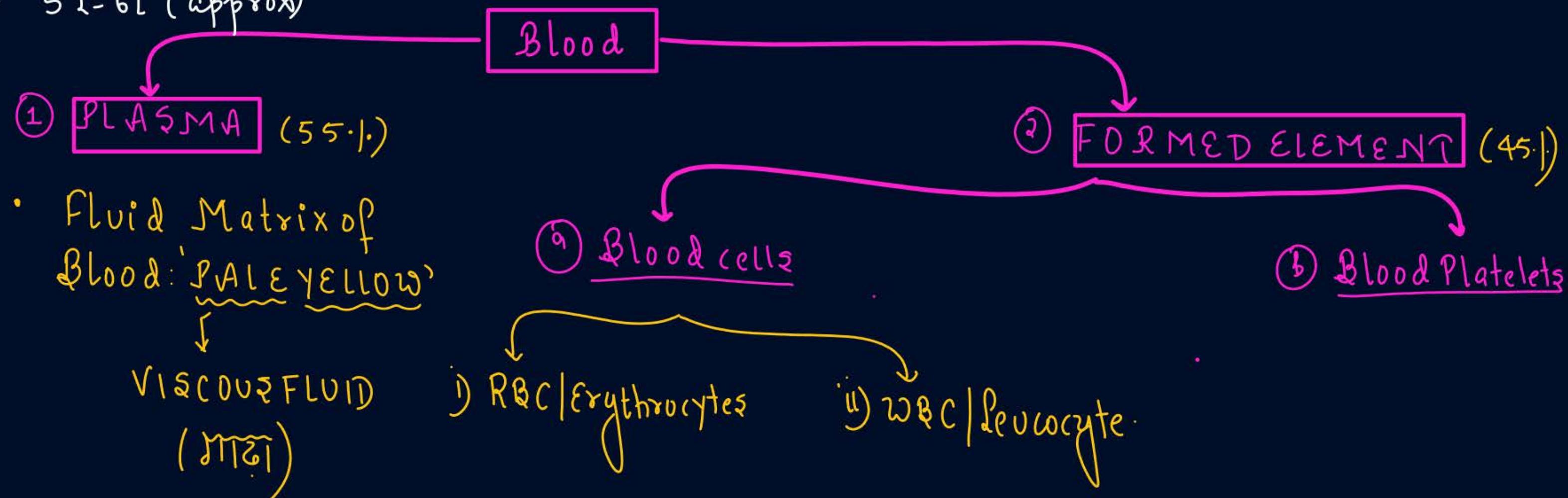
i) Blood

ii) Lymph

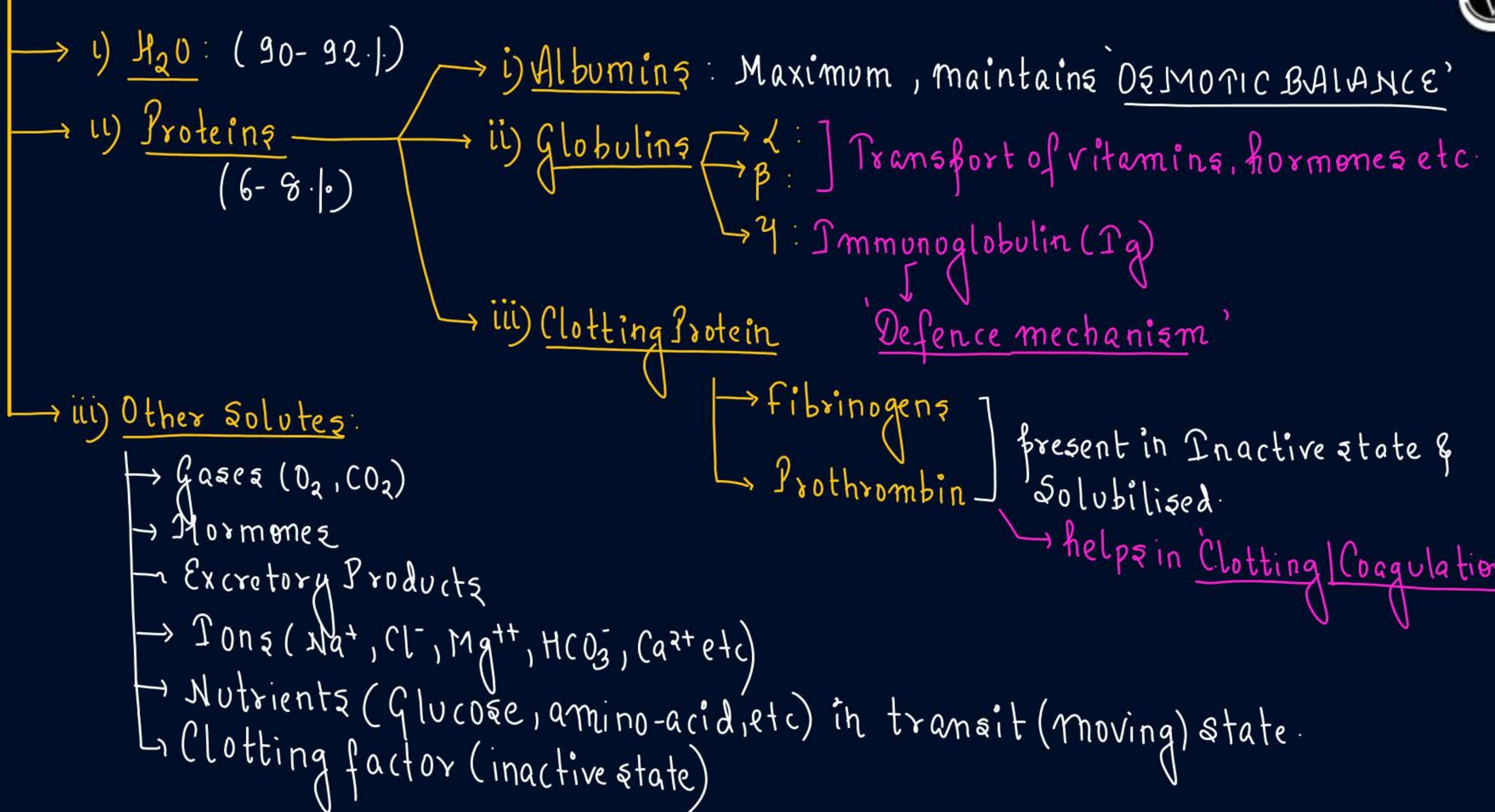
You have learnt that all living cells have to be provided with nutrients, O₂ and other essential substances. Also, the waste or harmful substances produced, have to be removed continuously for healthy functioning of tissues. It is therefore, essential to have efficient mechanisms for the movement of these substances to the cells and from the cells. Different groups of animals have evolved different methods for this transport. Simple organisms like sponges and coelenterates circulate water from their surroundings through their body cavities to facilitate the cells to exchange these substances. More complex organisms use special fluids within their bodies to transport such materials. **Blood** is the most commonly used body fluid by most of the higher organisms including humans for this purpose. Another body fluid, **lymph**, also helps in the transport of certain substances. In this chapter, you will learn about the composition and properties of blood and lymph (tissue fluid) and the mechanism of circulation of blood is also explained herein.

① Blood:

- fluid Connective Tissue
- Mesodermal
- Fibres (protein) Absent, Matrix (Plasma) is not secreted by its own cell.
- pH = 7.4
- 5 L - 6 L (approx)



i) Plasma: (55%)



SERUM = PLASMA - Clotting Factors / Proteins

↳ can't coagulate

18.1 BLOOD

Blood is a special connective tissue consisting of a fluid matrix, plasma, and formed elements.

18.1.1 Plasma

Plasma is a straw coloured, viscous fluid constituting nearly 55 per cent of the blood. 90-92 per cent of plasma is water and proteins contribute 6-8 per cent of it. Fibrinogen, globulins and albumins are the major proteins.

Fibrinogens are needed for clotting or coagulation of blood. Globulins primarily are involved in defense mechanisms of the body and the albumins help in osmotic balance. Plasma also contains small amounts of minerals like Na^+ , Ca^{++} , Mg^{++} , HCO_3^- , Cl^- , etc. Glucose, amino acids, lipids, etc., are also present in the plasma as they are always in transit in the body. Factors for coagulation or clotting of blood are also present in the plasma in an inactive form. Plasma without the clotting factors is called serum.



Homework

- REVISE CLAASNOTES / ZOOLOGY MED EASY

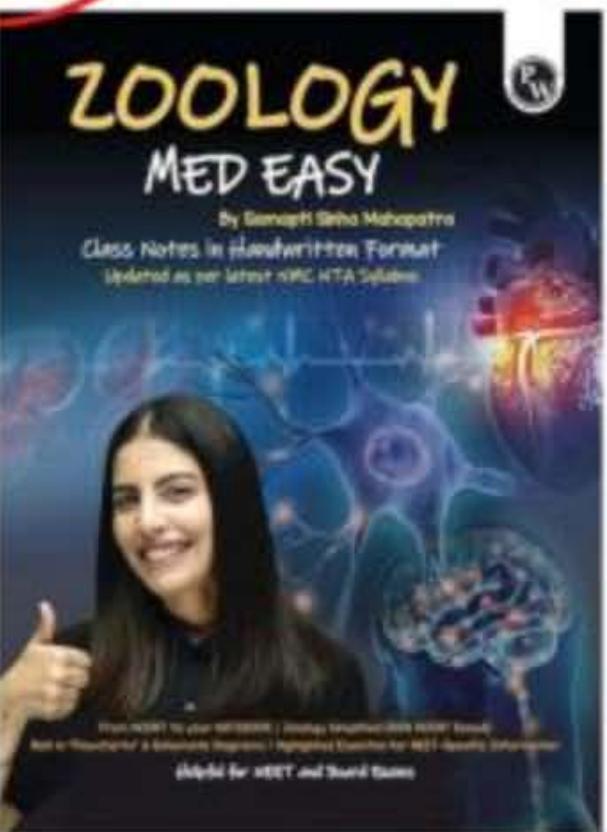
Samapti Sinha Mahapatra
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