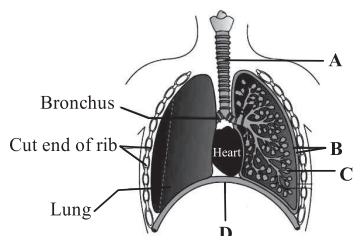


# Breathing and Exchange of Gases

## 17.1 Respiratory Organs

1. The figure shows a diagrammatic view of human respiratory system with labels A, B, C and D. Select the option which gives correct identification and main function and / or characteristic.



- (a) C - Alveoli - Thin walled vascular bag like structures for exchange of gases.  
 (b) D - Lower end of lungs - Diaphragm pulls it down during inspiration.  
 (c) A - Trachea - Long tube supported by complete cartilaginous rings for conducting inspired air.  
 (d) B - Pleural membrane - Surround ribs on both sides to provide cushion against rubbing.

(NEET 2013)

2. Lungs are enclosed in

- (a) periosteum (b) perichondrium  
 (c) pericardium (d) pleural membrane.

(1996)

3. Skin is an accessory organ of respiration in

- (a) humans (b) frog  
 (c) rabbit (d) lizard.

(1990)

## 17.2 Mechanism of Breathing

4. Select the correct events that occur during inspiration.

- (1) Contraction of diaphragm  
 (2) Contraction of external inter-costal muscles  
 (3) Pulmonary volume decreases  
 (4) Intra pulmonary pressure increases

- (a) (1) and (2)  
 (b) (3) and (4)

- (c) (1), (2) and (4)

- (d) only (4)

(NEET 2020)

5. 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?

- (a) 2700 mL

- (b) 1500 mL

- (c) 1700 mL

- (d) 2200 mL (NEET 2019)

6. Select the correct statement.

- (a) Expiration occurs due to external intercostal muscles.

- (b) Intrapulmonary pressure is lower than the atmospheric pressure during inspiration.

- (c) Inspiration occurs when atmospheric pressure is less than intrapulmonary pressure.

- (d) Expiration is initiated due to contraction of diaphragm.

(Odisha NEET 2019)

7. Match the items given in column I with those in column II and select the correct option given below.

### Column I

### Column II

- (A) Tidal volume (i) 2500 – 3000 mL

- (B) Inspiratory reserve volume (ii) 1100 – 1200 mL

- (C) Expiratory reserve volume (iii) 500 – 550 mL

- (D) Residual volume (iv) 1000 – 1100 mL

### (A) (B) (C) (D)

- (a) (iii) (ii) (i) (iv)

- (b) (iii) (i) (iv) (ii)

- (c) (i) (iv) (ii) (iii)

- (d) (iv) (iii) (ii) (i)

(NEET 2018)

8. Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration, because of

- (a) inspiratory reserve volume

- (b) tidal volume

- (c) expiratory reserve volume

- (d) residual volume.

(NEET 2017)

9. Lungs do not collapse between breaths and some air always remains in the lungs which can never be expelled because
- there is a negative pressure in the lungs
  - there is a negative intrapleural pressure pulling at the lung walls
  - there is a positive intrapleural pressure
  - pressure in the lungs is higher than the atmospheric pressure.

(NEET-II 2016)

10. Which one of the following is a possibility for most of us in regard to breathing, by making a conscious effort?
- One can breathe out air totally without oxygen.
  - One can breathe out air through Eustachian tube by closing both nose and mouth.
  - One can consciously breathe in and breathe out by moving the diaphragm alone, without moving the ribs at all.
  - The lungs can be made fully empty by forcefully breathing out all air from them.

(Mains 2011)

11. Listed below are four respiratory capacities (i–iv) and four jumbled respiratory volumes of a normal human adult.

Respiratory capacities	Respiratory volumes
(i) Residual volume	2500 mL
(ii) Vital capacity	3500 mL
(iii) Inspiratory reserve volume	1200 mL
(iv) Inspiratory capacity	4500 mL

Which one of the following is the correct matching of two capacities and volumes?

- (ii) 2500 mL, (iii) 4500 mL
- (iii) 1200 mL, (iv) 2500 mL
- (iv) 3500 mL, (i) 1200 mL
- (i) 4500 mL, (ii) 3500 mL

(2010)

12. What is vital capacity of our lungs?

- Inspiratory reserve volume plus expiratory reserve volume
- Total lung capacity minus residual volume
- Inspiratory reserve volume plus tidal volume
- Total lung capacity minus expiratory reserve volume

(2009)

13. Which one of the following statements is incorrect?

- The principle of countercurrent flow facilitates efficient respiration in gills of fishes.
- The residual air in lungs slightly decreases the efficiency of respiration in mammals.
- The presence of non-respiratory air sacs, increases the efficiency of respiration in birds.
- In insects, circulating body fluids serve to distribute oxygen to tissues.

(2006)

14. When 1500 mL air is in the lungs, it is called

- residual volume
- inspiratory reserve volume
- vital capacity
- tidal volume.

(1996)

15. The ventilation movements of the lungs in mammals are governed by

- muscular walls of lung
- diaphragm
- intercostal muscles
- both (b) and (c).

(1995)

16. In man and mammals, air passes from outside into the lungs through

- nasal cavity, larynx, pharynx, trachea, bronchi, alveoli
- nasal cavity, larynx, pharynx, trachea, bronchioles, alveoli
- nasal cavity, pharynx, larynx, trachea, bronchioles, bronchi, alveoli
- nasal cavity, pharynx, larynx, trachea, bronchi, bronchioles, alveoli.

(1994)

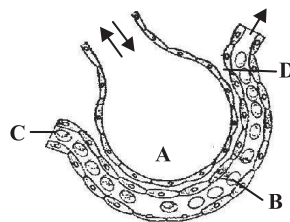
### 17.3 Exchange of Gases

17. The partial pressure of oxygen in the alveoli of the lungs is

- equal to that in the blood
- more than that in the blood
- less than that in the blood
- less than that of carbon dioxide.

(NEET-II 2016)

18. The figure given below shows a small part of human lung where exchange of gases takes place. Select the option which represents labelled part (A, B, C or D) correctly identified along with its function.



- C : Arterial capillary - Passes oxygen to tissues
- A : Alveolar cavity - Main site of exchange of respiratory gases
- D : Capillary wall - Exchange of  $O_2$  and  $CO_2$  takes place here
- B : Red blood cells - Transport of  $CO_2$  mainly

(2011)

19. The exchange of gases in the alveoli of the lungs takes place by

- passive transport
- active transport
- osmosis
- simple diffusion.

(1998)

20. In lungs, the air is separated from the venous blood through  
 (a) transitional epithelium + tunica externa of blood vessel  
 (b) squamous epithelium + endothelium of blood vessel  
 (c) squamous epithelium + tunica media of blood vessel  
 (d) none of the above. (1997)
21. The alveolar epithelium in the lung is  
 (a) non-ciliated columnar  
 (b) non-ciliated squamous  
 (c) ciliated columnar  
 (d) ciliated squamous. (1990)

## 17.4 Transport of Gases

22. Identify the wrong statement with reference to transport of oxygen.  
 (a) Binding of oxygen with haemoglobin is mainly related to partial pressure of  $O_2$ .  
 (b) Partial pressure of  $CO_2$  can interfere with  $O_2$  binding with haemoglobin.  
 (c) Higher  $H^+$  conc. in alveoli favours the formation of oxyhaemoglobin.  
 (d) Low  $pCO_2$  in alveoli favours the formation of oxyhaemoglobin. (NEET 2020)
23. Reduction in pH of blood will  
 (a) decrease the affinity of haemoglobin with oxygen  
 (b) release bicarbonate ions by the liver  
 (c) reduce the rate of heartbeat  
 (d) reduce the blood supply to the brain. (NEET-I 2016)
24. Approximately seventy percent of carbon dioxide absorbed by the blood will be transported to the lungs  
 (a) as bicarbonate ions  
 (b) in the form of dissolved gas molecules  
 (c) by binding to RBC  
 (d) as carbamino - haemoglobin. (2014)
25. A large proportion of oxygen remains unused in the human blood even after its uptake by the body tissues. This  $O_2$   
 (a) acts as a reserve during muscular exercise  
 (b) raises the  $pCO_2$  of blood to 75 mm of Hg  
 (c) is enough to keep oxyhaemoglobin saturation at 96%  
 (d) helps in releasing more  $O_2$  to the epithelial tissues. (2011)
26. Bulk of carbon dioxide ( $CO_2$ ) released from body tissues into the blood is present as  
 (a) bicarbonate in blood plasma and RBCs

- (b) free  $CO_2$  in blood plasma  
 (c) 70% carbamino-haemoglobin and 30% as bicarbonate  
 (d) carbamino-haemoglobin in RBCs. (Mains 2011)
27. What is true about RBCs in humans?  
 (a) They carry about 20-25 percent of  $CO_2$ .  
 (b) They transport 99.5 percent of  $O_2$ .  
 (c) They transport about 80 percent oxygen only and the rest 20 percent of it is transported in dissolved state in blood plasma.  
 (d) They do not carry  $CO_2$  at all. (2010)
28. The haemoglobin of a human fetus  
 (a) has only 2 protein subunits instead of 4  
 (b) has a higher affinity for oxygen than that of an adult  
 (c) has a lower affinity for oxygen than that of the adult  
 (d) its affinity for oxygen is the same as that of an adult. (2009)
29. The majority of carbon dioxide produced by our body cells is transported to the lungs as  
 (a) attached to haemoglobin  
 (b) dissolved in the blood  
 (c) as bicarbonates  
 (d) as carbonates. (2006)
30. Haemoglobin is a type of  
 (a) carbohydrate (b) respiratory pigment  
 (c) vitamin (d) skin pigment. (1999)
31. How the transport of  $O_2$  and  $CO_2$  by blood happens?  
 (a) With the help of WBCs and blood serum  
 (b) With the help of platelets and corpuscles  
 (c) With the help of RBCs and blood plasma  
 (d) With the help of RBCs and WBCs (1996)
32. At high altitude, the RBCs in the human blood will  
 (a) increase in number (b) decrease in number  
 (c) increase in size (d) decrease in size. (1995)
33. Although much  $CO_2$  is carried in blood, yet blood does not become acidic, because  
 (a)  $CO_2$  is continuously diffused through the tissues and is not allowed to accumulate  
 (b) in  $CO_2$  transport, blood buffers play an important role  
 (c)  $CO_2$  is absorbed by the leucocytes  
 (d)  $CO_2$  combines with water to form  $H_2CO_3$  which is neutralised by  $NaCO_3$ . (1995)
34. The carbon dioxide is transported *via* blood to lungs mostly  
 (a) in combination with haemoglobin only  
 (b) dissolved in blood plasma  
 (c) in the form of bicarbonate ions  
 (d) as carbamino-haemoglobin and as carbonic acid. (1995)

35. Carbon dioxide is transported from tissues to respiratory surface by only  
 (a) plasma and erythrocytes  
 (b) plasma  
 (c) erythrocytes  
 (d) erythrocytes and leucocytes. (1993)

### 17.5 Regulation of Respiration

36. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe?  
 (a) Falling  $\text{CO}_2$  concentration  
 (b) Rising  $\text{CO}_2$  and falling  $\text{O}_2$  concentration  
 (c) Falling  $\text{O}_2$  concentration  
 (d) Rising  $\text{CO}_2$  concentration (2015 Cancelled)
37. The respiratory centres, which control inspiration and expiration, are located in  
 (a) diencephalon (b) medulla oblongata  
 (c) cerebellum (d) spinal cord. (1999)
38. The respiratory centre which regulates respiration is located in  
 (a) cerebellum (b) medulla oblongata  
 (c) cerebral peduncle (d) the vagus nerve. (1994)

### 17.6 Disorders of Respiratory System

39. Due to increasing air-borne allergens and pollutants, many people in urban areas are suffering from respiratory disorder that cause wheezing due to  
 (a) reduction in the secretion of surfactant by pneumocytes  
 (b) benign growth on mucous lining of nasal cavity  
 (c) inflammation of bronchi and bronchioles  
 (d) proliferation of fibrous tissues and damage of the alveolar walls. (NEET 2019)
40. Which of the following options correctly represents the lung conditions in asthma and emphysema, respectively?  
 (a) Inflammation of bronchioles; Decreased respiratory surface  
 (b) Increased number of bronchioles; Increased respiratory surface  
 (c) Increased respiratory surface; Inflammation of bronchioles  
 (d) Decreased respiratory surface; Inflammation of bronchioles (NEET 2018)

41. Which of the following is an occupational respiratory disorder?  
 (a) Anthracis (b) Silicosis  
 (c) Botulism (d) Emphysema (NEET 2018)
42. Name the chronic respiratory disorder caused mainly by cigarette smoking.  
 (a) Respiratory acidosis (b) Respiratory alkalosis  
 (c) Emphysema (d) Asthma (NEET-I 2016)
43. Asthma may be attributed to  
 (a) inflammation of the trachea  
 (b) accumulation of fluid in the lungs  
 (c) bacterial infection of the lungs  
 (d) allergic reaction of the mast cells in the lungs. (NEET-I 2016)
44. Name the pulmonary disease in which alveolar surface area involved in gas exchange is drastically reduced due to damage in the alveolar walls.  
 (a) Pneumonia (b) Asthma  
 (c) Pleurisy (d) Emphysema (2015)
45. Which one of the following is the correct statement for respiration in humans?  
 (a) Cigarette smoking may lead to inflammation of bronchi.  
 (b) Neural signals from pneumotoxic centre in pons region of brain can increase the duration of inspiration.  
 (c) Workers in grinding and stone-breaking industries may suffer from lung fibrosis.  
 (d) About 90% of carbon dioxide ( $\text{CO}_2$ ) is carried by haemoglobin as carbamino-haemoglobin. (2012)
46. Blood analysis of a patient reveals an unusually high quantity of carboxyhaemoglobin content. Which of the following conclusions is most likely to be correct?  
 The patient has been inhaling polluted air containing unusually high content of  
 (a) carbon disulphide (b) chloroform  
 (c) carbon dioxide (d) carbon monoxide. (2004)
47. When  $\text{CO}_2$  concentration in blood increases breathing becomes  
 (a) shallower and slow  
 (b) there is no effect on breathing  
 (c) slow and deep  
 (d) faster and deeper. (2004)

### ANSWER KEY

- |         |         |         |         |         |         |         |         |         |         |
|---------|---------|---------|---------|---------|---------|---------|---------|---------|---------|
| 1. (a)  | 2. (d)  | 3. (b)  | 4. (a)  | 5. (b)  | 6. (b)  | 7. (b)  | 8. (d)  | 9. (b)  | 10. (b) |
| 11. (c) | 12. (b) | 13. (b) | 14. (a) | 15. (d) | 16. (d) | 17. (b) | 18. (b) | 19. (d) | 20. (b) |
| 21. (b) | 22. (c) | 23. (a) | 24. (a) | 25. (a) | 26. (a) | 27. (a) | 28. (b) | 29. (c) | 30. (b) |
| 31. (c) | 32. (a) | 33. (b) | 34. (c) | 35. (a) | 36. (d) | 37. (b) | 38. (b) | 39. (c) | 40. (a) |
| 41. (b) | 42. (c) | 43. (d) | 44. (d) | 45. (c) | 46. (d) | 47. (d) |         |         |         |