BREATHING AND EXCHANGE OF GASES
SOLUTIONS

LEVEL – I

RESPIRATORY ORGAN

1. Simplest respiratory organ is
(1) gills (2) lungs
(3) skin (4) contractile vacuole
Porifera to annelida, animals respire through their body surface or skin. Gills are organs of breathing for most aquatic animals and lungs are organs of breathing for terrestrial vertebrates. Contractile vacuole are organelles found in protozoan for osmoregulation.

2. Match the following animals with their respiratory organ:

A.	Earthworm	i.	Moist cuticle
B.	Insects	ii.	Gills
C.	Fishes	iii.	Lungs
D.	Birds/ Reptiles	iv.	Trachea

(1) A-ii, B-i, C-iv, D-iii (2) A-i, B-iv, C-ii, D-iii
(3) A-i, B-iii, C-ii, D-iv (4) A-i, B-ii, C-iv, D-iii

HUMAN RESPIRATORY SYSTEM

3. Which of the following is not a function of the nasal cavity in humans?
(1) Filtration of the air (2) Humidification of the air
(3) Warming of the air (4) Removal of carbon dioxide from the air
XI NCERT pg 270. Filtration of the air , Humidification of the air and Warming of the air are functions of the conducting system of respiratory tract.

4. Which of the following is the last structure through which the exhaled air passes?
(1) bronchiole (2) larynx (3) pharynx (4) trachea
Respiratory tract begins from nose - pharyx - larynx - trachea - bronchi-bronchioles- alveoli.

5. The division of the respiratory tree from which the alveoli branch off are the
(1) tertiary bronchi (2) bronchioles
(3) terminal bronchioles (4) respiratory bronchioles
Branching tree inside lungs comprises of, Primary bronchus - Secondary bronchus - Tertiary bronchus – Initial Bronchiole –Terminal bronchiole- Respiratory bronchiole –Alveolar duct - Alveoli.

6. In the human respiratory system, which of these following structures is the actual gas exchange surface?
(1) Bronchus (2) Alveolus (3) Bronchiole (4) Trachea
Alveolus lined by squamous epithelium for diffusion of gases.

7. Air is breathed through
(1) Trachea → Lungs → Larynx → Pharynx → Alveoli
(2) Nose → Larynx → Pharynx → Bronchus → Alveoli → Bronchioles
(3) Nostrils → Pharynx → Larynx → Trachea →Bronchus→Bronchioles→Alveoli

(4) Nose → Mouth → Lungs Larynx → Pharynx → Alveoli
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8. Epithelium of respiratory bronchioles is
(1) pseudostratified and columnar (2) squamous and sensory
(3) pseudostratified and sensory (4) cuboidal and columnar
Respiratory bronchiole branches out into alveolar duct to form alveoli and hence is lined with squamous epithelium to allow diffusion of gases.

9. Cartilaginous rings are incomplete in trachea at _____ surface
(1) dorsal (2) ventral (3) lateral (4) ventrolateral
Trachea is lined with dorsally incomplete C shaped cartilaginous rings to prevent it from collapsing.

10. The function of cilia in trachea is to pass
(1) mucus out (2) mucus in (3) air out (4) air in
The respiratory tract is mucous coated to trap dust particles and the ciliary action of the inner lining pushes the dust particle upwards to be thrown out of body via sneezing or coughing.

11. The alveolar epithelium in lung is
(1) non-ciliated columnar (2) non-ciliated squamous
(3) ciliated columnar (4) ciliated squamous
The alveolar epithelium in lung is non-ciliated squamous epithelium for diffusion of gases.

12. Pulmonary Surfactant
(1) is a lipoprotein (2) is a Mucin
(3) Present in bronchi (4) Maintain alveolar integrity
Pulmonary Surfactant ie Lecithin is a phospholipid present in alveoli to prevent it from collapsing ie maintain alveolar integrity

13. The most important muscular structure in respiratory system of rabbit is
(1) external intercostal muscles (2) internal intercostal muscles
(3) diaphragm (4) vertebral column
Rabbit being mammal has diaphragm that accounts for 70% change in thoracic volume during breathing and hence major muscle compared to inter coastal muscles.

MECHANISM OF BREATHING

14. Breathing refers to exchange of gases between
(1) inspired air and blood (2) blood and tissue fluid
(3) alveolar and blood (4) environmental air and lungs
Breathing or ventilation is part of respiration.

15. With respect to normal breathing, mark the true statement among the following
(1) Inspiration is a passive process while expiration is active
(2) Inspiration is an active process while expiration is passive
(3) Both inspiration and expiration are passive processes
(4) Both inspiration and expiration are active processes
Inspiration involves contraction of EICM and diaphragm , requires ATP and hence is an active process. Expiration involves muscle relaxation, so no ATP needed and hence passive process.

16. Which of the following leads to expiration?
(1) Contraction of diaphragm
(2) Elevation of the rib cage
(3) Contraction of internal intercostal muscles
(4) Contraction of external intercostal muscles
EICM, diaphragm relax during expiration bringing the rib cage back to its original position. IICM contracts during forceful expiration.

17. What happens to the diaphragm when a person exhales?
(1) relaxes and arches. (2) relaxes and flattens
(3) contracts and arches (4) contracts and flattens.
XI NCERT pg 271. Diaphragm relaxes and becomes dome shaped during expiration.

18. Consider the following:
I. Contraction of the diaphragm
II. Relaxation of the diaphragm
III. Contraction of internal intercostals
IV. Contraction of external intercostals
Inhalation would be brought about by:
(1) I, and III (2) II and III (3) I and IV (4) II and IV.
XI NCERT pg 271. EICM and diaphragm contracts during inspiration.

19. Expiratory muscles contract at the time of
(1) deep inspiration (2) normal inspiration (3) forceful expiration (4) normal expiration
IICM is an expiratory muscles , that contracts at the time of forceful expiration and remains relaxed during normal breathing.

20. Abdominal breathing refers to
(1) normal breathing (2) slow breathing
(3) fast breathing (4) voluntary breathing
Normal breathing includes thoracic breathing (due to EICM) and abdominal breathing (due to diaphragm)

21. During the initial part of inspiration, which of the following does not occur?
(1) Intrapulmonary pressure falls (2) Intra thoracic pressure rises
(3) Intra abdominal pressure rises (4) The lungs start to expand
Intra thoracic pressure decreases as thoracic volume increases.

22. Effort during normal respiration is done due to
(1) Lung elasticity (2) Respiratory air passages
(3) Alveolar air spaces (4) Creating negative pleural pressure
Lungs are balloon like elastic and naturally collapsible organ and hence effort is required to expand it during inspiration.

23. The intrapleural pressure at the end of deep inspiration is
(1) –4 mm Hg (2) +4 mm Hg (3) –16 mm Hg (4) +18 mm Hg
Intrapleural pressure is always negative to prevent lungs from collapsing and it becomes more negative during inspiration.

24. True about inspiration, the intrapleural pressure becomes
(1) More – ve (2) More + ve
(3) Same (4) Initially +ve, then –ve
Intrapleural pressure is always negative to prevent lungs from collapsing and it becomes more negative during inspiration.

RESPIRATORY VOLUMES

25. Functional residual capacity of lung is defined as
(1) Volume expired after normal expiration
(2) Volume remaining after forced expiration
(3) ERV + RV
(4) Tidal volume + volume inspired forcefully
XI NCERT pg 272 , FRC= RV+ERV

26. Tidal volume is calculated by
(1) Inspiratory capacity minus the inspiratory reserve volume
(2) Total lung capacity minus the reserve volume
(3) Functional residual capacity minus residual volume
(4) Vital capacity minus expiratory reserve volumes
TV=IC-IRV OR TV=EC-ERV
TLC-RV=VC, FRC-RV=ERV, VC-ERV=IC

27. Total lung capacity depends upon
(1) Size of airway (2) Closing volume
(3) Lung compliance (4) Residual volume
Lung compliance means elasticity of lungs ie how much it can expand to accommodate extra volume of air inspired during forceful breathing.

28. Functional residual capacity is
(1) Volume remaining after forced expiration
(2) Tidal volume + volume inspired forcefully
(3) Volume remaining after normal expiration
(4) Tidal volume + volume expired by forced expiration
XI NCERT pg 272 , FRC= RV+ERV

29. Volume of air taken in and given out during normal respiration is referred to as
(1) IRV (2) TV (3) ERV (4) VC
XI NCERT pg 271, last para

30. A person breathes in some volume of air by forced inspiration after having a forced expiration. The quantity of air taken in is
(1) total lung capacity (2) tidal volume
(3) vital capacity (4) inspiratory capacity
XI NCERT pg 272

31. After deep inspiration, capacity of maximum expiration of lung is
(1) total lung capacity (2) tidal volume
(3) vital capacity (4) inspiratory capacity
XI NCERT pg 272

32. Total alveolar ventilation volume (in L/min) is:
(1) 1.5 (2) 3.5 (3) 4.2 (4) 8.0
Total alveolar ventilation volume means volume of air actually available for diffusion of gases ie volume of air in alveoli. Volume of air present in the conducting part ie from nose to tertiary bronchiole and is unavailable for exchange of gases is called dead space volume.
Dead space volume = 150ml/breath
Total alveolar ventilation volume = (TV – dead space vol) x breathing rate
= (500-150) x (12 to 16) = 350 x (12 to 16) = 4200 to 5600 ml/min

33. Calculate the alveolar ventilation per minute of a patient with respiratory rate 14/min, Tidal volume 500 ml with a vital capacity 7000 ml
(1) 4900 ml (2) 2000 ml (3) 7700 ml (4) 7000 ml
Dead space volume = 150ml/breath
Total alveolar ventilation volume = (TV – dead space vol) x breathing rate
= (500-150) x 14=350 x 14 = 4900ml

34. Spirometry can demonstrate and measure all of the following except
(1) Tidal volume (2) Residual volume
(3) Vital capacity (4) Inspiratory reserve capacity
Spirometer instrument can measure volume of air that can be inspired or expired and not the volume of air always trapped in lungs ie RV.

35. Routine spirometry can't estimate
(1) FRC (2) VC (3) IRC (4) ERV
FRC=ERV + RV, As FRC includes RV , it cannot be measured by spirometry .Spirometer instrument can measure volume of air that can be inspired or expired and not the volume of air always trapped in lungs ie RV.

EXCHANGE OF GASES

36. The thickness of the respiratory membrane is
(1) more than a millimeter but less than a centimeter
(2) more than a centimeter but less than 5 centimeters
(3) more than a millimeter but less than a meter
(4) less than a millimeter
Thinner the membrane more shall be the diffusion of gases.

37. Mouth-to-mouth respiration provides an oxygen concentration is
(1) 16% (2) 20% (3) 22% (4) 24%
Inspired air has 21% oxygen and expired air has 16% oxygen because under normal condition only 25% oxygen gets exchanged in lungs.

TRANSPORT OF GASES

38. The state of iron responsible for O_2 transport
(1) Fe^{++} (2) Fe^{+++} (3) Both (4) None of these
Hb has 4 Fe^{++} that binds loosely with 4 oxygen molecules.

39. Methaemoglobin refers to
(1) a colourless respiratory pigment (2) oxidized haemoglobin
(3) oxygenated hemoglobin (4) deoxygenated haemoglobin
Approx. 99%Hb gets oxygenated to form oxyhaemoglobin, about 1% Hb gets oxidized to form methaemoglobin.

40. In one circulation, how much oxygen does the blood supply to tissues?
(1) 75% (2) 1.34% (3) 25% (4) 7%
Under resting condition every 100ml of arterial blood having approx 20ml oxygen delivers 5ml oxygen to tissues, hence 25% of its transport capacity.

41. Amount of oxygen present in one gram of haemoglobin is
(1) 20 ml (2) 1.34 ml (3) 13.4 ml (4) none of these
Every 100ml or dl of blood has approx. 15gm Hb. Each gm of Hb carries approx. 1.3ml oxygen .

42. In lungs, air is separated from venous blood by
(1) squamous epithelium + tunica externa of blood vessel
(2) squamous epithelium + endothelium of blood vessel
(3) transitional epithelium + tunica media of blood vessel
(4) columnar epithelium + three layered wall of blood vessel
Respiratory membrane is made of alveolar membrane (squamous ep.) and capillary membrane (endothelium).

43. Exchange of gases in lung alveoli occurs through
(1) active transport (2) osmosis (3) simple diffusion (4) passive transport
Exchange of gases in lung alveoli occurs through simple diffusion due to difference in partial pressure of gases.

44. O_2 delivery to tissues depends on all/except
(1) Cardiac output (2) Type of fluid administered
(3) Hemoglobin concentration (4) Affinity of hemoglobin for O_2
O_2 delivery to tissues increases with Cardiac output . O_2 delivery to tissues increases with increasing Hb content.

TRANSPORT OF O_2 (oxygen dissociation curve)

45. Arterial blood O_2 in ml of O_2 per dl is
(1) 12.1 (2) 19.8 (3) 15.6 (4) 27.8
Every 100ml or dl of blood has approx. 15gm Hb. Each gm of Hb carries approx. 1.3ml oxygen . Therefore each dl of arterial blood carries 15 x 1.3=19.5ml oxygen

46. Percentage of O_2 carried in chemical combination
(1) 97% (2) 3% (3) 66% (4) 33%
Approx 97% of O_2 carried in chemical combination as oxyhaemoglobin.

47. During exercise increase in O_2 delivery to muscles is because of all except
(1) Oxygen dissociation curve shifts to left (2) Increased stroke volume

(3) More extraction of oxygen from blood (4) Increased blood flow to muscles

Oxygen dissociation curve shifts to left means association of Hb with oxygen so during exercise Oxygen dissociation curve shifts to right indicating dissociation.

48. Binding of oxygen with haemoglobin is primarily related to

(1) partial pressure of oxygen (2) partial pressure of carbon dioxide

(3) hydrogen ion concentration (4) temperature

Binding of oxygen with haemoglobin is primarily related to high partial pressure of oxygen.

49. Which of the following factors can interfere with binding of oxygen with haemoglobin?

(a) pO_2 (b) pCO_2 (c) H^+ concentration (d) Temperature

(1) only a (2) b, c and d (3) a and d (4) a, b, c and d

Affinity of Hb towards oxygen changes due to factors like pO_2 (affinity increases), pCO_2 (affinity decreases with increase in carbondioxide) , H^+ concentration (affinity decreases with increase in H ions) and Temperature (affinity increases with temperature increase)

50. What will happen to the oxygen dissociation curve if pH is decreased?

(1) shift to left (2) shift to right

(3) remains unchanged (4) oscillates erratically

pH decreased means blood becomes acidic due to presence of more H ions causing oxygen dissociation curve to shift right ie causing dissociation of Hb from oxygen .

51. Decreased O_2 affinity of Hb in blood with decreased pH is

(1) Haldane effect (2) Double Haldane effect

(3) Bohr's effect (4) Double Bohr effect

Bohr effect due to high pCO_2 is mainly responsible for delivery of oxygen to tissues

52. Which of the following does not occur as the blood passes through systemic capillaries?

(1) Increased protein content

(2) Shift of Hemoglobin dissociation curve to left

(3) Increased hematocrit

(4) Decreased pH

As the blood passes through systemic capillaries ie near tissues, Hb shall undergo dissociation ,so Shift of Hemoglobin dissociation curve to right.

53. At rest, about _____ of the oxyhemoglobin in the arterial blood dissociates (unloads its oxygen) in one pass through the systemic capillaries,

(1) 10-12% (2) 20-25% (3) 50-60% (4) 85-97%

Under resting condition every 100ml of arterial blood having approx 20ml oxygen delivers 5ml oxygen to tissues, hence 25% of its transport capacity.

54. The oxygen dissociation curve of foetal haemoglobin is

(1) sigmoid and lies on the left of the oxygen dissociation curve of maternal haemoglobin

(2) sigmoid and lies on the right of the oxygen dissociation curve of maternal haemoglobin

(3) parabolic and lies on the left of the oxygen dissociation curve of maternal haemoglobin

(4) parabolic and lies on the right of the oxygen dissociation curve of maternal haemoglobin

Foetal Hb shows more affinity towards oxygen compared to adult Hb.

55. An increase in which of the following parameters will shift the O_2 dissociation curve to the left

(1) Temperature (2) Partial pressure of CO_2

(3) 2, 3 DPG concentration (4) Oxygen affinity of hemoglobin

O_2 dissociation curve shift to the left means association of Hb with oxygen and that shall be more when Hb shows more affinity towards oxygen .

56. The sigmoid nature of Hb-O_2 dissociation curve is because of

(1) Binding of one O_2 molecule increases the affinity for the next O_2 molecule

(2) Alpha chain has more affinity for O_2 than beta chain

(3) Beta chain has more affinity for O_2 than alpha chain

(4) Hemoglobin is acidic in nature

Each Hb molecule binds with 4 oxygen molecules but all don't get attached together.

57. The factor responsible for the left shift of Hb-O_2 dissociation curve is

(1) Increase in 2, 3 DPG in RBC (2) Fall in temperature

(3) Fall in pH (4) Increase level of CO_2 in blood

Decrease in temperature associates Hb with oxygen shifting the curve towards left.

58. Role of 2, 3 DPG in hemoglobin

(1) Unloading oxygen to tissues (2) Increased affinity for oxygen

(3) Buffering capacity (4) Osmotic fragility

2, 3 DPG (diphosphoglycerate) in hemoglobin decreases affinity of Hb for oxygen causing right shift in oxygen dissociation curve.

59. During acclimatization to high altitude all of the following take place except

(1) Increase in minute ventilation

(2) Increase in the sensitivity of central chemoreceptors

(3) Increase in the sensitivity of carotid body to hypoxia

(4) Shift in the oxygen dissociation curve to the left

During acclimatization to high altitude Shift in the oxygen dissociation curve is to right as partial pressure of oxygen is less decreasing affinity of Hb for oxygen.

60. Myoglobin binds with _____ mole/s of oxygen .

(1) 1 (2) 2 (3) 3 (4) 4

Hb has 4 Fe and myoglobin has only 1 Fe.

61. The affinity of oxygen for Hb decreases with fall in pH. This is called

(1) Brain bridge effect (2) Bohr's effect

(3) Haldane effect (4) Herring effect

Bohr effect due to high pCO_2 is mainly responsible for delivery of oxygen to tissues

TRANSPORT OF CARBON DIOXIDE

62. Which ion replaces HCO_3^- when it diffuses out of the red blood cells into the plasma in systemic capillaries?

(1) hydrogen ion (H^+) (2) hydroxyl ion (OH^-)

(3) chloride ion (Cl^-) (4) sodium ion (Na^+)

Near tissues efflux of bicarbonates from RBCs is balanced by influx of choride ions (chloride shift).

63. Largest fraction of CO_2 is present in blood as:

(1) Attached with RBC (2) Dissolved in blood
(3) Carbaminohaemoglobin (4) Bicarbonate
About 70% CO_2 is present in blood is carried as Na bicarbonates.

64. Arterial carbon dioxide level is
(1) 40 mm Hg (2) 37 mm Hg (3) 45 mm Hg (4) 60 mm Hg
Arterial carbon dioxide level ie carbon dioxide level in oxygenated blood =40mm Hg. XI NCERT pg 272, table 17.1

65. Which of the following statement/s is/are correct?
(a) A high concentration of carbonic anhydrase is present in RBC.
(b) Minute concentration of carbonic anhydrase is present in plasma.
(c) Every 100 ml blood delivers approximately 4 ml of CO_2 to alveoli.
(d) 20-25% CO_2 is carried by haemoglobin as carbaminohaemoglobin.
(1) a, c and d (2) a and d (3) a, b, c and d (4) only a
XI NCERT pg 274,275

66. Carbon dioxide is carried in the blood in all of the following ways except as
(1) dissolved gas (2) bicarbonate ion
(3) carbaminohaemoglobin (4) carboxyhaemoglobin
Hb shows max. affinity towards carbon monoxide and binds irreversibly with it.

67. During transport of carbon dioxide, blood doesn't become acidic due to
(1) neutralization of H_2CO_3 by Na_2CO_3 (2) absorption of leucocytes
(3) blood buffers (4) non accumulation
Blood buffers like Na bicarbonate (alkali) and carbonic acid (acid). Hb also act as buffer , oxyhaemoglobin (acid) and reduced Hb (alkali).

68. The enzyme required to form carbonic acid from carbon dioxide in erythrocytes is
(1) carbonic amidase (2) carbonate hydrogenase
(3) carbonic anhydrase (4) carboxypeptidase
Carbonic anhydrase is present in abundance inside RBCs and in negligible amounts in plasma.

REGULATION OF RESPIRATION

69. Hering-Breuer reflex is related to effect of ____ on respiratory centre.
(1) pH (2) CO_2 (3) nerves (4) temperature
Hering-Breuer reflex is a protective reflex which prevents the alveoli from overstretching or bursting.

70. Respiratory centre in brain is stimulated by
(1) CO_2 content in venous blood (2) CO_2 content in arterial blood
(3) O_2 content in venous blood (4) O_2 content in arterial blood
Chemoreceptors in aorta (artery) and carotid artery are highly sensitive to increased pCO_2

71. A chemosensitive area is situated adjacent to the respiratory rhythm centre which is highly sensitive to _____ and _____ ions
(1) O_2, H^+ (2) CO_2, OH^- (3) CO_2, H^+ (4) O_2, OH^-
Chemoreceptors in aorta (artery) and carotid artery are highly sensitive to increased pCO_2 and increased H ion conc. ie acidity of blood.

72. True statement regarding respiratory centre is
(1) Directly stimulated by fall in PaO_2 (2) Inhibited during swallowing

(3) Connected with cardiac centre (4) Situated in midbrain

Breathing stops during swallowing as epiglottis closes opening of trachea to prevent entry of food.

73. Hering – Breuer's reflex – mainly related to

(1) Normal centre of ventilation (2) Control of pneumotaxic centre

(3) Prevent excess lung inflation (4) Prevent collapsing of alveoli

Hering-Breuer reflex is a protective reflex which prevents the alveoli from overstretching or bursting.

DISORDERS

74. A person is having normal lung compliance and increased airway resistance. The most economical way of breathing for him

(1) Rapid & deep (2) Rapid & shallow (3) Slow & deep (4) Slow & shallow

A person with normal lung structure but obstructed respiratory pathway shall have difficulty in breathing so most efficient is slow (as pathway is obstructed) and deep.

75. Ascent of high mountains causes altitude sickness in men. Prime cause of this is

(1) excess of carbon dioxide in blood (2) decreased efficiency of haemoglobin

(3) decreased partial pressure of oxygen (4) decreased proportion of oxygen in air

The air becomes thinner at higher altitude so the percentage of individual gases remains the same but as the pressure decreases at higher altitude , the partial pressure of each gas decreases too.

76. Hemoglobin that is bonded to carbon monoxide and therefore cannot transport oxygen, is called

(1) carboxyhaemoglobin (2) methaemoglobin

(3) reduced hemoglobin (4) carbaminohaemoglobin

Hb shows max. affinity towards carbon monoxide and binds irreversibly with it.

77. Apnoea is defined as

(1) Stoppage of heart beat (2) Cessation of respiration

(3) Irregular respiration (4) Regular respiration

Apnoea means when breathing stops .

78. Emphysema is a disease characterized by

(1) haemorrhage of pulmonary capillaries (2) increase in number of air sacs

(3) infection of *Mycobacterium* (4) over-inflation of alveolar sacs

Emphysema cause damage to alveolar membrane decreasing the overall surface area for diffusion.

79. Asthma is a respiratory disease caused due to

(1) infection of trachea (2) infection of lungs

(3) bleeding into pleural cavity (4) spasm in bronchial muscles

Spasm in bronchial muscles due to allergens like dust or smoke causes asthma.

80. Cigarette smoking is one of the major causes of

(1) asthma (2) bronchitis (3) emphysema (4) fibrosis

Emphysema is a chronic disorder most common in smokers.

81. In which of these would you expect to find an increase in thickness of the respiratory membrane

(1) Emphysema (2) Asthma

(3) Pulmonary artery thrombosis (4) Pulmonary edema

Emphysema cause damage to alveolar membrane decreasing the overall surface area for diffusion. Asthma doesn't affect alveoli. Pulmonary artery thrombosis is thickening of Pulmonary artery wall. Pulmonary oedema shall increase the respiratory membrane due to accumulation of fluids.

82. Emphysema is a condition in which
(1) respiratory centre is inhibited (2) fluid accumulates in lungs
(3) the walls separating the alveoli break (4) lungs have more oxygen

Emphysema is a chronic disorder most common in smokers. Emphysema cause damage to alveolar membrane decreasing the overall surface area for diffusion.

LEVEL – II

HUMAN RESPIRATORY SYSTEM

1. Which of the following is not a function of conducting part of the respiratory system?
(1) Diffusion of O_2 and CO_2 (2) Clears the air from foreign particles
(3) Humidifies the air (4) Brings the air to body temperature

Conducting part of the respiratory system, as its lined with either compound ep or ciliated ep. , and hence have no role in exchange of gases.

2. Choose the incorrect statement
(1) At the level of 5^{th} thoracic vertebra, trachea divides into right and left primary bronchi
(2) Larynx is a cartilaginous box which helps in sound production and hence called sound box
(3) Outer pleural membrane is in close contact with thoracic lining whereas the inner pleural membrane is in contact with the lungs surface
(4) Thoracic chamber is formed dorsally by sternum ventrally by vertebral column, laterally by ribs and on lower side by dome-shaped diaphragm

Thoracic chamber is formed ventrally by sternum dorsally by vertebral column, laterally by ribs and on lower side by dome-shaped diaphragm

3. Which of the following organ is not considered as major organ during vocalization?
(1) Lips (2) Tongue (3) Soft palate (4) Hyoid bone

Hyoid bone only helps to support organs in throat and provide site for attachment of muscles.

4. Which of the following pressure always maintain –ve with respect to atmospheric pressure?
(1) Pleural pressure (2) Alveolar pressure
(3) Transpulmonary pressure (4) Recoil pressure

Intrapleural pressure is always maintain –ve with respect to atmospheric pressure to prevent lungs from collapsing.

5. In humans, respiration takes place in
(1) cells lining the lung cavity (2) cells found in blood
(3) all living cells of the body (4) only RBC

Respiration takes place in all living cells of the body to produce energy aerobically or anerobically.

6. Each lung is enclosed in a double membrane called pleura. The part which closely covers the lung is
(1) pulmonary pleura (2) visceral pleura (3) peritoneal pleura (4) parietal pleura
Outer pleural membrane is in close contact with thoracic lining whereas the inner pleural membrane is in contact with the lungs surface

7. If the thoracic wall is ruptured but the lungs aren't
(1) the lungs get inflated (2) the lungs get collapsed
(3) the breathing rate decreases (4) the breathing rate increases
Lungs are situated in thoracic cavity which is an anatomically air tight chamber and any change in its volume causes changes in lungs volume. So if the thoracic wall is ruptured but the lungs aren't shall make the lungs collapse as thoracic cavity is no longer an anatomically air tight chamber .

8. The most important function of diaphragm of mammals is
(1) to divide the body cavity into compartments
(2) to protect lungs
(3) to aid in respiration
(4) to aid in ventilation
Only mammals have diaphragm to do abdominal breathing or ventilation. Respiration is precisely happening in each cell. Breathing is a part of respiration.

9. The conducting zone of the respiratory system includes all of the following passages, except
(1) the trachea (2) alveolar ducts
(3) tertiary bronchi (4) terminal bronchioles
The conducting zone of the respiratory system includes all of the following passages, except alveolar ducts and alveoli as they allow diffusion of gases.

10. Bronchioles don't collapse when there is no air in them. This is due to presence of
(1) lecithin (2) incomplete cartilaginous rings
(3) complete cartilaginous rings (4) mucous
Incomplete cartilaginous rings around conducting pathway (trachea to bronchiole) prevents their collapsing.

11. Narrowest and most abundant tubes of lungs are
(1) trachea (2) bronchi (3) bronchioles (4) alveoli
The diameter of the respiratory tract keeps decreasing as we do deeper ie trachea is widest and bronchiole is narrowest. Alveoli are sac like structure and not tubular.

12. In which of the following cilia is not present:
(1) Respiratory bronchioles (2) Trachea
(3) Bronchi (4) Terminal bronchioles
Conducting pathway ie from trachea to terminal bronchioles is ciliated. Part after that ie respiratory bronchioles , alveolar ducts and alveoli are non ciliated.

13. The function of the lung surfactant compounds is to
(1) filter impurities from the inspired air.
(2) increase the intrapulmonary pressure.
(3) reduce the surface tension in the alveoli.
(4) keep the lungs moist so gas diffusion can occur.
Surfactant lecithin prevents collapsing of the alveoli.

14. Which of the following part of respiratory tree is most sensitive to initiate coughing reflex?
(1) Respiratory bronchioles (2) Alveoli
(3) Alveolar duct (4) Secondary bronchi

Conducting pathway ie from trachea to terminal bronchioles is ciliated. Part after that ie respiratory bronchioles , alveolar ducts and alveoli are non ciliated.Since secondary bronchi is ciliated ,hence its sensitive to dust particles to initiate process of coughing.

MECHANISM OF BREATHING

15. During inspiration, contraction in diaphragm increase volume of thoracic cavity
(1) Dorso ventrally (2) Antero posteriorly
(3) Laterally (4) Dorso laterally.

Since diaphragm is present as muscular plate between thoracic and abdominal cavity, its contraction (becomes flat) increases thoracic volume up to down ie in Antero posterior axis of body.

16. Which of the following muscle/s is/are contracted during forceful expiration?
(1) Abdominal muscles (2) External intercostal muscles
(3) Phrenic muscles (4) Both (1) and (2)

Expiration being a passive process involves relaxation of EICM and diaphragm, but forceful expiration involves contraction of abdominal muscle sand IICM.

17. Among mammals, the efficiency of ventilation of lungs as compared to reptiles and birds is better developed by the presence of
(1) ribs and costal muscles (2) only ribs
(3) only costal muscles (4) diaphragm

Reptiles ,aves and mammals, all have rib cage and ICM but only mammals have diaphragm .

18. Breathing by ribs is more pronounced in
(1) male (2) female (3) pregnant female (4) none of these

Breathing by ribs is called thoracic breathing ,which is more pronounced in pregnant female as diaphragm does not get sufficient space to contract as most of the abdominal space is occupied by the growing foetus .Hence in a pregnant female breathing is mostly thoracic , rapid and shallow.

RESPIRATORY VOLUMES

19. Maximum inspiration after full expiration is called
(1) vital capacity (2) lung capacity (3) tidal volume (4) residual volume

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20. About 1200 ml air left in the lungs is called
(1) tidal volume (2) vital capacity (3) reserve volume (4) residual volume

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21. Which of the following prevents the O_2 and CO_2 concentration in the lungs from fluctuating greatly with each breath?
(1) Anatomical dead space (2) Physiological dead space

(3) Residual volume (4) Alveolar dead space

Certain volume of air always remains in lungs even after forceful expiration ie RV, that prevents the O_2 and CO_2 concentration in the lungs from fluctuating greatly with each breath

22. The maximum volume of air a person can contain in the lungs after maximum inspiration is

(1) Inspiratory reserve volume (2) Expiratory reserve volume

(3) Vital capacity (4) Total lung capacity.

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23. Arrange the following in the order of increasing volume

a. Tidal volume b. Residual volume

c. Inspiratory reserve volume d. Vital capacity

(1) a < b < d < c (2) a > b > c > d (3) a < b < c < d (4) b < c < a < d

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24. Alveolar ventilation is

(1) TV × Breathing rate (2) (TV – Dead space volume) × Breathing rate

(3) VC + RV (4) TV + IRV + ERV

Total alveolar ventilation volume means volume of air actually available for diffusion of gases ie volume of air in alveoli. Volume of air present in the conducting part ie from nose to tertiary bronchiole and is unavailable for exchange of gases is called dead space volume.

25. A patient with respiratory rate of 30 per minute and Tidal volume of 250 ml

(1) His pulmonary ventilation is 6L/min (2) His alveolar ventilation is 3L/min.

(3) He is likely to have normal arterial Po_2 (4) He is likely to have normal arterial PCo_2

Total alveolar ventilation volume means volume of air actually available for diffusion of gases ie volume of air in alveoli. Volume of air present in the conducting part ie from nose to tertiary bronchiole and is unavailable for exchange of gases is called dead space volume.dead space vol. is 150ml.

Alveolar ventilation = (TV – Dead space volume) × Breathing rate

=(250-150)x30=3000ml/min

26. Whether a child died after normal birth or died before birth can be confirmed by measuring

(1) tidal volume of air (2) residual volume of air

(3) the weight of the child (4) the dead space air

A child after birth who has breathed can only have residual volume of air in lungs.

27. Which of the following correctly explain the pulmonary ventilation?

(1) Transport of O_2 and CO_2 in the blood and body fluids to and from the cells

(2) Diffusion of O_2 and CO_2 between the alveoli and blood cells

(3) In flow and outflow of air between the atmosphere and the lung alveoli

(4) Downward and upward movement of the diaphragms to lengthen or shorter the chest cavity.

The pulmonary ventilation means volume of air inhaled or exhaled per minute.

28. The air which is not participating in the exchange of gases

(1) Tidal air (2) Vital air (3) Dead space air (4) Residual air

Air trapped in the conducting part and not available for diffusion is called dead space volume air.

EXCHANGE OF GASES

29. Alveoli are the primary sites of exchange of gases O_2 and CO_2 are exchanged in these sites by simple diffusion which is based on

(1) Pressure/concentration gradient (2) Solubility of gases
(3) Thickness of membranes (4) All of these

Pressure/concentration gradient is directly proportional to diffusion. Solubility of gases is directly proportional to diffusion. Thickness of membranes is inversely proportional to diffusion.

30. PO_2 and PCO_2 in oxygenated blood is
(1) 95 and 40 mmHg respectively (2) 40 and 45 mmHg respectively
(3) 159 and 0.3 mmHg respectively (4) 104 and 40mmHg respectively.

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31. The amount of oxygen in expired air is
(1) 10% (2) 16% (3) 19% (4) 4%

Inspired air has 21% oxygen and expired air has 16% oxygen because under normal condition only 25% oxygen gets exchanged in lungs.

32. Which of the following has minimum amount of O_2 content?
(1) Expired air (2) Venous blood (3) Inspired air (4) Arterial blood

pO_2 in inspired air=159mmHg, pO_2 in expired air= 121mm Hg, pO_2 in Arterial blood= 95mmHg, pO_2 in venous blood = 40mmHg

33. Which of the following has maximum amount of O_2 content?
(1) Inspired air (2) Arterial blood (3) Alveolar air (4) Venous blood

pO_2 in inspired air=159mmHg, pO_2 in alveolar air= 104mm Hg, pO_2 in Arterial blood= 95mmHg, pO_2 in venous blood = 40mmHg

34. Which of the following is the correct order of diffusion rate of oxygen, carbon dioxide and nitrogen from lungs to blood through the respiratory membrane?
(1) $CO_2 > O_2 > N_2$ (2) $CO_2 > N_2 > O_2$
(3) $O_2 > CO_2 > N_2$ (4) $O_2 > N_2 > CO_2$.

Carbon dioxide being most soluble hence shows max diffusion and nitrogen is least soluble.

TRANSPORT OF GASES

35. The combination of oxygen and haemoglobin is called
(1) oxidation (2) oxygenation (3) reduction (4) none of these

Oxygen is loosely attached to Fe of haemoglobin and hence its oxygenation reaction and not oxidation reaction as ferrous ion is not converted to ferric ions.

36. How much percent of CO_2 is transported by hemoglobin as carbamino-hemoglobin?
(1) 3% (2) 7% (3) 20-25% (4) 70

Approx- 20-25% CO_2 is transported by hemoglobin as carbamino-hemoglobin

37. Which of the following statement is correct with respect to transport of gases?
(i) 97% of $O_2$is transported by RBC in the blood
(ii) 3% of O_2 carried in a dissolved state through the RBC
(iii) 70% CO_2 is carried as bicarbonate.
(iv) 7% of CO_2 is carried in a dissolved state through plasma.
(1) (i), (iii) & (iv) (2) (i), (ii) & (iii) (3) Only (i) (4) All are correct.

3% of O_2 carried in a dissolved state in plasma.

38. Which of the following is false concerning the haemoglobin molecule ?
(1) It contains amino acids (2) It contains iron
(3) It can bind four O_2 molecules (4) It is found in humans only

Haemoglobin is found in vertebrates and annelids.

TRANSPORT OF O_2 (oxygen dissociation curve)

39. Which of the following change of pressure difference at O_2 arterial blood leads to maximum saturation of hemoglobin?
(1) 10 → 20 mm Hg (2) 20 → 30 mm Hg
(3) 40 → 50 mm Hg (4) 70 → 80 mm Hg
XI NCERT pg 274, figure 17.5. Nearly 20% saturation at 10 → 20 mm Hg, Nearly 30% saturation at 20 → 30 mm Hg, and just 10% saturation at 40 → 50 mm Hg, and hardly 5% saturation at 70 → 80 mm Hg

40. In comparison to adult haemoglobin, the oxygen dissociation curve of myoglobin is situated towards
(1) Right side (2) Left side (3) Either 1 or 2 (4) No change.
Myoglobin shows more affinity for oxygen than Hb and hence its curve shall be on the left side of oxygen dissociation curve.

41. Which of the following statement correctly defines Bohr's effect?
(1) Rise in P_{50} with a decrease in CO_2 concentration
(2) Rise in P_{50} with decrease in pH
(3) Rise in P_{50} with increase in O_2
(4) Fall in P_{50} with decrease in pH
Bohr effect is due to increased pCO2 and reduced blood pH ie acidic blood causing dissociation making the curve shift right.

42. Select what is true about Haldane's effect
(1) It operates in body tissues
(2) Dissociation of CO_2 from Hb takes place due to formation of oxyhaemoglobin
(3) Reciprocal exchange of O_2 and CO_2 between the foetal blood and maternal blood
(4) Both (2) & (3).
Haldane effect is due to increased pO_2 in lungs causing formation of oxyhaemoglobin and release of CO_2 from body.

43. The oxygen hemoglobin dissociation curve is sigmoid. At which partial pressure of oxygen the Hb is 75% saturated?
(1) 20 mm Hg (2) 30 mm Hg (3) 40 mm Hg (4) 98 mm Hg
XI NCERT pg 274, figure 17.5.

44. The oxygen dissociation curve will not shift to left in
(1) Foetal blood (2) Decrease in pH
(3) Decrease in hydrogen ion concentration (4) Low temperature.
Decrease in pH shall cause dissociation making the oxygen dissociation curve will shift to right.

45. Mark the factors which are favorable for the formation of oxyhaemoglobin at the level of alveoli
(i) High pO_2 (ii) Lesser H^+ conc (iii) Low pCO_2 (iv) Lower temperature
(1) (i), (ii) & (iv) (2) (i), (ii) & (iii) (3) (ii), (iii) & (iv) (4) (i), (ii), (iii) & (iv)
XI NCERT pg 274, 2nd para.

46. P_{50} value in adult human at which haemoglobin is 50% saturated with oxygen is a _____
(1) 10 mm Hg of pO_2 (2) 18 mm Hg of pO_2
(3) 27 mm Hg of pO_2 (4) 50 mm Hg of pO_2

XI NCERT pg 274, figure 17.5.

47. Which of the following best explain the Haldane effect?
(1) Increase in CO_2 in the blood will cause O_2 to be displaced from the Hb
(2) Binding of O_2 with Hb tend to displace carbon dioxide from the blood
(3) Decrease in arterial PO_2 tends to displace more amount of CO_2 from the blood
(4) Decrease in arterial PCO_2 tend to displace O_2 from the Hb.

Haldane effect is due to increased pO_2 in lungs causing formation of oxyhaemoglobin and release of CO_2 from body.

48. Which of the following is not correct about Haldane effect?
(1) In the tissue capillaries, Haldane effect causes increased pickup of CO_2
(2) In lungs, it causes increased release of CO_2
(3) Haldane effects acts opposite to Bohr's effect
(4) In the tissue capillaries Haldane effect causes increased pickup of O_2

Haldane effect is due to increased pO_2 in lungs causing formation of oxyhaemoglobin and release of CO_2 from body. Its mainly for transport of CO_2 in lungs as well as near tissues. In the tissue capillaries Bohr effect causes increased pickup of O_2

49. Around 50 ml of O_2 to the tissues under normal physiological conditions is transported by
(1) 100 ml of oxygenated blood (2) 1000 ml of oxygenated blood
(3) 1000 ml of deoxygenated blood (4) 200 ml of oxygenated blood.

As each 100ml of oxygenated blood delivers 5ml oxygen to tissues ,hence every 1000 ml of oxygenated blood shall deliver 50 ml of O_2 to the tissues under normal physiological conditions

50. Which of the following takes place when blood becomes acidic?
(1) Binding of oxygen with haemoglobin increases
(2) Red blood corpuscles are formed in higher number
(3) Binding of oxygen with haemoglobin decreases
(4) There is no change in the binding of oxygen and number of RBCs

When blood becomes acidic due to increased H ions, it causes Bohr effect , oxygen dissociates from Hb.

51. Haldane effect is due to
(1) CO_2 (2) lactic acid (3) pH (4) oxyhaemoglobin

Haldane effect is due to increased pO_2 in lungs causing formation of oxyhaemoglobin and release of CO_2 from body.

52. Ratio of oxyhaemoglobin and haemoglobin in blood is based upon
(1) oxygen tension (2) CO_2 tension (3) carbonate tension (4) bicarbonate tension

pO_2 or oxygen tension shall mainly decide the state of Hb.

53. Breathing 100% oxygen is likely to produce all of the following except?
(1) Marked increase in alveolar PO_2
(2) Marked increase in arterial blood PO_2
(3) Marked increase in arterial blood O_2 content
(4) Almost no change is arterial blood PCO_2

Breathing 100% oxygen shall not increase in arterial blood O_2 content as it shall still remain the same as each Hb molecule can still combine with only 4 oxygen molecules .Each 100ml of arterial blood shall carry aprrox. 20ml oxygen.

54. The utilization coefficient of body tissue where the blood flow is extremely slow and metabolic rate is high will be
(1) 25% (2) 75% (3) 100% (4) 50%
At resting condition every 100ml of blood delivers 5 ml oxygen to tissues ie. 25% of its carrying capacity .So during increased activity as BMR increased and so demand for oxygen also increases making this delivery capacity reach 75% but never 100% because that shall disturb the pH of blood.

55. Amount of oxygen transported by one gram of hemoglobin is
(1) 1.34 ml (2) 13.4 ml (3) 20 ml (4) 3.7 ml.
One gram of hemoglobin carries 1.34ml oxygen.

56. Oxyhaemoglobin acts as
(1) alkali (2) acid (3) buffer (4) neutral
Hb acts as a buffer –oxyhaemoglobin acts as acid and reduced haemoglobin acts as alkali.

57. Amount of O_2 transported by 100 ml of blood
(1) 50 ml (2) 20 ml (3) 80 ml (4) 100 ml
Each gm of Hb carries 1.34ml O_2.100ml of blood has approx.. 15gm Hb.

TRANSPORT OF CARBON DIOXIDE

58. Every 100 ml of deoxygenated blood delivers approximately _____ ml of CO_2 to the alveoli
(1) 2 ml (2) 16 ml (3) 4 ml (4) 6 ml.
XI NCERT pg 275,2nd para ,last line.Every 100 ml of deoxygenated blood delivers approximately 4ml of CO_2 to the alveoli.

59. Carbonic anhydrase is most abundant in
(1) RBC (2) WBC (3) blood plasma (4) platelets
XI NCERT pg 275,1st para,2nd line.

60. Carbon dioxide is transported from tissue to respiratory surface by
(1) plasma (2) erythrocytes (3) both (1) and (2) (4) RBCs and WBCs
Carbon dioxide is dissolved in plasma and carried by Hb in RBCs.

61. For proper transport of oxygen and carbon dioxide, blood should be
(1) slightly acidic (2) strongly acidic
(3) slightly alkaline (4) strongly alkaline
For proper transport of oxygen and carbon dioxide, blood should be of pH 7.4.

62. Concentration of carbonic acid doesn't increase in blood due to presence of
(1) Na^+ (2) Mg^{+2} (3) Ca^{+2} (4) K^+
Concentration of carbonic acid in blood is balanced by Na bicarbonates.

63. Which one is correct with respect to reverse chloride shift?
(1) Cl^- moves in the RBC (2) HCO_3^- moves in the RBC
(3) HCO_3^- moves out the RBC (4) O_2 moves out the RBC
Reverse chloride shift taking place in lungs causes Cl^- moves out of RBC and HCO_3^- moves in the RBC

REGULATION OF RESPIRATION

64. The impulse for voluntary muscles for forced breathing starts in
(1) medulla oblongata (2) vagus nerve
(3) cerebellum (4) cerebrum

The impulse for voluntary muscles for forced breathing starts in cerebrum and the impulse for voluntary muscles for normal breathing starts in medulla oblongata.

65. Which of the respiratory centre present in the pons region of the brain moderate the function of the respiratory rhythm centre?

(1) Pneumotaxic centre (2) DRG
(3) VRG (4) Both (2) & (3).

XI NCERT pg 275, 3rd para

66. Nerve impulses from the dorsal respiratory group of neurons stimulate the

(1) Diaphragm to become flat shaped
(2) Abdominal muscle to relax completely
(3) External intercostal muscle to lower the rib cage
(4) Internal intercostal muscle to raise the rib cage.

Nerve impulses from the dorsal respiratory group of neurons stimulate to cause inspiration by contracting EICM and diaphragm.

67. If the pneumotaxic centre is sending weak inhibitory signals to DRG

(1) duration of inspiration increases, decreasing the respiratory rate
(2) duration of inspiration increases, increasing the respiratory rate
(3) duration of inspiration decreases, increasing the respiratory rate
(4) duration of inspiration decreases, decreasing the respiratory rate\

Pneumotaxic centre of pons inhibits respiratory rhythm centre of medulla and hence decreases the duration of inspiration and increases the breathing rate. But if these signals are weak then the effect shall be opposite.

68. Select the correct statement w.r.t. regulation of respiration

(1) Role of oxygen in regulation of respiratory rhythm is insignificant
(2) Chemosensitive area is highly sensitive to O_2 and hydrogen ions
(3) Medulla region of the brain has Pneumotaxic centre
(4) Respiratory rhythm centre is the pons varolii region of brain can reduce duration of inspiration.

Chemosensitive area is highly sensitive to CO_2 and hydrogen ions . Pons region of the brain has Pneumotaxic centre. Respiratory rhythm centre is in the medulla region of brain .

69. Which respiratory centre primarily limits inspiration?

(1) Dorsal respiratory group of neurons (2) Ventral respiratory group of neurons
(3) Pneumotaxic centre (4) Apneustic centre.

Pneumotaxic centre of pons inhibits respiratory rhythm centre of medulla and hence decreases the duration of inspiration and increases the breathing rate.

70. Respiratory centres of brain are highly sensitive to

(1) O_2 concentration in blood (2) CO_2 concentration in blood
(3) High pH of blood (4) Body temperature.

Chemosensitive area is highly sensitive to CO_2 and hydrogen ions conc of arterial blood.

71. Rate of respiration is directly affected by

(1) CO_2 conc. (2) O_2 in trachea
(3) O_2 concentration (4) diaphragm expansion

Chemosensitive area is highly sensitive to CO_2 and hydrogen ions and hence if CO2 conc. increases ,rate of breathing too increases.

DISORDERS

72. Carbon monoxide has times affinity greater than oxygen with haemoglobin.

(1) 1000 (2) 200 (3) 20 (4) 2

Carbon monoxide has 200-250 times affinity greater than oxygen with Hb.

73. Carbon monoxide prevents transport of oxygen by
(1) forming stable compound with haemoglobin
(2) destroying haemoglobin
(3) forming carbon dioxide from oxygen
(4) destroying RBCs

Carbon monoxide binds irreversibly with Hb to form carboxy haemoglobin.

74. Ascent to high mountains may cause altitude sickness in human. Prime cause of this is
(1) Excess of CO_2 in blood
(2) Decreased efficiency of hemoglobin to bind with oxygen
(3) Decreased amount of hemoglobin in blood
(4) Decreased partial pressure of oxygen

At high altitude air becomes thin and hence partial pressure of individual gases is reduced.

75. In carbon monoxide poisoning, there is
(1) increase in CO_2 concentration (2) decrease in oxygen availability
(3) decrease in free haemoglobin (4) none of these

In carbon monoxide poisoning, there is decrease in free haemoglobin as CO binds irreversibly with Hb.

76. A chronic disorder, mainly caused due to cigarette smoking, in which alveolar walls are damaged due to which respiratory surface is decreased, called
(1) Asthma (2) Bronchitis (3) Emphysema (4) Atelectasis.

Emphysema cause damage to alveolar membrane decreasing the overall surface area for diffusion.

77. Respiratory distress syndrome of new borns is primarily due to
(1) Non functioning of diaphragm
(2) Non functioning of intercostals
(3) Little or no surfactant formation in alveoli
(4) Inability of secretion of nitric oxide

Respiratory distress syndrome of new borns means the lungs fail to expand ie baby is born with collapsed lungs mainly due to severe deficiency of lecithin in alveoli.

78. Which of the following is not correct about chronic asthma?
(1) Increase in FRC (2) Dyspnoea
(3) Barrel chest (4) Decrease intrapulmonary pressure

Chronic asthma causes Barrel chest reducing lungs size and hence intrapulmonary pressure slightly increases. Dyspnoea means difficulty in breathing. Since expiration is difficult so more air remains in lungs as FRC.

PREVIOUS YEARS QUESTIONS

1. If the total pressure of the gases is 760 mmHg and its composition is 20% oxygen, 0.04% carbon dioxide, 75% nitrogen and 5% water vapour, the partial pressure of oxygen is:

(1) 15.2 mmHg (2) 118 mmHg **[Kerala PMT 2001]**
(3) 152 mmHg (4) 20 mmHg.

pO_2 in atmospheric air is 159mm Hg.

2. After taking a long deep breath we do not respire for some seconds due to: **[Kerala PMT 2001]**
(1) Less O_2 in blood (2) More O_2 in blood
(3) Less CO_2 in blood (4) More CO_2 in blood.

Breathing rate and type of breath is most affected by conc of CO2 and H ions in blood.

3. During CO_2 transport, HCO_3^- diffuses from erythrocytes to plasma and in turn upsets the ionic equilibrium momentary. In order to keep the ionic balance, an equal number of Cl^- ions pass into the erythrocytes from plasma. This process is known as:
[Kerala PMT 2001]
(1) Haldane effect (2) Bohr effect
(3) Bicarbonate shift (4) Hamburger phenomenon.

Hamburger phenomenon is also called as chloride shift.

4. The volume of air breathed in and out during a normal breathing by man is called:
[Kerala PMT 2001, 02]
(1) Tidal volume (2) Vital capacity
(3) Residual volume (4) Inspiratory reserve volume.

XI NCERT pg 271 ,last para

5. Oxyhaemoglobin dissociates into oxygen and deoxyhaemoglobin at:
(1) low O_2 pressure in tissue **[JIPMER 2002]**
(2) high O_2 pressure in tissue
(3) equal O_2 pressure inside and outside tissue
(4) all times irrespective of O_2 pressure.

Oxyhaemoglobin dissociates into oxygen and deoxyhaemoglobin at tissues due to low pO2, high pCO2,high temperature etc.

6. Respiratory centre that controls normal breathing lies in: **[CPMT 2002]**
(1) Midbrain (2) Cerebrum (3) Cerebellum (4) Medulla oblongata.

Respiratory rhythm centre that controls normal breathing lies in medulla region of brain.

7. Given below are four matching of an animal and its kind of respiratory organ: **[CBSE 2003]**
A. Silver fish – trachea B. Scorpion – book lungs
C. Sea squirt – pharyngeal gills D. Dolphin – skin
The correct matching are:
(1) B and D (2) C and D (3) A and D (4) A, B, and C.

Dolphin – lungs. All mammals terrestrial or aquatic has lungs as organ of breathing.

8. Carbon monoxide contained in tobacco smoke **[Orissa JEE 2003]**

(1) Is carcinogenic
(2) Causes gastric ulcers
(3) Reduces oxygen carrying capacity of blood
(4) Raises blood pressure

CO binds irreversibly with Hb.

9. When man inhales air containing normal concentration of O_2, but also carbon monoxide, he suffers from suffocation because: **[BV Pune 2003]**

(1) Haemoglobin combines with CO instead of with O_2 and product cannot dissociate
(2) CO react with O_2 reducing percentage of O_2 in the air
(3) CO affects the diaphragm and intercostal muscles
(4) CO affects the nerves of the lungs.

Hb has max. affinity for CO .

10. Ravi, who lived at sea level, had around 5 million RBCs per cubic millimeter of his blood. Later when he lived at an altitude of 18,000 ft, showed around 8 million RBCs per other millimeter of blood. This is an adaptation because.

(1) He had pollution free air to breathe
(2) At high altitude he ate more nutritive food
(3) At high altitude, O_2 level is less hence more RCBs were required to absorb enough oxygen
(4) At high altitude there is more of UV-radiation which enhances RBCs production.

At high altitude as partial pressure of oxygen is less, people need to get acclimatize . Hb content increases as RBC count increases.

11. What is true about hemoglobin? **[AIEEE 2004]**

(1) It is a dipeptide and present in red blood corpuscles in blood worm
(2) It is present in the dissolved state in blood plasma in earthworm
(3) It is a dipeptide in mammals and localized in red blood corpuscles
(4) It is present in dissolved state in blood plasma in scorpion.

Hb is a tetrapeptide and present in red blood corpuscles in vertebrates. Scorpion lacks Hb , they have haemocyanin to impart blue colour to blood.

12. The rhythmic control of breathing is produced by the activity of inspiratory and expiratory neurons in: **[CPMT 2005]**

(1) Cerebral cortex
(2) Medulla oblongata
(3) Apneustic centre of the pons
(4) Pneumotaxic centre of the pons.

Respiratory rhythm centre that controls normal breathing lies in medulla region of brain.

13. Dissociation curve shifts to the right when **[CPMT 2005]**

(1) O_2 concentration increases
(2) CO_2 concentration decreases
(3) CO_2 concentration increase
(4) Chloride concentration increase

XI NCERT pg 274. Increase in CO2 concentration in blood causes Bohr effect as a result of which Hb affinity towards oxygen is decreased making the dissociation curve shift towards right.

14. In lungs, there is definite exchange of ions between RBC and plasma. Removal of CO_2 from blood involves: **[CPMT 2005]**

(1) Influx of Cl^- ions into RBC (2) Efflux of Na from RBC

(3) Influx of HCO_3^- ions into RBC (4) Efflux of HCO_3^- ions from RBC.

Reverse chloride shift in lungs causes Influx of HCO_3^- ions into RBC and efflux of Cl^- ions from RBC.

15. If the level of carboxyhaemoglobin in blood reaches upto …. the functioning of central nervous system is severely affected which results in death. **[MH-CET 2005]**

(1) 1 to 2% (2) 0.1 to 0.5% (3) 0.20 to 0.30% (4) 0.30 to 0.40%.

Carbon monoxide is a very poisonous gas as it binds irreversibly with Hb hence transport of other gases in body stops mainly oxygen.

16. Asthma is caused due to: **[WB-JEE 2006]**

(1) Infection of lungs (2) Infection of trachea

(3) Spasm in bronchial muscles (4) Bleeding into pleural cavity

Asthma is an allergy caused due to exposure to dust or smoke etc causing constriction of bronchi.

17. Combining of hemoglobin with oxygen in lungs can be promoted by: **[MPPMT 2006]**

(1) Introducing CO into blood (2) Decreasing O_2 concentration in blood

(3) Increasing O_2 concentration in blood (4) Increasing CO_2 concentration in blood.

Association of Hb with oxygen is mainly due to increased pO2.

18. The function/s of surfactant is/are: **[WB-JEE 2007]**

(1) To reduce the surface tension on the alveoli

(2) Maintaining the stable size of the alveoli

(3) Facilitating lung expansion

(4) All of the above

Lecithin is the surfactant present in alveoli. To prevent its collapsing.

19. Vital capacity of lungs is: **[Kerala PMT 2007]**

(1) IRV + ERV (2) IRV + ERV + TV

(3) IRV + ERV + TV – RV (4) IRV + ERV + TV + RV

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20. Match the items in Column I with Column II and choose the correct option:

	Column I		**Column II**
A	Tidal volume	1	2500 to 3000 mL of air
B	Inspiratory reserve volume	2	1000 mL of air
C	Expiratory reserve volume	3	500 mL of air
D	Residual volume	4	3400 to 4800 mL of air
E	Vital capacity	5	1200 mL of air

Answer Codes: **[Kerala PMT 2007]**

(1) (A – 3); (B – 4); (C – 2); (D – 1); (E – 5)
(2) (A – 3); (B – 1); (C – 4); (D – 5); (E – 2)
(3) (A – 5); (B – 4); (C – 2); (D – 1); (E – 3)
(4) (A – 3); (B – 1); (C – 2); (D – 5); (E – 4)
(5) (A – 4); (B – 3); (C – 2); (D – 1); (E – 5)

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21. Lungs are not affected by the disease **[DPMT 2007]**
(1) Pneumonia (2) Bronchitis (3) Polio (4) Asthma

XI NCERT pg 275. Polio is a neural disorder.

22. Which of the following factors raise the P_{50} value and shifts the HbO_2 dissociation curve to right? **[BHU 2007]**
(a) Rise in P_{CO_2} (b) Fall in temperature
(c) Rise in H^+ ions (= fall in pH) (d) Fall in diphosphoglyceric acid
(1) (a) and (b) are correct (2) (b) and (d) are correct
(3) (a) and (c) are correct (4) (a), (b) and (c) are correct.

Rise in P_{CO_2} and Rise in H^+ ions (= fall in pH) both causes dissociation making the curve shifted right, whereas Fall in temperature and Fall in diphosphoglyceric acid shall cause left shift.

23. Which of the following statements is not true? **[Kerala PMT 2007]**
(1) The partial pressure of oxygen in deoxygenated blood is 40 mmHg
(2) The partial pressure of oxygen in oxygenated blood is 95 mmHg
(3) The partial pressure of carbon dioxide in oxygenated blood is 95 mmHg
(4) The partial pressure of carbon dioxide in the alveolar air is 40 mmHg.

The partial pressure of carbon dioxide in oxygenated blood is 40 mmHg

24. The number of RBCs in man increases if he lives at a higher altitude because:
(1) There is less oxygen at mountains **[WB-JEE 2007]**
(2) There is more oxygen at the mountains
(3) There are no germs in the air in mountain
(4) More heat is required to be produced in the body for keeping warm.

At high altitude as partial pressure of oxygen is less, people need to get acclimatize . Hb content increases as RBC count increases.

25. During inspiration, the diaphragm: **[CPMT 2008; Manipal 2008]**
(1) Relaxes to become dome-shaped (2) Contract and flattens
(3) Shows no change (4) Expands.

During inspiration, the diaphragm Contract and flattens.

26. The alveoli of lungs are lined by _____ epithelium **[Kerala PMT 2008]**

(1) Simple (2) Squamous (3) Cuboidal (4) Columnar epithelium

The alveoli of lungs and endothelium of lung capillary both are lined by squamous epithelium

27. How many haem molecules are present in one molecule of haemoglobin?

(1) 1 (2) 2 (3) 3 (4) 4

Each Hb molecule has 4 Fe containing porphyrin rings and hence can bind with 4 oxygen molecules.

28. According to Boyle's law, the product of pressure and volume is a constant. Hence **[KCET 2010]**

(1) If the volume of the lungs is increased, the pressure decreases proportionately

(2) If the volume of the lungs is increased, the pressure also increases proportionately

(3) If the volume of the lungs is increased, the pressure decreases disproportionately

(4) If the volume of the lungs is increased, the pressure remains same

According to Boyle's law, volume is inversely proportional to pressure.

29. Which of the following statements is correct? **[UP-CPMT 2010]**

(1) During inspiration, external intercostals muscles and diaphragm contract

(2) Cyanosis means collapse of alveoli

(3) Eupnoea means slow breathing

(4) Coryza is caused by human corona virus

Cyanosis means bluish skin colour due to hypoxia. Eupnoea means normal breathing. Coryza is caused by Rhino virus.

30. The urge to inhale in humans results from: **[DUMET 2010]**

(1) Rising PCO_2 (2) Rising PO_2 (3) Falling Pco_2 (4) Falling PO_2

Breathing rate and type of breath is most affected by conc of CO2 and H ions in blood.

31. In which of the following subjects, the dead space is highest? **[WB-JEE 2010]**

(1) Old man (2) Old woman (3) Young man (4) Young woman

Lungs are comparatively larger in males than females . So male dead space area too shall be larger. With increasing age efficiency of lungs decreases and that adds extra physiological dead space in old males.

32. Which of the following is the cofactor of carbonic anhydrase? **[WB-JEE 2010]**

(1) Fe (2) Zn (3) Cu (4) Mg

Zn is co-factor for enzyme carbonic anhydrase.

33. Skin is an accessory organ of respiration in: **[WB-JEE 2010]**

(1) Humans (2) Frogs (3) Rabbit (4) Lizard

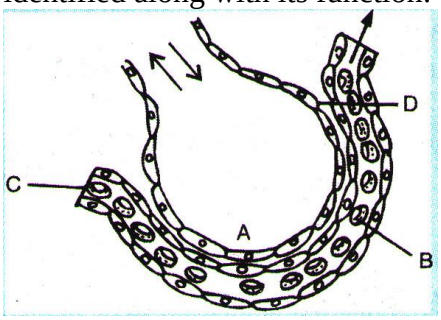
Skin is an accessory organ of respiration in amphibians as they lack exoskeleton and their skin is moist and glandular.

34. Between breaths, the intrapleural pressure is approximately …… mmHg less than atmospheric pressure **[AMU 2010]**

(1) 1 (2) 4 (3) 8 (4) 10

The intrapleural pressure is always negative to prevent lungs from collapsing. During inspiration its -16mm hg and at end of expiration its -4mm hg.

35. The figure given below shows a small part of human lung where exchange of gases takes place. In which one of the options given below, the one part A, B, C and D is correctly identified along with its function: **[CBSE 2011]**



(1) C – Artery capillary – passes oxygen to tissues

(2) A – Alveolar cavity – main site of exchange of gases

(3) D – Capillary wall – exchange of O_2 and CO_2 takes place

(4) B – Red blood cells – transport of CO_2 mainly

C – Artery capillary – passes carbon dioxide to lungs. D – alveolar wall – exchange of O_2 and CO_2 takes place . B – Red blood cells – transport of both O2 and CO_2

36. A large proportion of oxygen is left unused in the human blood even after its uptake by the body tissues. This O_2 **[CBSE 2011]**

(1) Acts as a reserve during muscular exercise

(2) Raises the pCO_2 of blood to 75 mm of Hg

(3) Is enough to keep oxy hemoglobin saturation at 96%

(4) Helps in releasing ore O_2 to the epithelial tissues

Both Hb in blood and myoglobin in muscles stores oxygen.

37. Two friends are eating together on a dining table, one of them suddenly starts coughing while swallowing some food. This coughing would have been due to improper movement of: **[CBSE 2011]**

(1) Epiglottis (2) Diaphragm

(3) Lungs (4) Tongue

Epiglottis prevents entry of food in trachea.

38. Which one of the following can bind several times more strongly to the haemoglobin than oxygen? **[AMU 2011]**

(1) CO (2) CO_2 (3) SO_2 (4) H_2CO_3

Carbon monoxide is a very poisonous gas as it binds irreversibly with Hb hence transport of other gases in body stops mainly oxygen.

39. The factor which does not affect the rate of alveolar diffusion is **[Kerala PMT 2011]**

(1) Solubility of gases (2) Thickness of respiratory membrane

(3) Pressure gradient (4) Reactivity of gases

The rate of alveolar diffusion is directly proportional to Solubility of gases and Pressure gradient, rate of alveolar diffusion is inversely proportional to Thickness of respiratory membrane.

40. Congestion of the lungs is one of the main symptoms in: **[Kerala PMT 2011]**

(1) Hypotension (2) Coronary heart disease

(3) Angina (4) Heart failure

Congestive heart failure is a chronic heart problem .

41. Amount of CO_2 in expired air is: **[J&K CET 2011]**

(1) 0.04% (2) 0.03% (3) 3.6% (4) 21%

Amount of CO2 in expired air is 100 times more than in inspired air.

42. Which one of the following is the correct statement for respiration in humans? **[AIPMT – 2012]**

(1) Workers in grinding and stone-breaking industries may suffer, from lung fibrosis

(2) About 90% of carbon dioxide (CO_2) is carried by haemoglobin as carbaminohaemoglobin

(3) Cigarette smoking may lead to asthma.

(4) Neural signals from pneumotoxic centre in pons region of brain can increase the duration of inspiration

About 20-25% of carbon dioxide (CO_2) is carried by haemoglobin as carbaminohaemoglobin . Cigarette smoking may lead to emphysema. Neural signals from pneumotoxic centre in pons region of brain can decrease the duration of inspiration

43. People who have migrated from the planes to an area adjoining Rohtang Pass about six months back **[AIPMT – 2012]**

(1) Suffer from altitude sickness with symptoms like nausea, fatigue, etc

(2) Have the usual RBC count but their haemoglobin has very high binding affinity to O_2

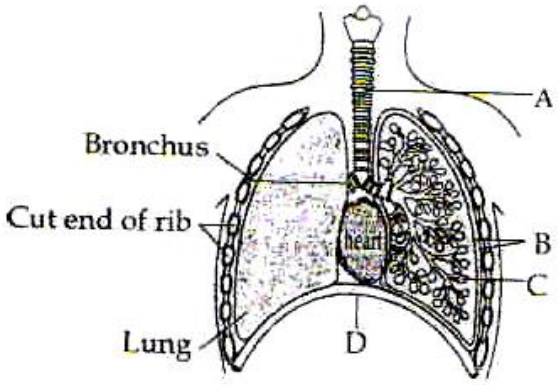
(3) Have more RBCs and their haemoglobin has a lower binding affinity to O_2

(4) Are not physically fit to play games like football

As a result of acclimatization to higher altitude, the RBC count increases as the pO2 at high altitude is less and due to less pO2 the Hb affinity for O2 is lowered.

44. 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 characteristics

[NEET – 2013]



(1) D – lower end of lungs – diaphragm pulls it down during inspiration
(2) A–trachea–long tube supported by complete cartilaginous rings for conducting inspired air
(3) B–pleural membrane – surround ribs on both sides to provide cushion against rubbing
(4) C – Alveoli – thin walled vascular bag like structures for exchange of gases

A–trachea–long tube supported by incomplete cartilaginous rings .
B–pleural membrane – surrounds lungs and present inner to ribs.
D – diaphragm- pulls lungs down during inspiration

45. Approximately seventy percent of carbon-dioxide absorbed by the blood will be transported to the lungs: **[AIPMT – 2014]**

(1) by binding to R.B.C. (2) as carbamino – haemoglobin
(3) as bicarbonate ions (4) in the form of dissolved gas molecules

70% CO2 carried as bicarbonates of Na ,20-25% as carbamino-haemoglobin and 7% dissolved in plasma.

46. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe? **[AIPMT – 2015]**

(1) rising CO_2 concentration (2) falling CO_2 concentration
(3) rising CO_2 and falling O_2 concentration (4) falling O_2 concentration

Chemoreceptors present in the wall of aorta and carotid artery are highly sensitive to increased partial pressure of carbon dioxide and reduced oxygen level has a very negligible role to play .

47. Name the chronic respiratory disorder caused mainly by cigarette smoking: **[NEET-1 2016]**

(1) Respiratory alkalosis (2) Emphysema
(3) Asthma (4) Respiratory acidosis

Chronic smokers are at high risk to suffer from Emphysema. Cigarette Smoke destroys alveolar wall.

48. Reduction in pH of blood will: **[NEET-1 2016]**

(1) release bicarbonate ions by the liver.

(2) reduce the rate of heart beat.
(3) reduce the blood supply to the brain
(4) decrease the affinity of hemoglobin with oxygen.

Reduction in pH of blood ie acidic pH causes Bohr effect near tissues enabling O2 transport to tissues.

49. The partial pressure of oxygen in the alveoli of the lungs is **[NEET-2 2016]**

(1) Less than that in the blood (2) Less than that of carbon dioxide
(3) Equal to that in the blood (4) More than that in the blood

The partial pressure of oxygen in the alveoli of the lungs is 104mmHg and the partial pressure of oxygen in oxygenated blood is 95 mm Hg and in deoxygenated blood is 40mm Hg.

50. Lungs do not collapse between breaths and some air always remains in the lungs which can never be expelled because: **[NEET-2 2016]**

(1) There is a positive intrapleural pressure
(2) Pressure in the lungs is higher than the atmospheric pressure.
(3) There is a negative pressure in the lungs.
(4) There is a negative intrapleural pressure pulling at the lung walls

Intrapleural pressure is always negative to prevent lungs from collapsing. Hence certain volume of air always remains in lungs to prevent them from collapsing called as Residual volume .Intrapulmonary pressure is negative during inspiration and positive during expiration.

51. Lungs are made up of air-filled sacs, the alveoli. They do not collapse even after forceful expiration, because of: **[NEET- 2017]**

(1) Residual Volume (2) Inspiratory Reserve Volume
(3) Tidal Volume (4) Expiratory Reserve Volume

Intrapleural pressure is always negative to prevent lungs from collapsing. Hence certain volume of air always remains in lungs to prevent them from collapsing called as Residual volume

52. Match the items given in Column I with those in Column II and select the correct option given below **[NEET 2018]**

	Column I		**Column II**
1.	Tidal volume	(i)	2500 – 3000 mL
2.	Inspiratory reserve volume	(ii)	1100 – 1200 mL
3.	Expiratory reserve volume	(iii)	500 – 550 mL
4.	Residual volume	(iv)	1000 – 1100 mL

	1	2	3	4
(1)	i	iv	ii	iii
(2)	iii	i	iv	ii
(3)	iii	ii	i	iv
(4)	iv	iii	ii	i

(2)

Tidal Volume (TV) is the volume of air inspired or expired during normal breath. It is about 500-550 mL. Inspiratory Reserve Volume (IRV) is the extra amount of air that can be inspired directly after a normal inspiration. It is about 2500-3000 mL. Expiratory Reserve Volume (ERV)is the extra amount of air that can be expired forcibly after a normal expiration. It is about 1000-1100 mL Residual Volume (RV)is the volume of air which remains still in the lung after the most forceful expiration. It is about 1100-1200 mL. Therefore, option (b) is correct.

53. Which of the following is an Occupational respiratory disorder? **[NEET 2018]**
(1) Botulism (2) Silicosis (3) Anthracis (4) Emphysema
(2)
Silicosis is an occupational respiratory disorder which is caused due to excessive inhalation of silica dust. It usually affects the workers of grinding or stone breaking industries. The long-term exposure can cause lung fibrosis (or stiffening), leading to breathing difficulties. Anthracis or Anthrax is a bacterial infection caused by Bacillus anthracis. Botulism is food poisoning Infection caused by Clostridium botulinum. Its symptoms include diarrhoea, vomiting, abdominal distention, etc.

54. Which one of the following options correctly represents the lung conditions in asthma and emphysema, respectively? **[NEET 2018]**
(1) Increased respiratory surface: Inflammation of bronchioles
(2) Increased number of bronchioles; Increased respiratory surface
(3) Inflammation of bronchioles; Decreased respiratory surface
(4) Decreased respiratory surface; Inflammation of bronchioles
(3)
Asthma is inflammation of bronchioles. Its symptoms include wheezing, coughing and difficulty in breathing mainly during expiration. Emphysema is an inflation or abnormal distension of the bronchioles or alveolar sacs of the lungs. Many of the septa between the alveoli are destroyed and much of the elastic tissue of the lungs is replaced by connective tissue. As a result alveolar septa collapse and the surface area get greatly reduced.

55. Select the CORRECT statement. **[NEET (Odisha) 2019]**
(1) Expiration occurs due to external intercostal muscles
(2) Intrapulmonary pressure is lower than the atmospheric pressure during inspiration
(3) Inspiration occurs when atmospheric pressure is less than intrapulmonary pressure
(4) Expiration is initiated due to contraction of diaphragm
(2)
Statement (2) is Correct as intrapulmonary pressure is lower than the atmospheric pressure During inspiration. Other statements can be Corrected as
(1) Inspiration occurs due to external intercoastal muscles.
(2) Inspiration occurs when atmospheric pressure is more than intrapulmonary pressure.
(3) Inspiration is initiated due to contraction of diaphragm.

56. The maximum volume of air a person can breathe in after a forced expiration is known as **[NEET (Odisha) 2019]**
(1) expiratory capacity (2) vital capacity
(3) inspiratory capacity (4) total lung capacity
(2)
Vital Capacity (VC) is the maximum Volume of air a person can breathe in after a forced expiration. This includes ERV, TV and IRV or the maximum volume of air a person can

breathe out after a forced inspiration.

57. 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?

[NEET (National) 2019]

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

(4)

The Expiratory Capacity of athlete will be 1500 mL.
It can be calculated as
Given, Tidal Volume (TV)= 500 mL
Expiratory Reserve Volume(ERV)=1000 mL
Expiratory Capacity = TV+ERV
= 500+ 1000 = 1500 mL

58. Select the correct events that occur during inspiration.

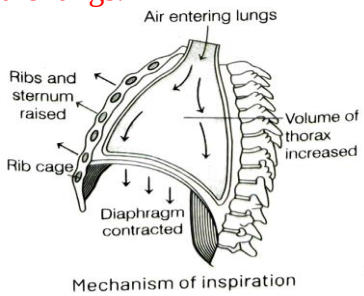
[NEET (Sep.) 2020]

I. Contraction of diaphragm.
II. Contraction of external inter-costal muscles.
III. Pulmonary volume decreases.
IV. Intra pulmonary pressure increases.

(1) II and IV (2) I, II and IV (3) Only IV (4) I and II

(4)

Statement I and II are correct as during inspiration, the contraction of diaphragm occurs which pulls it downward, while the external intercostal muscles contract and lifts up the ribs and sternum. This increases the size of the thoracic cavity and decreases the pressure inside. As a result, air rushes in and fills the lungs. Statement III and IV are incorrect because during inspiration, the volume of the thoracic cavity increases. This causes a similar increase in pulmonary volume. An increase in pulmonary Volume decreases the intrapulmonary pressure to less than the atmospheric pressure which forces the air from Outside to move into the lungs.



Mechanism of inspiration

59. The Total Lung Capacity (TLC) is the total volume of air accommodated in the lungs at the end of a forced inspiration. This includes **[NEET (Oct.) 2020]**

(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)

(4)

The Total Lung Capacity(TLC)is the total volume of air accommodated in the lungs at the end of a forced inspiration. This includes Residual Volume (RV), Expiratory Reserve Volume (ERV), Tidal Volume(TV)and Inspiratory Reserve Volume (IRV). TLC is also equals to vital

capacity Of residual volume. Thus, option(d)is Correct.

60. Match the following columns and select the correct option from the codes given below.

[NEET (Oct.) 2020]

	Column I		**Column II**
A.	Pneumotaxic centre	1.	Alveoli
B.	O_2 dissociation curve	2.	Pons region of brain
C.	Carbonic anhydrase	3.	Haemoglobin
D.	Primary site of exchange of gases	4.	RBC

	A	B	C	D
(1)	1	3	2	4
(2)	2	3	4	1
(3)	3	2	4	1
(4)	4	1	3	2

(2)

Option (2) is correct match, which is as follows. Pneumotaxic centre is present in the pons region of the brain. O_2, dissociation curve is useful in studying the effect of factors like pCO_2, H^+ concentration, etc., on binding of O_2, with haemoglobin. Carbonic anhydrase is an enzyme present on the surface of RBC. Primary site of exchange of gases is the alveoli of the lungs.

61. Identify the wrong statement with reference to transport of oxygen.

[NEET (Sep.) 2020]

(1) Partial pressure of CO_2 can interfere with O_2 binding with haemoglobin
(2) Higher H^+ concentration in alveoli favours the formation of oxyhaemoglobin
(3) Low pCO_2, in alveoli favours the formation of oxyhaemoglobin
(4) Binding of oxygen with haemoglobin is mainly related to partial pressure of O_2

(2)

Statement in option (2) is incorrect with reference to transport of oxygen. It can be corrected as In alveoli high pO_2, low pCO_2, . low H^+ Concentration and lower temperature are the factors that favour the formation of oxyhaemoglobin.

62. **Assertion (A)** A person goes to high altitude and experiences 'altitude sickness' with symptoms like breathing difficulty and heart palpitations.
Reason (R) Due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.
In the light of the above statements, choose the correct answer from the options given below.

[NEET 2021]

(1) Both A and R are true and R is the correct explanation of A
(2) Both A and Rare true, but R is not the Correct explanation of A
(3) A is true, but R is false
(4) A is false, butR is true

(1)

Both A and R are true and R is the correct explanation of A. A person goes to the high altitude And experiences altitude sickness like heavy breathing and heart palpitation. It is due to low atmospheric pressure at high altitude, the body does not get sufficient oxygen.

63. Select the favourable conditions required for the formation of oxyhaemoglobin at the alveoli. **[NEET 2021]**

(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
(1)

The favourable conditions for the formation of oxyhaemoglobin is high pO_2 lesser H^+ concentration and lower temperature found in alveoli, whereas low PO_2, high H' concentration and high temperature are favourable for dissociation of oxygen from the Oxyhaemoglobin found in tissues.

64. The partial pressures (in mm Hg) of Oxygen (0_2) and carbon dioxide (CO_2) at alveoli (the site of diffusion) are **[NEET 2021]**

(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)

Partial pressures of oxygen (in mm Hg) and carbon dioxide at alveoli are pO_2, 104 and pCO_2 = 40.

Respiratory gas	Atmospheric air	Alveoli	Blood (deoxygenated)	Blood (oxygenated)	Tissue
O_2	159	104	40	95	40
CO_2	0.3	40	45	40	45

65. Under normal physiological conditions in human being every 100 ml of oxygenated blood can deliver _____ml of O_2 to the tissues **[NEET 2022]**

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

5 ml of O_2 is delivered by 100ml of oxygenated blood to the tissues under normal physiological conditions.

66. Which of the following is not the function of conducting part of respiratory system? **[NEET 2022]**

(1) Inhaled air is humidified
(2) Temperature of inhaled air is brought to body temperature
(3) Provides surface for diffusion of O_2 and CO_2
(4) It clears inhaled air from foreign particles

The conducting part of respiratory system is to keep the inhaled air warm, moist and filtered

67. Vital capacity of lung is **[NEET 2023]**

(1) IRV+ ERV + TV + RV
(2) IRV + ERV + TV – RV
(3) IRV + ERV + TV
(4) IRV + ERV

NCERT, Page no. 272; 4th paragraph 'Vital capacity'