BIOLOGY

BOTANY AND ZOOLOGY FOR NEET AND AIIMS

BREATHING AND EXCHANGE OF GASES

Exercise I Respiratory Organs

1. Identify correct sequence.

A. Breathing Pulmonary gas exchange $\rightarrow$ Transport of gases systemic gas exchange $\rightarrow$ cellular respiration

B. Breathing $\rightarrow$ systemic gas exchange $\rightarrow$ Transport of gases pulmonary gas exchange $\rightarrow$ cellular respiration

C. Cellular respiration $\rightarrow$ pulmonary gas exchange $\rightarrow$ transport of systemic gas exchange $\rightarrow$ breathing

D. Cellular respiration $\rightarrow$ breathing $\rightarrow$ pulmonary gas exchange - transport of gases $\rightarrow$ systemic gas exchange

Answer: A

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2. Which of the following is a part of both digestive tract as well as respiratory tract?

A. Trachea

B. Larynx

C. Nose

D. Pharynx

Answer: D

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3. Flow of water and blood to the respiratory organs is countercurrent in these animals

A. Sponges, coelenterates, flatworms

B. Pisces

C. Mammals

D. Aquatic arthropods & molluscs

Answer: B

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4. Mark the odd one with respect to respiratory organs

A. Pisces

B. Mammals

C. Reptiles

D. Aves

Answer: A

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5. Choose incorrect statement about respiration.

A. Insects have a network of tubes.

B. Earthworins use their vascularised parapodia as respiratory structures.

C. Amphibians like frogs can respire through moist skin also.

D. Coelenterates exchange O_2 with CO_2 by simple diffusion over their entire body surface.

Answer: B

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6. Identify the parts of respiratory tract without 'C' shaped cartilages.

A. Trachea

B. Primary bronchi

C. Secondary bronchi

D. Terminal bronchioles

Answer: D

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7. Lungs do not enclose

A. Bronchi

B. Trachea

C. Bronchioles

D. Alveoli

Answer: B

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8. Set of respiratory organs used for exchange of gases in terrestrial habitat is

A. skin and gills

B. gills and trachea

C. trachea and lungs

D. lungs and ctenidia

Answer: C

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9. Pharynx opens into trachea through

A. gullet

B. glottis

C. syrinx

D. alveoli

Answer: B

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10. Trachea divides into bronchi at the level of

A. atlas

B. axis

C. 3^{rd} cervical vertebra

D. 5^{th} thoracic vertebra

Answer: D

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11. Open circulatory system which does not participate in the transport of O_2 occurs in

A. Echinodermata

B. Annelida

C. Arthropoda

D. Vertebrata

Answer: C

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12. Which of the following is a part of conducting zone in respiratory system?

A. Terminal bronchioles

B. Respiratory bronchioles

C. Alveolar ducts

D. Alveoli

Answer: A

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13. Lungs are enclosed in

A. periosteum

B. perichondrium

C. pericardium

D. pleural membranes

Answer: D

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14. Skin is an accessory organ of respiration in

A. humans

B. frog

C. rabbit

D. lizard

Answer: B

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15. Respiration in insects is called direct because

A. The cells exchange O_2/CO_2 directly with the air in the tubes

B. The tissues exchange O_2/CO_2 directly with coelomic fluid

C. The tissue exchange O_2/CO_2 directly with the air outside through body surface

D. Tracheal tubes exchange O_2/CO_2 directly with the haemocoel which then exchange with tissues

Answer: A

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Exercise I Mechanism Of Breathing

1. The amount of air which one can inhale/exhale with maximum effort is called

A. vital capacity

B. tidal volume

C. IRV

D. ERV

Answer: A

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2. Mark the correct order of lung volumes

A. TV $<$ ERV $<$ RV $<$ IRV

B. TV $<$ RV $<$ ERV $<$ IRV

C. IRV $<$ RV $<$ TV $<$ ERV

D. ERV $<$ TV $<$ RV $<$ IRV

Answer: A

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3. Mark the correct order of lung capacities

A. EC $<$ FRC $<$ IC $<$ VC

B. EC $<$ IC $<$ FRC $<$ VC

C. VC $<$ IC $<$ EC $<$ FRC

D. FRC $<$ EC $<$ IC $<$ VC

Answer: A

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4. Inspiration can take place only when:

A. Intrapulmonary pressure is more than the atmospheric pressure

B. Intrapulmonary pressure is less than the intrapleural pressure

C. There is a negative pressure in the atmosphere with respect to the lungs

D. There is a negative pressure in the lungs with respect to atmospheric pressure

Answer: D

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5. The volume of thoracic chamber increases in dorso-ventral axis due to the contraction of

A. Phrenic muscles

B. External intercostal muscles

C. Abdominal muscles

D. Internal intercostal muscles

Answer: B

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6. The volume of the air involved in breathing movements can be estimated by using

A. Spherometer

B. Sphygmomanometer

C. Spirometer

D. Voltmeter

Answer: C

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7. Which of the following happens during expiration?

A. Increase in the pulmonary volume decreases the intrapulmonary pressure

B. Increase in the pulmonary volume increases the intrapulmonary pressure

C. Decrease in the thoracic volume decreases the intrapulmonary pressure

D. Decrease in the thoracic volume slightly increases the intrapulmonary pressure

Answer: D

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8. In a normal healthy individual, the volume of air remaining in the lungs even after forcible expiration is about

A. 1200 ml

B. 500 ml

C. 3000ml

D. 2000ml

Answer: A

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9. When diaphragm contracts,

A. the volume of the thoracic cavity increases

B. intrapulmonary pressure increases

C. the volume of the thoracic cavity decreases

D. the intrapleural pressure increases

Answer: A

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10. Which of the following does not give the correct definition of a respiratory volume?

A. Residual volume = Volume of air remaining in the lungs after normal expiration

B. Inspiratory reserve volume = Additional volume of air a person can inspire by forcible inspiration

C. Tidal volume = Volume of air inspired or expired during normal respiration.

D. Expiratory reserve volume = Additional volume of air a person can expire by forcible expiration

Answer: A

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11. Which of the following statements is not correct?

A. An increase in pulmonary volume decreases the intra-pulmonary pressure to less than the atmospheric pressure

B. Relaxation of the diaphragm and the intercostal muscles increases the thoracic volume and thereby the pulmonary volume.

C. Intrapleural pressure is always less than intrapulmonary pressure

D. We have the ability to increase the strength of inspiration and expiration with the help of additional muscles in the abdomen.

Answer: B

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12. Vital capacity does not include

A. Tidal volume

B. Inspiratory reserve volume

C. Residual volume

D. Expiratory reserve volume

Answer: C

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13. Contraction of diaphragm

A. Increases intra-alveolar pressure resulting in exhalation

B. Decreases intra-alveolar pressure resulting in exhalation

C. Increases intra-alveolar pressure resulting in inhalation

D. Decreases intra-alveolar pressure resulting in inhalation

Answer: D

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14. Which one of the following is incorrect?

A. Expiratory capacity = ERV + TV

B. Vital capacity = TLC - RV

C. Inspiratory capacity = TV + IRV

D. Total lung capacity = IRV + ERV + RV

Answer: D

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15. The total volume of air accommodated in the lungs at the end of normal expiration is termed

A. Residual volume

B. Expiratory reserve volume

C. Vital capacity

D. Functional residual capacity

Answer: D

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16. Inspiration occurs when

A. Intrapulmonary pressure $>$ Atmospheric pressure

B. Intrapulmonary pressure $<$ Atmospheric pressure

C. Intrapulmonary pressure = Atmospheric pressure

D. Atmospheric pressure $>$ = Intrapulmonary pressure

Answer: B

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17. O_2 enters the lungs when

A. Positive pressure in the lungs

B. Positive pressure in the lungs

C. Negative pressure in the cells

D. Negative pressure in the lungs

Answer: D

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18. Expiration occurs when

A. Intrapulmonary pressure $>$ Atmospheric pressure

B. Intrapulmonary pressure $<$ Atmospheric pressure

C. Intrapulmonary pressure = Atmospheric pressure

D. Intrapulmonary pressure $>=$ Atmospheric pressure

Answer: A

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19. Which of the following events is not related to inspiration?

A. decrease in the volume of the thoracic cavity

B. Increase in the volume of the thoracic cavity

C. Contraction of internal intercostal muscles

D. Contraction of external intercostal muscles

Answer: B

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20. Negative pressure inside lungs is created due to

A. The contraction of muscles of diaphragm & relaxation of external intercostal muscles

B. The relaxation of muscles of diaphragm & contraction of external intercostal muscles

C. The contraction of muscles of diaphragm & contraction of external intercostal muscles

D. The relaxation of muscles of diaphragm & relaxation of external intercostal muscles

Answer: C

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21. Which of the following events is not related to inspiration?

A. Increase in the volume of the thoracic cavity

B. Relaxation of external intercostal muscles

C. Contraction of external intercostal muscles

D. Contraction of the diaphragm

Answer: B

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22. Humans can increase the strength of both inspiration & expiration with the help of

A. Internal intercostal muscles

B. External intercostal muscles

C. Muscles of diaphragm

D. Additional muscles of abdomen

Answer: D

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23. On an average a healthy human breaths _____ times per hour

A. $12 - 16$

B. 720-960

C. $4 - 5$

D. 120-160

Answer: B

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24. The instrument that helps in clinical assessment of pulmonary functions is

A. Spirometer

B. Sphygmomanometer

C. Voltmeter

D. Ammeter

Answer: A

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25. Amount of air expelled from the lungs during the quiet breathing per one minute is

A. 500 mL

B. 6000-8000 mL

C. 2,500 mL to 3000 mL

D. 1000 - 1100 mL

Answer: B

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26. Volume of air remaining in the lungs even after a forcible expiration is

A. EC

B. RV

C. ERV

D. IRV

Answer: B

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27. Volume of air that will remain in the lungs after normal expiration is equal to

A. TV + ERV

B. TV + IRV

C. VC + ERV

D. ERV + RV

Answer: D

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28. RV + VC =

A. EC

B. TLC

C. IC

D. RV

Answer: B

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29. Identify the incorrect match about lung volumes.

A. TV-500 ml

B. IRV-3000 ml

C. RV-2000 ml

D. ERV- 1100 ml

Answer: C

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30. For the occurrence of inspiration intra pulmonary pressure should be

A. equal to atmospheric pressure

B. more than atmospheric pressure

C. less than atmospheric pressure

D. all of these

Answer: C

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31. The volume of thoracic chamber increases in dorso-ventral axis due to the contraction of

A. contraction of external inter-costal muscles

B. relaxation of external inter-costal muscles

C. relaxation of diaphragm

D. contraction of diaphragm

Answer: D

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32. Volume of air either inspired or expired during normal respiration is

A. Inspiratory reserve volume

B. Tidal volume

C. Inspiratory capacity

D. Vital capacity

Answer: B

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33. Correct one of the following regarding respiratory capacities is

A. FRC = ERV+RV

B. VC = IC - ERV

C. IC = ERV+ VC

D. EC = IC - ERV

Answer: A

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34. Maximum volume of air a person can breathe in after a forced expiration is

A. inspiratory capacity

B. vital capacity

C. expiratory capacity

D. total lung capacity

Answer: B

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35. Expiratory reserve volume of a healthy person is

A. 1000mL to 1100mL

B. 6000mL to 8000mL

C. 2500mL to 3000mL

D. 2100mL to 2200mL

Answer: A

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36. During inhalation diaphragm

A. becomes dome shaped

B. becomes flat

C. remain unchanged

D. expands

Answer: B

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37. A person suffers punctures in his chest cavity in an accident, without any damage to the lungs, its effect could be

A. Reduced breathing rate

B. Rapid increase in breathing rate

C. No change in respiration

D. Cessation of breathing

Answer: D

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38. Mark the true statement among the following with reference to normal breathing

A. Inspiration is a passive process where as expiration is active

B. Inspiration is an active process where asb expiration is a passive process

C. Inspiration and expiration are active processes

D. Inspiration and expiration are passive processes

Answer: B

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39. Mark the correct pair of muscles involved in the normal breathing in humans

A. External and internal intercostals muscles

B. Diaphragm and abdominal muscles

C. Diaphragm and external intercostals muscles

D. Diaphragm and intercostal muscles

Answer: C

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40. In breathing movements, air volume can be estimated by

A. Stethoscope

B. hygrometer

C. Sphygmomanometer

D. Spirometer

Answer: D

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41. A person breathes in some volume of air by forced inspiration after having a forced expiration. This quantity of air taken in is

A. Total lung capacity

B. Tidal volume

C. Vital capacity

D. Inspiratory capacity

Answer: C

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42. From the following relationships between respiratory volumes and capacities, mark the correct option

1) Inspiratory capacity (IC) = Tidal Volume + Residual Volume

2) Vital Capacity (VC) = Tidal Volume (TV) + Inspiratory Reserve Volume (IRV) + Expiratory Reserve Volume (ERV)

3) Residual Volume (RV) = Vital Capacity (VC) - Inspiratory Reserve Volume (IRV)

4) Tidal Volume (TV) = Inspiratory Capacity (IC) - Inspiratory Reserve Volume (IRV)

A. (i) Incorrect, (ii) Incorrect, (iii) Incorrect, (iv) Correct

B. (i) Incorrect, (ii) Correct, (iii) Incorrect, (iv) Correct

C. (i) Correct, (ii) Correct, (iii) Incorrect, (iv) Correct

D. (i) Correct, (ii) Incorrect, (ii) Correct, (iv) Incorrect

Answer: B

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Exercise I Exchange Of Gases

1. Choose the correct statement regarding the partial pressures of respiratory gases.

A. pCO_2 is more than that of O_2 in atmosphere.

B. pCO_2 in oxygenated blood is equal to partial pressure ofO_2 in deoxygenated blood

C. Solubility of CO_2 is 20-25 time lesser than O_2

D. pCO_2 in tissues is equal to O_2 partial pressure in oxygenated blood.

Answer: B

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2. The difference in the partial pressures of carbon dioxide is very less at the alveoli of lungs (about 5 mm Hg). Still higher amount of

carbon dioxide can diffuse through the diffusion membrane compared to that of Oxygen. The reason is

A. Difference in the partial pressures of oxygen is low at the alveoli of lungs when compared to CO_2

B. Solubility of carbon dioxide is 20-25 times higher than that of oxygen.

C. The alveolar membrane is with a single layer of thin squamous epithelium

D. Thin diffusion membrane is favourable for diffusion of gases

Answer: B

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3. The rate of diffusion of respiratory gases is affected by:

A. Pressure gradient of the gases

B. Solubility of the gas

C. Diffusion distance

D. All the above

Answer: D

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4. Identify the correct match.

A. Atmospheric air : pO_2- 159 mm Hg, pCO_2

- 3 mm Hg

B. Pulmonary artery : $PO_2 - 95$ mm Hg , pCO_2 -40 mm Hg

C. Alveolar air : $pO_2 - 104$ mm Hg, pCO_2- 40 mm Hg

D. Pulmonary vein :$pO_2 - 40$mm Hg , pCO_2 - 45 mm Hg

Answer: C

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5. Primary site of pulmonary gas exchange is

A. Trachea

B. Alveoli

C. Larynx

D. Bronchi

Answer: B

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6. Rate of diffusion of gases is not influenced by

A. Pressure gradient

B. Solubility of gases

C. Thickness of olfactory membrane

D. Distance of diffusion

Answer: C

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7. The partial pressure of O_2 in atmospheric air, alveoli, deoxygenated blood, oxygenated blood and tissues respectively (in mm Hg) is

A. 159, 104, 40, 95, 40

B. 0.3,40,45,40,45

C. 104, 40, 95, 40, 40

D. 159, 40 95, 40, 45 76.

Answer: A

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8. Choose the correct statement.

A. Partial pressure of CO_2 is more than that of O_2 in atmosphere.

B. Partial pressure of CO_2 in oxygenated blood is equal to partial pressure of O_2 in deoxygenated blood.

C. Solubility of CO_2 is 20-25 times lesser than O_2

D. Partial pressure of CO_2 in tissues is equal to O_2 partial pressure in

oxygenated blood.

Answer: B

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9. Partial pressure of O_2 in alveoli is

A. 45 mm Hg

B. 104 mm Hg

C. 159 mm Hg

D. 50 mm Hg

Answer: B

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10. Diffusion membrane is made up of

A. Thin squamous epithelium of alveoli

B. Endothelium of alveolar capillaries

C. Basement membrane

D. All the above

Answer: D

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11. Partial pressure of CO_2 in alveoli, oxygenated blood, deoxygenated blood, tissue respectively in mm Hg) are

A. 40, 40, 40, 40

B. 45, 45, 40, 40

C. 40. 40, 45, 45

D. 45, 45, 45, 45

Answer: C

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12. After taking a long breath, we can hold the breath as long as

A. CO_2 in the blood is more

B. H^+ in the blood is more

C. CO_2 in the blood is less

D. O_2 in the blood less

Answer: C

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13. In lungs, the air is separated from the venous blood by

A. 1. Squamous epithelium + Tunica externa of blood vessel

B. 2. Squamous epithelium + endothelium of blood vessel

C. 3. Columnar epithelium + 3 layered wall of blood vessel

D. 4. Transitional epithelium + Tunica media of blood vessel

Answer: A

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14. Correct one of the following regarding partial pressure (m min Hg) of O_2 and CO_2 in systemic veins respectively is

A. 40 and 45

B. 95 and 40

C. 104 and 40

D. 100 and 140

Answer: A

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15. The CO_2 content by voiune, in the atmospheric air is about

A. $3.34\ \%$

B. 4%

C. 0.0314%

D. 0.34%

Answer: C

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16. Which vertebrate organ receives only oxygenated blood?

A. Spleen

B. Liver

C. Gill

D. Lung

Answer: A

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Exercise I Transport Of Gases

1. Every 100 mL of deoxygenated blood delivers approximately

A. 5 mL of O_2 to the tissues

B. 5 mL of CO_2 to the tissues

C. 4 mL of CO_2 to the alveoli

D. 4 mL of O_2 to the alveoli

Answer: C

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2. Carbon dioxide (CO) diffuses into blood from tissue site and passes to alveolar site in the form of

A. bicarbonate: 70%

B. bicarbonate: 20-25%

C. carbamino haemoglobin: 60-70%

D. carbamino haemoglobin: 7%

Answer: A

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3. Oxygen binding to haemoglobin in blood is

A. directly proportional to the concentration of CO_2 in the medium

B. inversely proportional to the concentration of CO_2 in the medium

C. directly proportional to the concentration of CO in the medium

D. independent of the concentration of CO in the medium

Answer: B

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4. Carbon dioxide is considered a harmful by-product of cellular respiration because it

A. lowers the hydrogen ion concentration in the blood

B. combines with haemoglobin to form carboxyhaemoglobin

C. has more affinity for haemoglobin

D. lowers the pH of the blood

Answer: D

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5. About seven percent of carbon dioxide is transported to the lungs

A. as carbamino compounds through RBC

B. in a dissolved state through the plasma

C. as bicarbonate ions through RBC

D. as bicarbonate ions through the plasma

Answer: B

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6. Right-shift of oxygen-haemoglobin dissociation curve can occur due to

A. High pH

B. Low temperature

C. High H^+ concentration

D. Low pCO_2

Answer: C

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7. The affinity of haemoglobin for oxygen increases due to

A. Increase of carbon dioxide in the blood and decrease in the pH

B. Increase of temperature and decrease in the partial pressure of carbon dioxide

C. Decrease in the partial pressure of carbon dioxide and rise in pH

D. Decrease of temperature and increase in partial pressure of carbon dioxide

Answer: C

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8. The following are the two statements regarding carbon dioxide:

(a) Carbon dioxide produced during cellular

respiration must be eliminated from the body.

(b) Carbon dioxide reacts with water to form carbonic acid and thus increases pH.

Of the above statements, which one of the following options is correct

A. (b) is correct but (a) is false

B. Both (a) and (b) are correct

C. (a) is correct but (b) is false

D. Both (a) and (b) are false

Answer: C

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9. Which of the following is the most important factor that determines whether oxygen binds to or dissociates from haemoglobin?

A. Partial pressure of carbon dioxide

B. pH

C. Body temperature

D. Partial pressure of oxygen

Answer: D

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10. Formation of carbonic acid from carbon dioxide and water is catalysed by

A. Carbonic anhydrase

B. Adenylate cyclase

C. Restriction endonuclease

D. Phenylalanine hydroxylase

Answer: A

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11. Every 100 mL of oxygenated blood delivers approximately

A. 15 mL of O_2 to the tissues

B. 15 ml. of CO_2 to the tissues

C. 4 mL of CO_2 to the alveoli

D. 4 ml of O_2 to the alveoli

Answer: A

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12. The chemical bond between oxygen and haemoglobin is

A. Stable and reversible

B. Unstable and reversible

C. Stable and irreversible

D. Unstable and irreversible

Answer: B

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13. Percentage of O_2 transported from lungs to the tissues through RBC is

A. 3

B. 67

C. 97

D. 75

Answer: C

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14. Percentage of O_2 & CO_2 transported in a dissolved state through plasma respectively

A. 3 and 7

B. 7 and 3

C. 20 and 7

D. 7 and 20

Answer: A

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15. The curve obtained when percentage saturation of Hb with O_2 is plotted against pO_2 is

A. J shaped

B. Rectangular hyperbola

C. Linear curve

D. Sigmoid curve

Answer: D

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16. Which of the following factors is not favourable for the formation of oxyhaemoglobin?

A. High pH

B. Low temperature

C. High pO_2

D. High H^+ concentration

Answer: D

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17. The major factor which could affect the binding of CO_2 to Hb is

A. Low temperature

B. pO_2

C. High pH

D. High temperature

Answer: B

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18. Amount of CO_2 transported as bicarbonates, carbamino compounds and dissolved condition respectively is

A. 70%, 23%, 7%

B. 23%, 7%, 70%

C. 70%, 7%, 23%

D. 7%, 23%, 70%

Answer: A

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19. During transport of CO_2 blood does not become more acidic due to

A. H^+ ions do not bind with haemoglobin

B. O_2 does not bind with haemoglobin

C. Acid base buffers

D. Carbonic anhydrase in RBC

Answer: C

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20. In pulmonary capillaries, there is definite exchange of ions between RBC and plasma. Removal of CO_2 from the blood involves

A. Influx of HCO_3 ions into RBC

B. Influx of Cl^- into RBC

C. Efflux of H^+ ions from RBC

D. Efflux of HCO_3^+ ions from RBC

Answer: A

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21. Much of CO_2 is transported by the blood as

A. Dissolved in plasma

B. Bicarbonate

C. Attached to haemoglobin

D. Carbonate

Answer: B

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22. Factor that helps in formation of oxyhaemoglobin in the alveoli is

A. high pCO_2

B. high pO_2

C. higher H^+ concentration

D. all of these

Answer: B

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23. Carbonic anhydrase is present in very high concentration in

A. plasma

B. epithelial tissue

C. RBC

D. muscular tissue

Answer: C

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24. Carbonic anhydrase helps in the formation of

A. carbamino-haemoglobin

B. oxyhaemoglobin

C. carbonic acid

D. more on

Answer: C

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25. Haemoglobin has greater affinity for

A. O_2

B. CO

C. CO_2

D. O_3

Answer: B

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26. Which of the following favours dissociation of HbO_2 ?

A. higher pH

B. ow temperature

C. lower pCO_2

D. high H^+

Answer: D

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27. CO_2 dissociates from carbamino-haemoglobin when

A. pCO_2 is high and pO_2 is low

B. pO_2 is high and pCO_2 is low

C. pCO_2 and pO_2 are equal

D. none of these

Answer: B

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28. It known that exposure to carbon monoxide is harmful to animals because

A. It reduces CO_2 transport

B. It reduces O_2 transport

C. It increases CO_2 transport

D. It increases O_2 transport

Answer: B

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29. Mark the incorrect statement in context to O_2 binding to Hb.

A. Lower pH

B. Lower temperature

C. lower pCO_2

D. Higher pO_2

Answer: A

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30. CO_2 dissociates from carbamino-haemoglobin when

A. pCO_2 is high and pO_2 is low

B. pO_2 is high and pCO_2 is low

C. pCO_2 and pO_2 are equal

D. None of above

Answer: B

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31. Right-shift of oxygen-haemoglobin dissociation curve can occur due to

A. high pCO_2

B. high pO_2

C. Low pCO_2

D. Less H^+ concentration

Answer: A

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Exercise I Regulation Of Respiration

1. Pneumotaxic centre is associated with

A. breathing

B. excretion

C. digestion

D. sleeping

Answer: A

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2. Carotid bodies are stimulated by

A. CO_2 concentration in venous blood

B. O_2 concentration in arterial blood

C. CO_2 concentration in arterial blood

D. O_2 concentration in venous blood

Answer: C

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3. Respiration is controlled by

A. medulla oblongata

B. cerebellum

C. hypothalamus

D. cerebrum

Answer: A

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4. Chemosensitive area of respiratory centre in medulla is affected by

A. less CO_2 and H^+ ions

B. less O_2 and H^+ ions

C. excess CO_2 and H^+ ions

D. excess O_2 and H^+ ions

Answer: C

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5. Choose the incorrect statement.

A. Receptors associated with aortic arch can recognize changes in H^+ concentration

B. A chemosensitive area is located adjacent to respiratory rhythm centre.

C. Chemosensitive area is highly sensitive to CO_2

D. The role of oxygen in the regulation of respiratory rhythm is quite significant .

Answer: D

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6. The centres that regulate respiratory rhythm are located in:

A. Cerebrum and cerebellum

B. Pons and midbrain

C. Midbrain and medulla

D. Medulla and pons

Answer: D

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7. Pick out the correct statements:

a) Pneumotaxic centre moderates the functioning of respiratory rhythm centre.

b) Pneumotaxic centre is primarily responsible for regulation of respiratory movements.

c) Decrease in pH of cerebrospinal fluid is detected by medulla.

d) The role of carbon dioxide in the regulation of respiratory rhythm is quite insignificant.

A. (a) and (c) are correct

B. (b) and (d) are correct

C. (a), (c) and (d) are correct

D. (a), (b) and (c) are correct

Answer: A

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8. The basic rhythin of quiet respiration is controlled by

A. Medullary rhythmicity centre

B. Apneustic centre

C. Pneumotaxic centre

D. Cardiovascular centre

Answer: A

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9. When you hold your breath, which of the following first leads to the urge to breathe?

A. Falling carbon dioxide

B. Rising oxygen

C. Rising carbon dioxide

D. Falling oxygen

Answer: C

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10. Respiratory rhythm centre is present in

A. Medulla

B. Cerebellum

C. Cerebrum

D. Pons

Answer: A

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11. Respiratory centre that can moderate functions of respiratory rhythm centre is located in

A. Medulla

B. Cerebellum

C. Cesebium

D. Pons

Answer: D

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12. Medulla oblongata has

A. Respiratory rhythm centre

B. Chemosensitive area

C. Pneumotaxic centre

D. (1) & (2)

Answer: D

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13. Choose the incorrect statement.

A. The role of oxygen in the regulation of respiratory rhythm is quite significant.

B. Receptors associated with aortic arch can recognize changes in CO_2 & H^+ concentration.

C. Decrease in concentration of O_2 cannot activate chemosensitive area.

D. Chemosensitive area is located nearer to respiratory rhythm centre.

Answer: A

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14. Identify correct match.

A. Pneumotaxic centre - Pons

B. Respiratory rhytbm centre - Cerebellum

C. Chemosensitive area - Pulmonary aorta

D. Carotid receptors - Medulla

Answer: A

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15. Respiratory process is regulated by certain specialized centres in the brain. One of the following listed centres can reduce the inspiratory duration upon stimulation

A. Medullary inspiratory centre

B. Pneumotaxic centre

C. Apneustic centre

D. Chemosensitive centre

Answer: B

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Exercise I Disorders Of Respiratory System

1. Which of the following match is correct?

A. Emphysema : reduction of surface area of alveoli

B. Pneumonia : occupational disease with asbestos

C. Silicosis : inflammation of alveoli

D. Asthma : excessive secretion of bronchial mucus

Answer: A

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2. Cigarette smoking increases the risk of

A. jaundice

B. emphysema

C. SARS

D. pneumonia

Answer: B

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3. Which one of the following gives the correct description of a health disorder?

A. Asthma- Inflamniation of pleural membranes of the lung

B. Jaundice - Bilirubin is not produced in the body

C. Emphysema- Alveolar walls are damaged

D. Constipation- Increased frequency of bowel movement

Answer: C

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4. Difficulty in breathing causes wheezing due to constriction of bronchi and bronchioles in case of

A. Asthma

B. Emphysema

C. Bronchitis

D. Pneumonia

Answer: A

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5. Major cause for the respiratory disorder, characterized by decreased respiratory surface area is

A. Tobacco chewing

B. Hypersensitivity

C. Bacteria

D. Tobacco smoking

Answer: D

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6. Long exposure to dust causes inflammation leading to

A. Fibrosis

B. Decreasing respiratory surface area

C. Accumulation of mucus

D. Inflammation of bronchi

Answer: A

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7. Which of the following is a respiratory disease?

A. Polio

B. Cancer

C. Emphysema

D. Arthritis

Answer: C

Watch Video Solution

8. Which of the following is not a COPD?

A. Pneumonia

B. Asthma

C. Bronchitis

D. Emphysema

Answer: A

Watch Video Solution

9. Incidence of Emphysema - a respiratory disorder is high in cigarette smokers. In such cases

A. The bronchioles are found damaged

B. The alveolar walls are found damaged

C. The plasma membrane is found damaged

D. The respiratory muscles are found damaged

Answer: B

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Exercise Ii Respiratory Organs

1. Ciliated epithelium lining the trachea and bronchi is advantageous because

A. Cilia act as sensory hairs

B. Cilia increase the surface area of absorption

C. Cilia kill foreign microbes

D. Ciliary movement propels the mucus and foreign particle towards the larynx

Answer: D

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2. Which of the following pairs of parts are formed by the same type of epithelium?

A. Trachea - Bronchiole

B. Pharynx- stomach

C. Pleura -Alveoli

D. Alveoli-intestinal villi

Answer: C

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3. Common passage for food and air in humans is

A. Oesophagus

B. Nasopharynx

C. Laryngopharynx

D. Larynx

Answer: C

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4. Trachea divides into bronchi at the level of

A. 5^{th} vertebra

B. 12^{th} vertebra

C. 10^{th} vertebra

D. 17^{th} vertebra

Answer: B

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5. Choose correct statement about anatomical arrangement of lungs.

A. They are surrounded by axial skeletal and appendicular skeletal bones

B. They are surrounded by appendicular skeleton only

C. They are surrounded by axial skeleton only

D. They are surrounded by axial skeleton and diaphragm

Answer: D

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6. Twisted bones of nasal chambers are

A. Choanae

B. Conchae

C. Rima glottidis

D. Mediastinum

Answer: B

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7. In alcohol fermentation

A. carbon dioxide is taken in

B. oxygen is taken in

C. oxygen is given out

D. carbon dioxide is given out

Answer: D

Watch Video Solution

8. Rima glottidis is the opening in between

A. external nares

B. internal nares

C. conchae

D. vocal folds

Answer: D

Watch Video Solution

9. Schneiderian membrane is found in

A. loop of Henle

B. trachea

C. bowman's capsule

D. nasal mucosa

Answer: D

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10. The metal in haemocyanin is

A. Fe

B. Cu

C. Co

D. Ni

Answer: B

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11. Number of laryngeal cartilages, primary bronchi, vocal cords (true plus false), lobes of the lungs (right plus left) respectively in man are

A. 9, 2, 4, 5

B. 2, 2, 2, 2

C. 6, 4, 2,9

D. 2, 4, 4, 2

Answer: A

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12. The following are the two statements regarding alveolar fluid:

(a) It contains a surfactant that reduces the tendency of alveoli to collapse.

(b) Surfactant in the alveolar fluid lowers the surface tension.

Of the above statements, which one of the following options is correct?

A. (b) is correct but (a) is false

B. Both (a) and (b) are correct

C. (a) is correct but (b) is false

D. Both (a) and (b) are false

Answer: B

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13. Which of the following respiratory organs are not supplied with blood vessels?

A. The gills of a shark

B. The tracheae of a locust

C. The lungs of a rabbit

D. The skin of an earthworm

Answer: B

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14. Double ventilation occurs in the lungs of

A. Amphibians

B. Birds

C. Reptiles

D. Mammals

Answer: B

Watch Video Solution

15. Haemocyanin pigment is found in

A. Insecta

B. Annelida

C. Nematoda

D. Crustacea

Answer: D

Watch Video Solution

16. The total number of alveoli present in both the lungs of man is

A. 30 lakh

B. 30 million

C. 400 million

D. 300 million

Answer: D

Watch Video Solution

17. The number of lobes in the right and left lung of man respectively are

A. 2 & 3

B. 3& 2

C. 4 & 2

D. 2 & 4

Answer: B

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18. Two friends are eating together on a table. One of them suddenly starts coughing while swallowing some food. This coughing would have been due to improper movement of

A. Neck

B. Tongue

C. Epiglottis

D. Diaphragm

Answer: C

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19. Mammalian RBC doesn't utilize the received oxygen and completely transfer it to tissue cells because of

A. Biconcave shape

B. Enucleate

C. absence of mitochondria

D. absence of haemoglobin

Answer: C

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20. Gland associated with olfactory epithelium are

A. Bartholin's glands

B. Bowman's glands

C. Cowper's glands

D. Brunner's glands

Answer: B

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21. The region of lung through which blood vessels, nerves enter/exit the lung is

A. hilum

B. cardiac notch

C. mediastinum

D. alveoli

Answer: A

 Watch Video Solution

22. Vertebrate lungs arise from

A. pharynx

B. alveoli

C. skin

D. ribs

Answer: A

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23. Nasal cavity and oral cavity are separated by

A. nasal septum

B. diaphragm

C. hard palate

D. mediastinum

Answer: C

Watch Video Solution

24. Nasopharynx receives these openings

A. Conchae

B. Choanae

C. Columella auris

D. Larynx

Answer: B

Watch Video Solution

25. Cardiac notch is present in

A. atria

B. cardiac stomach

C. left lung

D. right lung

Answer: C

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26. Which one of the following statements is incorrect?

A. The principle of countercurrent flow facilitates efficient respiration in gills of fishes

B. The residual air in lungs slightly decreases the efficiency of respiration in mammals

C. The presence of non-respiratory air sacs, increases the efficiency of respiration in birds

D. In insects, circulating body fluids serve to distribute oxygen to tissues

Answer: D

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Exercise Ii Mechanism Of Breathing

1. Which of the following pulmonary volumes cannot be measured by spirometer?

A. Tidal volume

B. Inspiratory reserve volume

C. Expiratory reserve volume

D. Residual volume

Answer: D

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2. Total lung capacity =

A. Tidal Volume + Inspiratory Reserve Volume + Expiratory Reserve Volume

B. Inspiratory Capacity + Functional Residual Capacity

C. Vital Capacity - Residual Volume

D. Residual Volume + Inspiratory Reserve Volume + Expiratory Reserve Volume

Answer: B

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3. Function of conducting part of respiratory system is

A. clearing dust particles from inhaled air

B. humidifying inhaled air

C. bringing inhaled air to body temperature

D. all of these

Answer: D

Watch Video Solution

4. Between breaths, the intrapleural pressure is approximately _____ mmHg less than atmospheric pressure.

A. 1

B. 4

C. 8

D. 10

Answer: B

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5. Hiccups can be best described as

A. forceful sudden expiration

B. forceful contraction of intercostal muscles during deep breathing

C. vibration of soft palate during breathing while sleeping

D. jerky incomplete inspiration

Answer: D

 Watch Video Solution

6. Anatomic dead space in the respiratory tract of man is about

A. 1.5 L

B. 500 mL

C. 250 mL

D. 150 ml

Answer: D

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7. A person suffers punctures in his chest cavity in an accident, without any damage to the lungs, its effect could be

A. reduced breathing rate

B. rapid increase in breathing rate

C. no change in respiration

D. cessation in breathing

Answer: D

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Exercise Ii Exchange Of Gases

1. Difficulty in breathing on high mountains is due to

A. Decrease in pO_2

B. Increase in CO_2 concentration

C. Decrease in amount of O_2

D. All of these

Answer: A

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2. People living at sea level have around 5 million RBC per cu.mm of their blood where as those living at an altitude of 5400 metres have

around 8 million. This is because at high altitude

A. People eat more nutritive food, therefore more RBC are formed

B. People get pollution free air to breathe and more oxygen is available

C. Atmospheric O_2 level is less and more RBC are needed to absorb the required amount of O_2 to survive

D. There is more UV radiation which enhances RBCs production

Answer: C

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

A. passive transport

B. active transport

C. osmosis

D. simple diffusion

Answer: D

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4. Which two of the following changes (1-4) usually tend to occur in the plain dwellers when they move to high altitudes?

(a) Increase in RBC size

(b) Increase in RBC production

(c) Increase in breathing rate

(d) Increased oxygen-binding capacity of haemoglobin

A. b&c

B. c&d

C. a & d

D. b&d

Answer: A

Watch Video Solution

Exercise Ii Transport Of Gases

1. Hamburger's phenomenon is also known as

A. chloride shift mechanism

B. sodium - potassium pump

C. carbonic acid shift mechanism

D. hydrogen shift mechanism

Answer: A

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2. Bohr effect is related with

A. reduced carbon level in lymph

B. reduced oxygen level in haemoglobin

C. oxidised phosphorus level in blood

D. reduced carbon level in blood

Answer: B

 Watch Video Solution

3. Conditions responsible for shifting of O_2 dissociation curve away from Y-axis (Right side) are

A. LowpO_2

B. High pCO_2

C. High temperature

D. All

Answer: D

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4. Which of the following is an amphoteric molecule in man?

A. Carbonic anhydrase

B. Haemocyanin

C. Haemoglobin

D. Albumin

Answer: C

 Watch Video Solution

5. Reverse chloride shift begins at the

A. Venular end of pulmonary capillary

B. Arteriolar end of systemic capillary

C. Venular end of systemic capillary

D. Arteriolar end of pulmonary capillary

Answer: D

 Watch Video Solution

6. Unloading of oxygen is relatively more at the following areas

A. Lungs

B. Smooth muscles

C. Skeletal muscles

D. Gills

Answer: C

Watch Video Solution

7. The compound, which is soluble in water but does not impede the oxygen transportation is

A. NO

B. SO_2

C. CO

D. SO_3

Answer: A

Watch Video Solution

8. How much amount of oxygen can bind to one gram of haemoglobin?

A. 20 ml

B. 1.34 ml

C. 40 ml

D. 13.4 ml

Answer: B

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9. When a man inhales air containing normal concentration of O_2 as well as CO he suffers from suffocation because

A. CO reacts with O_2 reducing its percentage in air

B. Haemoglobin combines with CO instead of O_2 and forms carboxyhaemoglobin

C. CO affects diaphragm and intercostal muscles

D. CO affects the nerves of the lungs

Answer: B

 Watch Video Solution

10. What is the oxidation state of iron in haemoglobin?

A. Fe^{-}

B. Fe^{2+}

C. Fe^{3+}

D. Fe^{4+}

Answer: B

Watch Video Solution

11. Which of the following is not true about foetal haemoglobin?

A. It is a tetramer and consists of two alpha subunits and two beta subunits

B. Its oxygen-affinity is more than that of adult haemoglobin

C. Its oxygen-haemoglobin dissociation curve is to the left of the maternal oxygen haemoglobin dissociation curve.

D. It binds BPG less strongly than does adult haemoglobin

Answer: A

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12. Haemoglobin acts as a buffer due to the presence of

A. Lysine

B. Histidine

C. Glutamine

D. Aspartic acid

Answer: B

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13. 2,3 bispshosphoglycerate

A. increases affinity of Hb for CO_2

B. increases affinity of Hb for CO

C. increases affinity of Hb for O_2

D. decreases affinity of Hb for O_2

Answer: D

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Exercise Ii Regulation Of Respiration

1. The state, during which the respiratory centre is inhibited, is termed as

A. anoxia

B. asphyxia

C. suffocation

D. choking

Answer: A

 Watch Video Solution

2. Select the option that correctly describes the location and function of a respiratory centre.

A. Pneumotaxic centre - Pons - Reduces the duration of inhalation

B. Respiratory rhythm centre - Cerebellum - Establishes the basic respiratory rhythm

C. Apneustic centre - Midbrain - Sends stimulatory impulses to the inspiratory centre

D. Expiratory centre - Medulla - Stimulates contraction of diaphragm

Answer: A

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3. The duration of inhalation is shortened by signals from

A. pneumotaxic area

B. apneustic area

C. inspiratory area

D. expiratory area

Answer: A

Watch Video Solution

4. When 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

Answer: D

 Watch Video Solution

Exercise Ii Disorders Of Respiratory System

1. Which one of the following diseases does not affect the lower respiratory tract?

A. Common cold

B. Emphysema

C. Bronchitis

D. Asthma

Answer: A

Watch Video Solution

2. Which of the following disorders results in increased residual volume?

A. Emphysema

B. Pneumonia

C. Coryza

D. Tuberculosis

Answer: A

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3. Which of the following has been declared a killer disease under Factory Act?

A. Tuberculosis

B. Asbestosis

C. Shigellosis

D. Asthma

Answer: B

 Watch Video Solution

4. Severe Acute Respiratory Syndrome (SARS)

A. is caused by a variant of Pneumococcal pneumonia

B. is caused by a variant of the common cold virus (corona virus)

C. is an acute form of asthma

D. affects non-vegetarians much faster than the vegetarians

Answer: B

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5. Many visitors to the hills suffer from skin and allergy problems because

A. Percentage of oxygen is low at high altitudes

B. Partial pressure of oxygen is low at high altitudes

C. They exhibit physiological polycythemia

D. Conifer trees produce a large quantity of wind - borne pollen grains

Answer: D

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6. An asthmatic patient has difficulty in breathing. Which of the following would you administer to the patient? Why?

A. Histamine to cause vasodilation in the alveoli

B. Norepinephrine, to contract smooth muscles in the bronchioles

C. Antihistamine, to counteract the broncho-constriction caused by histamine

D. Acetylcholine, to cause bronchoconstriction

Answer: C

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7. The blue baby' syndrome results from

A. Methaemoglobin

B. Excess of chlorides

C. Excess of dissolved oxygen

D. Excess of TDS

Answer: A

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8. Increased asthmatic attacks in certain seasons are related to

A. Low temperature

B. Inhalation of seasonal pollen

C. Hot and humid environment

D. Eating fruits preserved in tin containers

Answer: B

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Exercise Ii Miscellaneous

1. When proteins are respiratory substrate, RQ will be

A. 20

B. 1.0

C. 0.8

D. 1.5

Answer: C

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2. Osphresiology is the study of sense of

A. Taste

B. Pain

C. Vision

D. Smell

Answer: D

Watch Video Solution

3. RQ means

A. ratio of CO_2 produced to O_2 utilized

B. consumption of CO_2 per minute

C. consumption of O_2 per minute

D. ratio of heat and O_2 consumption

Answer: A

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4. Blood analysis of a patient reveals an unusually high quantity of carboxyhaemoglobin content. The patient

most likely has been inhaling polluted air containing unusually high content of

A. carbon disulphide

B. chloroform

C. carbon dioxide

D. carbon monoxide

Answer: D

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Exercise Iii Previous Aipmt Neet Questions

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

A. Residual volume

B. Inspiratory reserve volume

C. Tidal volume

D. Expiratory reserve volume

Answer: A

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2. Which of the following cannot be measured by spirometry?

A. Tidal volume

B. Inspiratory reserve volume

C. Residual volume

D. Vital capacity

Answer: C

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3. A pollution can result in Emphysema, which is

A. Chronic damage to air sacs or alveoli leading to abnormal reduction in respiratory surface area

B. Persistant inflammation and damage to the cells lining the bronchi and bronchioles

C. An allergic reaction causing muscle spasms in the bronchial walls

D. Damage to any Lung tissue causing increase in elasticity of the air sacs

Answer: A

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4. Name the chronic respiratory disorder caused mainly by cigarette smoking

A. Emphysema

B. Asthma

C. Respiratory acidosis

D. Respiratory alkalosis

Answer: A

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5. Reduction in blood pH will

A. Reduce the rate of heart beat

B. Reduce the blood supply to the brain

C. Decrease the affinity of haemoglobin with oxygen

D. Release bicarbonate ions by the liver

Answer: C

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

A. equal to that in the blood

B. more than that in the blood

C. less than that in the blood

D. less than that of carbon dioxide

Answer: B

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7. Lungs do not collapse between breaths and w some air always remains in the lungs which can never be expelled because

A. there is a negative pressure in the lungs

B. there is a negative intrapleural pressure pulling at the lung walls

C. there is a positive intrapleural pressure

D. pressure in the lungs is higher than the atmospheric pressure

Answer: B

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8. 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

Answer: D

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Watch Video Solution

9. When you hold your breath, which of the following gas changes in blood would first lead to the urge to breathe?

A. Falling CO_2 concentration

B. Rising CO_2 and falling O_2 concentration

C. Falling O_2 concentration

D. Rising CO_2 concentration

Answer: D

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10. 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 R.B.C.

D. As carbamino - haemoglobin

Answer: A

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11. 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 pneumotaxic 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 (CO_2) is carried by haemoglobin as carbamino haemoglobin

Answer: C

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12. Why people migrate from place to place? Is there any families migrate from your village for employment? What about the position of remaining family members?

A. Have more RBCs and their haemoglobin in has a lower binding affinity to O_2

B. Are not physically fit to play games like football

C. Suffer from altitude sickness with symptoms like nausea, fatigue, etc.

D. Have the usual RBC count but their haemoglobin has very high binding affinity to O_2

Answer: A

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13. 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

Answer: A

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14. 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% as carbamino-haemoglobin and 30% as bicarbonate

D. Carbamino-haemoglobin in RBCs

Answer: A

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15. Which one of the following a possibility for most of us in regard to breathing, by making a conscious effort?

A. One can breathe out air totally without oxygen

B. One can breathe out air through Eustachian tube by closing both nose and mouth

C. One can consciously breathe in and breathe out by moving the diaphragm alone, without moving the ribs at all

D. The lungs can be made fully emply by forcefully breathing out all air from them

Answer: C

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16. What is true about RBCs in humans?

A. They carry about 20-25 per cent of CO_2

B. They transport 99.5 per cent of O_2

C. They transport about 80 per cent oxygen only and the rest 20 per cent of it is transported in dissolved state in blood plasma

D. They do not carry CO_2 at all

Answer: A

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17. What is vital capacity of our lungs?

A. Inspiratory reserve volume plus expiratory reserve volume

B. Total lung capacity minus residual volume

C. Inspiratory reserve volume plus tidal volume

D. Total lung capacity minus expiratory reserve volume

Answer: B

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18. The haemoglobin of a human foetus

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 an adult

D. Its affinity for oxygen is the same as that of an adult

Answer: B

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