BIOLOGY

NEET & AIIMS

BREATHING AND EXCHANGE OF GASES

Example

1. Which is the respiratory organ of earthworm ?

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2. Write down the term used for respiratory organs of insects

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3. Name the organ which helps in sound production

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4. Why is trachea surrounded by cartilaginous rings ?

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5. What happens to the volume of thoracic cavity when muscle fibres of diaphragm contract ?

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6. Normal breathing rate of a healthy human is

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7. What is the value of expiratory reserve volume (ERV) ?

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8. Define tidal volume

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9. What is respiratory capacity ?

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10. Which is the primary site for exchange of gases ?

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11. How are gases like O_2 and CO_2 exchanged in our boby ?

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12. Why is O_2 gas passed from atmospheric air to alveoli ?

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13. What is the medium of transport for O_2 and CO_2 ?

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14. What is the percentage of O_2 transported in bound from ?

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15. What is O_2 -dissociation curve ?

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16. Which compound is formed when O_2 binds with Hb ?

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17. Which is the main cantre of brain that regulates the repiration rate ?

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18. Where is respiratory rthythm centre located in brain ?

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19. A person faces difficulty in breathing and produces sound during breathing . Name the disease from

which he surffers

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20. What is the main cause of Emphysema ?

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Try Yourself

1. Name two group of animals that respire via gils ?

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2. Write the respiratory organ of todpole larve of frog .

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3. What is the main characteristic of gills ?

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4. Which group of animals have well-developed respriatory system ?

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5. In Which part nasal chamber opens ?

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6. What is the role of pleural membranes ?

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7. Which is the first step of respiration ?

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8. What is glottis ?

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9. What is the effect on the volume of pulmonary cavity when valume of thoracic cavity increases ?

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10. What happens to ribs and sternum during contraction of extermal intercostal muscles ?

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11. Name the additional muscles which help in increasing the strength of breathing .

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12. What happens when the pressure within the pulmonary cavity is more than the atmospheric air ?

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13. What is the value of tidal volume in a normal healthy man per minute ?

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14. What is respiratory valume ?

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15. What are the factors on which vital capacity of lungs depend ?

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16. How can you estimate the value of functional residual capacity (FRC) ?

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17. In which of the following vital capacity is maximum ?

Athlete, Old man, Women and Asthmatic .

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18. Among all the respiratory volumes which one has lowest value ?

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19. Which epithelium lines the alveoli ?

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20. Which gas, out of O_2 and CO_2 is more soluble ?

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21. What is the thickess of diffusion membrane ?

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22. How many layers form the diffusion membrane ?

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23. Why is CO_2 gas transferred from alveoil the atmospheric air ?

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24. Which gas has higher partial pressure in tissues ?

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25. What is the shape of O_2 dissociation curve for haemoglobin ?

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26. Write any two factors that are favourable for the formation of oxyhaemoglobin .

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27. Which compound is formed when O_2 binds with Hb ?

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28. What are the conditions responsible for more binding of CO_2 with Hb in tissues ?

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29. What is the percentage of CO_2 transported as bicarbonate ions ?

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30. Write down the reaction facilitated by an enzyme carbonic anhydrase present in RBCs .

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31. How much CO_2 is delivered to the alveoli by every 100 ml of deoxygenated blood ?

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32. what is the lcoation of pneumataxic centre in brain ?

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33. How pneumotaxic centre regulates the respiratory rate ?

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34. where is the chemosensitive area location in the brain which regulates the respiration ?

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35. To which substance chemosensitive area is highly sensitive ?

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36. What happens to bronchi and bronchiloles during asthma ?

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37. why is surface area for exchange of gases decreased during Emphysema ?

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38. Give two examples of occupational respiratory disorders .

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39. How can a person prevents himself from occupational respiratory diseases ?

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Exercise

1. Which of the following structure is not supported by in complete cartilaginous rings.

A. Trachea

B. Secondary bronchi

C. Terminal bronchioles

D. Primary bronchi

Answer: C

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2. Trachea is a straight tube extending up to the mid-thoracic cavity, which divides at the level of

A. 2^{nd} cervical vertebra

B. 5^{th} cervical vertebra

C. 5^{th} thoracic vertebre

D. 5^{th} lumbar vertebra

Answer: C

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3. Outer pleural membrane is in close contact with

A. Surface of lungs

B. Thoracic cavity

C. Both (1) & (2)

D. Alveoli

Answer: B

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4. The volume of air remaining in the lungs even after a forcible expiration is

A. Expiratory reserve volume

B. Expiratory capacity

C. Residual volume

D. Both (1) & (2)

Answer: C

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5. The maximum volume of air a person can brathe n after a forced expiration is

A. Vital capacity

B. ERV + TV + IRV

C. TLC - RV

D. All of these

Answer: D

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6. Which of the following statement is incorrect w.r.t the mechanism of breathing ?

A. Movement of air into and out of the lungs is carried out by creating a pressure gradient between the

lungs and the atmosphere

B. Inspiration is initiated by contraction of diaphragm which increases the volume of thoracic chamber

C. The contraction of external intercostal muscles lifts up the ribs and the sternum causing decrease in

the volume of thoracic chamber

D. On an average, a healthy human breathes 12 - 16 times/minute.

Answer: C

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7. The thoracic cage of man is formed of

A. Ribs and sternum

B. Ribs, sternum and thoracic vertebrae

C. Ribs, sternum and lumbar vertebrae

D. Ribs and thoracic vertebrae

Answer: B

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8. Trachea is lined with incomplete rings of

A. Fibrous cartilage

B. Calcified cartilage

C. Elastic cartilage

D. Hyaline cartilage

Answer: D

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9. Lungs have a large number of alveoli for

A. Having spongy texture and proper shape

B. More surface area for diffusion of gases

C. More space for increasing volume of inspired air

D. More nerve supply

Answer: B

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10. In mammals ventilation movements of lungs are governed by

A. Muscular wall of lungs

B. Intercostal muscles

C. Diaphragm

D. Diaphragm and intercostal muscles

Answer: D

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11. What will be the pO_2 and pCO_2 in the atmospheric air compared to those in the alveolar air?

A. pO_2 lesser, pCO_2 higher

B. pO_2 higher, pCO_2 lesser

C. pO_2 higher, pCO_2 higher

D. pO_2 lesser, pCO_2 lesser

Answer: B

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12. What is the partial pressure of oxygen and carbon dioxide in atmospheric air ?

A. pO_2 159 mm hg, pCO_2 0.3 mm Hg

B. pO_2 104 mm Hg, pCO_2 40 mm Hg

C. pO_2 40 mm Hg, pCO_2 45 mm Hg

D. pO_2 95 mm Hg, pCO_2 40 mm Hg

Answer: A

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13. Diffusion membrane is made up of which of the following layers gt

A. Thin squamous epithelium of alveoli

B. Basement membrane

C. Endothelium of alveolar capillaries

D. All of these

Answer: D

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14. Which of the following statement is incorrect about the transport of gases ?

A. About 97 percent of O_2 is transported by RBCs in the blood

B. 3 percent of O_2 is carried in dissolved state in the plasma

C. 20-25 percent of CO_2 is transported by RBCs in the form of carbaminohaemoglobin

D. 70 percent carbon dioxide is carried in dissolved state in plasma

Answer: D

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15. Binding of oxygen with haemoglobin is primarily related to :

A. Partial pressure of CO_2

B. Partial pressure of O_2

C. hydrogen ion concentration

D. Temperature

Answer: B

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16. Which of the following factorss ar favorable for the formation of oxyhemoglobin ?

(a) High p_{O_2}, low p_{CO_2}

(b) Lesser H^+ concentration, lower temperature

(c) Low p_{O_2}, high CO_2

(d) High H^+ , higher temperature

A. (A) only

B. (A) and (B)

C. (B) and (C)

D. (C) and (D)

Answer: B

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17. Under which condition the oxygen dissociation curve will move towards the right ?

A. Low pO_2

B. High CO_2

C. High H^+ concentration and higher temperature

D. All of these

Answer: D

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18. Tick mark of incorrect statement .

A. Every 100 ml of deoxygenated blood delivers approximately 4 ml of CO_2 to the alveoli

B. Carbonic anhydrase is present in very high concentration in RBC

C. High pCO_2 and low pO_2 in tissues help in binding of carbon dioxide

D. CO_2 is carried in haemoglobin as carboxyhaemoglobin

Answer: D

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19. Carbon dioxide is carried in the blood mainly as

A. Sodium bicarbonate

B. Potassium bicarbonate

C. Carbamino- haemoglobin

D. Dissolved gas in plasma

Answer: A

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20. the haemoglobin of a human foetus

A. Has higher affinity for oxygen than that of an adult

B. Has a lower affinity for oxygen than that of the adult

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

D. Has two protein sub-units instead of four

Answer: A

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21. In which of the following disorders there is difficulty in breathing causing wheezing due to

inflammation of

bronchi and bornchioles?

A. Emphysema

B. Asthma

C. Pleurisy

D. Tuberculosis

Answer: B

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22. Where is the respiratory rhythm centre present that has signigicant ability to maintain the respiratory

rhythm

to suit the demands of the body tissues? To suit the demands of the body tissues?

A. Cerebrum

B. Medulla

C. Pons varoli

D. Cerebellum

Answer: B

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23. Which of the following is a chronic respiratory disorder in which alveolar walls are damaged due to which

respiratory surgace is decreased? One of the major causes of this disease is cigarette smoking

A. Asthma

B. Emphysema

C. Silicosis

D. Pneumonia

Answer: B

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24. Pneumotaxic centre can moderate the functions of the respiratory rhythm centre. It is present in _____

A. Medulla

B. Cerebrum

C. Pons

D. Cerebellum

Answer: C

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25. Which of the following can activate the chemosensitive area situated adjacent to the rhythm centre?

A. High CO_2 concentration, less hydrogen ion concentration

B. HighCO_2 and high hydrogen ion concentration

C. Less CO_2 High H^+ ion concentration

D. Less CO_2 less H^+ ion concentration

Answer: B

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26. Which of the following can alter respiratory mechanism?

A. Pneumotaxic centre

B. Chemosensitive centre

C. Respiratory rhythm centre

D. Both (1) & (2)

Answer: D

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27. Which of the following is not an occupational disease?

A. Silicosis

B. Asbestosis

C. SARS

D. Pneumoconiosis

Answer: C

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28. Occupational diseases are characterised by fibrosis of lungs in

A. Upper part

B. Lower part

C. Base of lungs

D. Mediastinum

Answer: A

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29. Which of the following is pollution related disorder?

A. Pneumonia

B. SARS

C. Fluorosis

D. Leprosy

Answer: C

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30. The blue baby syndrome results from

A. Excess of total dissolved solids

B. Excess of chloride

C. Methaemoglobin

D. Excess of dissolved oxygen

Answer: C

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Assignment Section A

1. The process of oxidation of glucose during which CO_2, H_2O and energy are produced is known as

A. Breathing

B. Inspiration

C. Respiraton

D. Expiration

Answer: C

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2. The respiratory organs vary in different animals due to their

A. Nutrition

B. Habitat and level of organisation

C. Excretion

D. Reproduction

Answer: B

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3. Which of the following are the respiratory organs of insects?

A. Tracheae

B. Gills

C. Cuticle

D. Lungs

Answer: A

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4. Which animal among the following respires via buccal cavity, moist skin and lungs?

A. Hydra

B. Frog

C. Sycon

D. Earthworm

Answer: B

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5. Respiratiry organs in aquatic arthropods like cray fish, prawn and molluscs like Unio are

A. Body wall

B. Lungs

C. Tracheae

D. Gills

Answer: D

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6. Which of the following has most well- devwloped respiratory system?

A. Mammals

B. Invertebrates

C. Amphibians

D. Hemichordates

Answer: A

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7. Which structure in human respiratory system is involved in conditioning of air?

A. Internal nares

B. Nasal chamber

C. Larynx

D. Trachea

Answer: B

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8. Which of the following volume is not included in vital capacity

A. ERV

B. TV

C. IRV

D. RV

Answer: D

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9. A thin- elastic cartilabinous flap which prevente the entry of food into the larynx is known as

A. Glottis

B. Wind pipe

C. Epiglottis

D. Bronchiole

Answer: C

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10. At which level of thoracic vertebra, trachea divides

A. 2^{nd} thoracic vertebra

B. 5^{th} thoracic vertebra

C. 3^{rd} thoracic vertebra

D. 4^{th} thoracic vertebra

Answer: B

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11. Trachea divies into right and left

A. Secondary bronchi

B. Tertiary bronchi

C. Bronchioles

D. Primary bronchi

Answer: D

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12. Which menbrane covers the lungs and provide protection?

A. Pericardium

B. Renal capsule

C. Pleura

D. Epineurium

Answer: C

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13. Where are lungs situated in human body?

A. Abdominal cavity

B. Thoracic cavity

C. Coelomic cavity

D. Pleural cavity

Answer: B

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14. What is the last step involved in respiration?

A. Diffusion of gases

B. Breathing

C. Utilisation of O_2 by body cells and resultant releasa of CO_2

D. Transport of gases

Answer: C

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15. Inspiration occurs when intra-pulmonary pressure is

A. Higher than atmospheric pressure

B. Lower than atmospheric pressure

C. Equal to atmospheric pressure

D. Zero compared to atmospheric pressure

Answer: B

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16. Which muscles help us to increase the strength of expiration?

A. Cardiac muscles

B. Abdominal muscles

C. Internal intercostal muscles

D. Both (2) & (3)

Answer: D

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17. The breathing rate of a normal healthy man is

A. 8- 18 times/min

B. 6- 12 times/min

C. 10- 24 times/min

D. 12- 16 times/min

Answer: D

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18. What is the value of tidal volume in a mormal healthy man?

A. Approximately 6000-8000 ml/min

B. 1000-1100 ml/min

C. 2500-3000 ml/min

D. Approximately 8000-12000 ml/min

Answer: A

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19. The volume of air remaining in the lungs even after a forcible expiration is

A. Tidal volume

B. Residual volume

C. Inspiratory reserve volume

D. Expiratiory reserve volume

Answer: B

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20. What is the main site of human respiratory system where exchange of gases occurs?

A. Alveoli

B. Bronchiole

C. Primary and secondary bronchi

D. Trachea

Answer: A

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21. Partial pressure for oxygen and CO_2 is represented as

A. $pOanspCO$

B. p_o and p_{co_2}

C. pO_2 and pCO_2

D. O_2p and CO_2p

Answer: C

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22. What will be the pO_2 and pCO_2 in the atmospheric air compared to those in the alveolar air?

(i) pO_2 lesser, pCO_2 higher

(ii) pO_2 higher, pCO_2 lesser

(iii) pO_2 higher, pCO_2 higher

(iv) pO_2 lesser, pCO_2 lesser

A. High pO_2 and low pCO_2

B. High pCO_2 and low pO_2

C. Both are equal $(pCO_2 = pO_2)$

D. Low pO_2 and low pCO_2

Answer: A

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23. What is the value of pCO_2 in atmospheric air, alveoli and tissues respectively?

A. 0.3 mm Hg, 40 mm Hg and 95 mm Hg

B. 95 mm Hg 40 mm Hg 159 mm Hg

C. 45 mm Hg, 0.3 mm Hg and 40 mm Hg

D. 0.3 mm Hg, 40 mm Hg and 45 mm Hg

Answer: D

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24. O_2 binds with haemoglobin od RBC to form

A. Carboxyhaemoglobin

B. Oxyhaemoglobin

C. Carbaminohaemoglobin

D. Aminohaemoglobin

Answer: B

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25. With which part of Hb, O_2 molecules bind?

A. Haem

B. Globin

C. Both haem and globin

D. Amino group of globin

Answer: A

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26. $Hb + O_2 \underset{(2)}{\overset{(1)}{\Longleftrightarrow}} HbO_2$

Select (1) and (2) from the given options

A. (1) is tissues and (2) is lungs

B. (1) is lungs and (2) is blood

C. (1)is blood and (2) is lungs

D. (1) is lungs and (2) is tissues

Answer: D

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27. A graph is plotted between pO_2 and percentage saturation of Hb with O_2 from Hb?

A. O_2 association curve

B. $CO_2 - O_2$ dissociation curve

C. O_2 dissociation curve

D. $CO_2 - O_2$ association curve

Answer: C

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28. Which factors affect the dissociation of O_2 from Hb?

A. pH, pO_2, pCO_2 and temperature

B. Only pH

C. Salinity, temperature and pCO_2

D. HCO_3^- ions concentration, pH and salinity

Answer: A

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29. High percentage of CO_2 is transported in dissolved

form as compared to O_2 This is because

A. O_2 has high solubility in plasma

B. CO_2 has high solubility in plasma

C. pCO_2 is high in blood than pO_2

D. CO_2 has low solubility in plasma

Answer: B

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30. Which factor in tissues favours the formation of HCO_3^- and H^+ ions in the blood?

A. Low pCO_2

B. High pO_2

C. High pCO_2

D. High alkalinity

Answer: C

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31. How much CO_2 is delivered to the alveoli by every 100 ml of deoxygenated blood?

A. 6 ml

B. 4 ml

C. 5 ml

D. 3 ml

Answer: B

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32. Which enzyme os presemt om RBCs amd p,asma to catalyse the given reaction?

$$CO_2 + H_2O \Leftrightarrow \underset{\text{Carbonic acid}}{H_2CO_3} \Leftrightarrow H^+ + HCO_3^-$$

A. Carbonic anhydrase

B. Catalase

C. Aldolase

D. Carboxylase

Answer: A

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33. A specialised centre known as raspiratory rhythm centre regulates respiration. It is located in

A. Pons

B. Medulla oblongata

C. Cerebrum

D. Cerebellum

Answer: B

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34. Which substances when present in high level can activate the chemosensitive area present adjacent to rhythm centre?

A. CO_2 and O_2

B. HCO_3^- ions and O_2

C. CO_2 and H^+ ions

D. H^+ and HCO_3^- ions

Answer: C

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35. Which of the following is an occupational respiratory disease?

A. Diphtheria

B. Pneumonia

C. Tuberculosis

D. Asbestosis

Answer: D

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Assignment Section B

1. Which group of animals respire through lungs?

A. Earthworm and insects

B. Sponges, coelenterates and flatworms

C. Fishes and aquatic arthropods

D. Reptiles, birds and mammals

Answer: D

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2. A pair of external nostrils present in humans opens out

A. Below the upper lips

B. Above the upper lips

C. Between upper and lower lips

D. Above the larynx

Answer: B

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3. Solubility of CO_2 is _____ times higher than that of O_2

A. 40 - 45

B. 20 - 25

C. 100 - 200

D. 200 - 300

Answer: B

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4. What are the characteristics of alveoli?

A. Very thin, irregular walled and highly vascularised

B. Thick and smooth membrane

C. Network of blood capillaries and thick-walled

D. Thick, regular walled and lack of blood vessels

Answer: A

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5. What is the function of respiratory part of human respiratory system?

A. It clears the incoming air from foreign particles

B. It brings the temperature of air upto the body temperature

C. It transports the atmospheric air

D. It exchanges O_2 and CO_2 between blood and atmospheric air

Answer: D

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6. Ventrally and laterally, the thoracic chamber is formed by

A. Diaphragm and sternum respectively

B. Ribs and sternum respectively

C. Sternum and ribs respectively

D. Vertebral column and diaphragm respectively

Answer: C

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7. During inspiration, the volume of thoracic caity increases because of

A. Contraction of diaphragm and external intercostal muscles

B. Relaxation of diaphragm and external intercostal muscles

C. Contraction of diaphragm and relaxation of external intercostal muscles

D. Relaxation of diaphragm and contraction of external intercostal muscles

Answer: A

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8. Volume of thoracic chamber increases in antero-prosterior and dorse-ventral axis in rabbit by

A. Contraction of diaphragm and external intercostal muscles respectively

B. Relaxation of diaphragm and external intercostal muscles respectively

C. Relaxation of diaphragm and abdominal muscles respectively

D. Contraction of abdominal muscles and relaxation of external infercostal muscles respectively

Answer: A

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9. What instrument helps in clinical assessment of pulmonary functions?

A. Sphygmomanometer

B. Stethoscope

C. Spirometer

D. Electrocardiograph

Answer: C

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10. Expiration occurs due to

A. Relaxation of diaphragm and external intercostal muscles

B. Contraction of abdominal intercostal muscles and diaphragm

C. Relaxation of abdominal and internal intercostal muscles

D. Contraction of diaphragm and relaxation of abdominal muscles

Answer: A

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11. What happens to the volume of pulmonary cavity when there is an increase in the volume of thoracic chamber?

A. It decreases

B. It increases

C. It remains same

D. First decreases and then increases

Answer: B

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12. Diaphragm is a dome-shaped muscular structure which separates

A. Coelomic cavity from pelvic cavity

B. Pleural cavity from thoracic cavity

C. Thoracic cavity from abdominal cavity

D. Pelvic cavity frome abdominal cavity

Answer: C

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13. What happens when pressure within the pulmonary

cavity is higher than the atmospheric pressure?

A. Inhalation of air

B. Expulsion of air

C. No inhalation and expulsion of air occurs

D. Lungs inflate and rupture

Answer: B

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14. An additional volume of air, a person can inspire by a forceful inspiration is known as

A. Inspiratory capacity

B. Expiratory capacity

C. Expiratory reserve volume

D. Inspiratory reserve volume

Answer: D

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15. Volume of air remains in the lungs after normal expiration is

A. ERV + RV

B. IRV + RV

C. RV + IRV + ERV

D. TV

Answer: A

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16. What is the value of pO_2 in alveoli and tissues respectively?

A. 104 mm Hg and 150 mm Hg

B. 45 mm Hg and 0.3 mm Hg

C. 104 mm Hg and 40 mm Hg

D. 95 mm Hg and 159 mm Hg

Answer: C

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17. Which are the three main layers that form the diffusion membrane?

A. Thin squamous epithelium of alveoli, basement membrane of bronchioles and basement substance

B. Thin squamous epithelium of alveoli endothelium of alveolar capillaries and the basement substance

C. Basement substance, cuboidal epithelium of alveoli and stratified epithelium of bronchiole

D. Ciliated epithelium of trachea, endothelium of capillaries and basement substance

Answer: B

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18. What is the percentage of O_2 transported in dissolved form through the plasma?

A. About 7%

B. About 3%

C. About 20-25%

D. About 15%

Answer: B

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19. How many O_2 bolecules can vind with single molecule og Hb?

A. 8

B. 6

C. 4

D. 4.5

Answer: C

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20. To which part of Hb, CO_2 binds?

A. Haem

B. Amino group of globin

C. Iron of haem group

D. Carboxy group of globin

Answer: B

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21. Which of the following condition is not reponsible for shifting the curve towards left?

A. High pO_2

B. Low pCO_2

C. Low temperature

D. High H^+ ion concentration

Answer: D

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22. Which factors favour the binding of CO_2 with Hb in tissues?

A. High pCO_2 and high pO_2

B. Low pCO_2 and high pO_2

C. Low pCO_2 and low pO_2

D. High pCO_2 and lowpO_(2)`

Answer: D

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23. Pneumotaxic center can moderate the functions of respiratory rhythm center by

A. Reducing the duration of inspiration

B. Increasing the duration of inspiration only

C. First increasing and then reducing the duration of expiration

D. Increasing the duration of expiration only

Answer: A

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24. A chronic disorder in which alveolar walls are damaged duw to excessive cigarette smoking is

A. Asthma

B. Emphysema

C. Silicosis

D. Bronchitis

Answer: B

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25. Which of the following is not a symptom of asthma?

A. Difficulty in breathing

B. Breathing noisily / wheezing

C. Alveolar walls are damaged

D. Inflammation of bronchi and bronchioles

Answer: C

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26. In mature mammalian erythrocytes, the respiration is

A. Aerobic

B. Anaerobic

C. Sometimes aerobic and sometimes anaerobic

D. Absent

Answer: B

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27. Which of the following is not a character of respiratory surface?

A. Thin, permeable to gases

B. Extensive

C. Least vascular

D. Moist

Answer: C

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28. Skin of man cannot act as respiratory organ because

A. It is dry

B. It is not thin

C. It is not permeable to O_2 and CO_2

D. All of these

Answer: D

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29. Adam's apple is another name for

A. Sound box in birds

B. Sound box in man

C. Epiglottis

D. Thyroid cartilage

Answer: D

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30. Ring - like cartilage of larynx is known as

A. Thyroid cartilage

B. Arytenoid cartilage

C. Cricoid cartilage

D. Cartilage of Santorini

Answer: C

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31. Which of the following prevents collapsing of Trachea

A. Muscles

B. Diaphragm

C. Ribs

D. Cartilaginous rings

Answer: D

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32. The number of alveoli in the human lungs has been estimated to be approximately

A. 100 million

B. 300 million

C. 125 million

D. 300 billion

Answer: B

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33. In human, oblique fissure is present in

A. Right lung

B. Lft lung

C. Both of these

D. None of these

Answer: C

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34. If a person exhales out forcefully by applying all his efforts, what will be the pulmonary volume inhaled by him immediately under normal condition without applying any extra effort ?

A. TV + IRV

B. TV only

C. TV + ERV

D. TV + IRV + ERV

Answer: C

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35. The amount of oxygen transported by 1L of blood under strenuous condition is approximately

A. 5 ml

B. 50 ml

C. 15 ml

D. 150 ml

Answer: D

Watch Video Solution

Assignment Section C

1. 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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2. Lungs do not collapse between breaths and 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 in higher than the atmospheric pressure

Answer: B

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

A. Respiratory alkalosis

B. Emphysema

C. Asthma

D. Respiratory acidosis

Answer: B

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4. Reduction in pH of blood will

A. Release bicarbonate ions by the liver

B. Reduce the rate of heart beat

C. Reduce the blood supply to the brain

D. Decrease the affinity of hemoglobin with oxygen

Answer: D

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5. Asthma may be attributed to

A. Accumulation of fluid in the lungs

B. Bacterial infection of the lungs

C. Allergic reaction of the mast cells in the lungs

D. Inflammation of the trachea

Answer: C

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

A. Rising CO_2 and falling O_2 concentration

B. Falling O_2 concentration

C. Rising CO_2 concentration

D. Falling CO_2 concentration

Answer: C

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7. Approximately seventy percent of carbon dioxide absorbed by the blood will be transported to the lungs

A. As bicarbonate inos

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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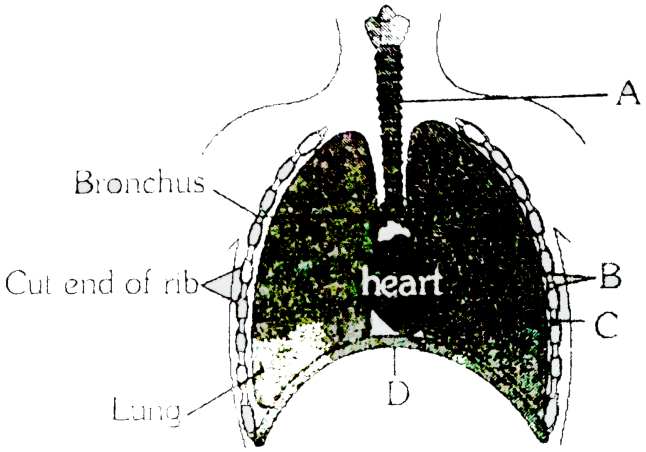
8. the figure shows a diagrammatic view of human respiratory system with labels A, B , C and D . Select the option which given correct identification and main

function and / or characteristic



A. B-pleural memrane-surround ribs on both sides to provide cushion against rubbing

B. C-Alveoli-thin walled vascular bag like structures for exchange of gases

C. D-lower end of longs-diaphragm pulls it down during inspiration

D. A-trachea-long tube supported by complete cartilaginous rings for conducting inspired air

Answer: B

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9. Which one of the following is the correct statement for respiration in humans ?

A. About 90% of carbon dioxide (CO_2) is carried by haemoglobin as carbamino-haemoglobin

B. Cigarette smoking may lead to inflammation of bronchi

C. Neural signals from pneumotaxic centre in pons region of brain can increase the duration of inspiration

D. Workers in grinding and stone-breaking industries may suffer, from lung fibrosis

Answer: D

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10. People who have migrated from the planes to an area adjoining Rohtang pass about six months back

A. Have the usual RBCs count but their haemoglobin has very high binding affinity to O_2

B. Have more RBCs and their haemoglobin has a lower binding affinity of O_2

C. Are not physically fit to play games like football

D. Suffer from altitude sickness with symptoms like nauses, fatigue, etc

Answer: B

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11. A large proportion of oxygen is left unused the human blood even after its uptake by the body tissue. This O_2

A. Helps in releasing more O_2 to the epithelial tissues

B. Acts as a reserve during muscular exercise

C. Raises the pCO_2 of blood to 75 mm of Hg.

D. Is enough to keep oxyhaemoglobin saturation at 96%

Answer: B

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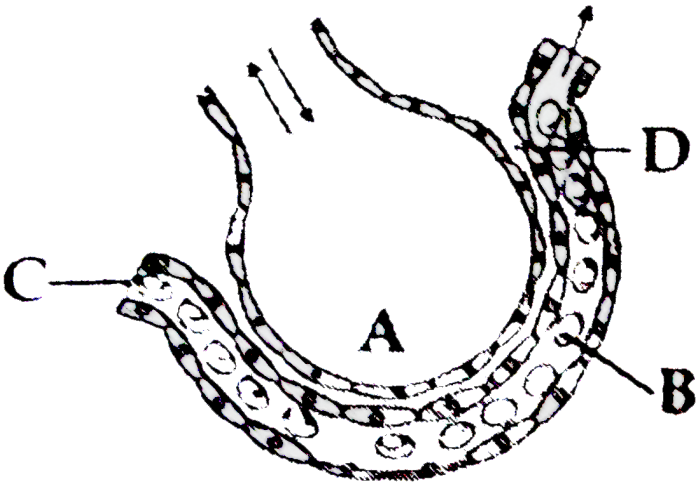
12. The figure given below shows a small part of human lung where exchange of gases takes place. In which one of the option given below, the one part A, B, C or D is correctly identified along with its functions



A. B: Red blood cell - transport of CO_2 mainly.

B. C: Arterial capillary - passes oxygen to lt brgt tissues

C. A: Alveolar cavity - main site of exchange of respiratory gases

D. D: Capillary wall - exchange of O_2 and CO_2 takes place here

Answer: C

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13. Bulk of carbon dioxide (CO_2) released from body tissues into the blood is present as

A. 70% carbamino-haemoglobin and 30% as bicarbonate

B. Carbamino-haemoglobin in RBCs

C. Bicarbonate in blood plasma and RBCs

D. Free CO_2 in blood plasma

Answer: C

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14. Which one of the following is a possibility for most of us in regards to breathing, by making a conscious effort

A. One can consciously breathe in and breathe out by moving the diaphragm alone, without

moving the ribs at all

B. The lungs can be made fully empty by forcefully breathing out all air from them

C. One can breathe out air totally without oxygen

D. One can breathe out air through eustachian tubes by closind both the nose and the mouth

Answer: A

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15. Which two of the following changes (A-B) usually tend to occur in the plain dwellers when they move to

high altitudes (3500 m or more)

(A) Increase in red blood cell size

(B) Increase in red blood cell production

(C) Increased breathing rate

(D) Increase in thrombocyte count

A. (a) & (b)

B. (b) & (c)

C. (c) & (d)

D. (a) & (d)

Answer: B

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16. listed below are four respiratory capacities (A-D) and four jumbled respiratory volumes of a normal human adult

Respiratory capacities	–	Respiratory volumes
Residual volume	–	2500 mL
Vital capacit	–	3500 mL
Inspiratory reserve volume	–	$1200mL$
Inspiratory capacity	–	$4500mL$

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

A. (a) 4500 mL, (b) 3500 mL

B. (b) 2500 mL, (c) 4500 mL

C. (c) 1200 mL, (d) 2500 mL

D. (d) 3500 mL, (a) 1200 mL

Answer: D

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17. what is vital capacity of our lungs

A. Total lungs capacity minus residual volume

B. Inspiratory reserve volume plus tidal volume

C. Total lungs capacity minus expiratory resserve volume

D. Inspiratory reserve volume plus expiratory reserve volume

Answer: A

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18. Increased asthmatic attacks in certain seasons are related to

A. Low temperature

B. Hot and humid encironment

C. Eating fruits preserved in tin containers

D. Inhalation of seasonal pollen

Answer: D

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19. People living at sea level have around 5 million RBC per cubic millimetre of their blood whereas those living at an altitude of 5400 metres have around 8 million. This is because at high altitude.

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

B. Atmospheric O_2 level is less and hence more RBCs are needed to absorb the required amount of O_2 to survive

C. There is more UV radiation which enhances RBC production

D. People eat more nutritive food, therefore more RBCs are formed

Answer: B

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20. Which one of the following statements is incorrect?

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

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

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

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

Answer: C

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21. The majority of carbon dioxide produced by our body cells is transported to the lungs -

A. Dissolved in the blood

B. As bicarbonates

C. As carbonates

D. attached to haemoglobin

Answer: B

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22. in man and mammals , air passes from outside into the lungs through

A. Nasal cabity, larynx, pharynx, trachea, bronchi, alveoli

B. Nasal cavity, larynx, pharyx, trachea,

bronchioles, alveoli

C. Nasal cavity, pharynx, larynx, trachea,

bronchioles, bronchi, alveoli

D. Nasal cabity, pharynx, larynx, trachea, bronchi

bronchioles, alveoli

Answer: D

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23. Lungs are enclosed in

A. Peritoneum

B. Perichondirum

C. Pericardium

D. Pleural membranes

Answer: D

Watch Video Solution

24. When a person brathes air through a tube directly into the trachea (tracheotomy) it may lead to serious lung crushing and infection due to

A. Cooling effect

B. Drying effect

C. Non filtering effect

D. All of these

Answer: D

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25. Pitch of the voice is lower in males than females as the vocal cords of man are

A. Thicker and longer

B. Thinner and longer

C. Thicker and shorter

D. Thinner and shorter

Answer: A

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26. Which of the following statement is not true for man?

A. Forceful expiration is an active process

B. Mammals have negative pressure breathing

C. Internal intercostal and abdominal muscles are muscles of forceful inspiration

D. Respiration excretes CO_2 water etc.

Answer: C

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

A. Muscular wall of lung

B. Diaphragm

C. Costal muscles

D. Both (2) & (3)

Answer: D

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28. In lungs, the air is separated from the venous blood through

A. Transitional epithelium of alveoli + squamous epithelium of blood vessel

B. Swuamous epithelium of alveoli + endothelium of blood vessel

C. Squamous epithelium of alveoli + cubical epithelium of blood vessel

D. Cubical epithlium of alveoli + columnar epithelium of blood vessel

Answer: B

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29. Which of the following wolume of capacity of lungs can't be measured directly by the spirometer?

A. Residual volume

B. Functional residual capacity

C. Total capacity

D. All of these

Answer: D

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30. Amount of air left in the lung after normal expiration is

A. Residual volume

B. Inspiratory reserve volume

C. Expiratory reserve volume

D. Functional residual capacity

Answer: D

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31. Minute Volume of Respiration (MVR) in a person can be defined as

A. Tidal volume $\times$ Breathing rate

B. (Tidal volume - Anatomic dead space) $\times$ Brathind rate

C. Vital capacity $\div$ Breathing rate

D. Vital capacity $\div$ Tidal volume

Answer: A

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32. 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 shallower

Answer: D

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33. The CO_2 content by volume, in the atmospheric air is about

A. $3.34\ \%$

B. $4\ \%$

C. $0.0314\ \%$

D. $0.34\ \%$

Answer: C

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34. Although much CO_2 is carried in blood, yet blood does not become acidic, because

A. CO_2 is continuously diffused through the tissues and is not allowed to accumulate

B. In CO_2 transport, blood buffers play an important role

C. CO_2 is absorbed by the leucocytes

D. CO_2 combines with water to form H_2CO_3 which is neutralized by $NaCO_3$

Answer: B

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35. The carbon dioxide is transported via blood to lungs mostly

A. In combination with haemogleobin only

B. Dissolved in blood plasma only

C. In the form of carbonic acid only

D. As carbaminohaemoglobin and as bicarbonates

Answer: D

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36. How the transport of O_2 and CO_2 by blood happens?

A. With the help of WBCs and blood serum

B. With the help of platelets and corpuscles

C. With the help of RBCs and blood plasma

D. With the help of RBCs and WBCs

Answer: C

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37. Blood analysis of a patient reveals an unusually high quantity of carboxyhemoglobin content. Which of the following conclusion is the most likely to be correct? The patient has been inhaling poliuted air containing unusually high content of

A. Carbon disulphide

B. Chloroform

C. Carbon dioxide

D. Carbon monoxide

Answer: D

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38. What is true about RBCs in humans?

A. They do not carry CO_2 at all

B. They carry both CO_2 and O_2

C. They transport 99.5 percent of O_2

D. They transport about 80 percent oxygen only and the rest 20 precent of it is trancported in dissolved state in blood plasma

Answer: B

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39. How carbon monside, emitted by automobiles, precents transport of oxygen to the body tissues?

A. BY forming a stable compound with haemoglobin

B. By inhibiting exchange of O_2 at alveoli

C. By changing oxygen into carbon dioxide

D. By destroying the haemoglobin

Answer: A

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40. The respiratory center , which regulates respiration, is located in

A. Cerebellum

B. Medulla oblongata

C. Cerebral peduncle

D. The vagus nerve

Answer: B

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41. Mark the incorrect statement

A. Hering Breure's reflex prevents the over expansion of lungs

B. Oxygen dissociation curve for foetal haemoglobin is on the left side with respect of maternal haemoglobin

C. When pneumotaxic centre transmits strong signals the inspiration time becomes shorter

D. Amount of air left in the lung after normal expiration is termed as residual volume only

Answer: D

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42. Which of the following reflex is involved to prevent excessive inflation of the lungs?

A. Stretch reflex

B. Hering- Breuer's reflex

C. Withdrawal reflex

D. Conditioned reflex

Answer: B

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43. Chemoreceptors present in carotid and aortic arch are very much sensitive to

A. Increase in pCO_2 in arterial blood

B. Increase in pO_2 in arterial blood

C. Decrease in pO_2 in venous blood

D. Both (2) & (3)

Answer: A

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44. A person remaining at high altitudes for years becomes more and more acclimatized to the low pO_2 by the following except

A. Increased pulmonary ventilation

B. Increased in RBCs and haemoglobin concentration

C. Polycythemia

D. Increased cardiac output permanently

Answer: D

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45. If the blood does not deliver adequate O_2 to the tissues, it is called

A. Anaemia

B. Anorexia

C. Hypoxia

D. Hypopnea

Answer: C

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46. Less oxygen due to high levels of carbon dioxide is called

A. Carbon monoxide poisoning

B. Asphyxia

C. Dyspnea

D. Apnoea

Answer: B

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47. Which of the following is not pollution related disorder?

A. Silicosis

B. Pneumoconiosis

C. Flourosis

D. Leprosy

Answer: D

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48. Hiccups can be best described as

A. Forceful sudden expiration

B. Jerky incomplete inspiration

C. Vibration of the soft palate during breathing

D. Sign of indigestion

Answer: B

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49. The number of alveoli in the human lungs has been estimated to be approximately

A. 100 million

B. 300 million

C. 125 million

D. 300 billion

Answer: B

Watch Video Solution

50. Which of the following can be termed as opposited of Bohr's effect ?

A. Haldane's effect

B. Hamburger's phenomenon

C. Hering-Breuer refiex

D. None of these

Answer: A

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Assignment Section D

1. Assertion: Pneumotaxic center controls the rate of respiration .

Reason: Primarly, it controls the switch off point of inspiration.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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2. Assertion: Asthmatic patients use bronchodilator drugs as well as inhalers for symptomatic relief .

Reason : Asthma is characterized by the spasm of smooth muscles in the wall of bronchioles due to allergen.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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3. Assertion : — Major part of CO_2 is transported in the form of sodium bicarbonate.

Reason : — 0.3 ml of CO_2 is transported per 100ml of blood in dissolved state in plasma of blood.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: B

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4. Assertion: In cockroaches, inspiration is a passive process.

Reason: The expansion of abdominal cavity allows the space of expansion of tracheal trunk. As a result, air enter through spiracle.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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5. Assertion: The diffusion of carbon dioxide is 20 times faster then oxygen.

Reason: It is due to difference in partial pressure as well as solubility of diffusing gases .

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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6. A: The passage starting with the external nostrils upto the terminal bronchiole constitute the respiratory part.

R: The respiratory part transport the air to the alveoli, clears it from the foreign material,

humidified and brings the air to body temperature.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: D

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7. A: Normal expiration during quiet breathing, unlike inspiration, is a passive process because on muscular contractions are involved.

R: Normal expiration results from the elastic recoil of the chest wall and lungs.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

Watch Video Solution

8. A: Human blood always contains more amount of CO_2 than blood oxygen.

R: Solubility coefficient of CO_2 is more than O_2.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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9. A: When a person starts doing exercise, rate and depth of breathing increases even before there are changes in pO_2, pCO_2 or H^+ concentration.

R: The main stimulus for these quick changes is due to input from the proprioreceptors, which monitor movements of joints and muscles.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: A

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10. A: Emphysema is a chronic obstructive- disease of lung, causing irreversible distension and loss of elasticity of alveoli.

R: Emphysema is preventable if chronic exposure to smoke (cigarette and others) and pollutants is avoided.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the

assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: B

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11. A: 100 ml of venous blood has 14.4 ml of O_2 i.e., it is still 75% saturated with oxygen in normal condition.

R: About 4.6 ml of O_2 i.e. 25% diffuses from arterial blood into the tissue during exercise.

A. If both Assertion & Reason are true and the reason is the correct explanation of the assertion, then mark (1)

B. If both Assertion & Reason are trye but the reason is not the correct explanation of the assertion , then mark (2)

C. If Assertion is true statement but Reason is fakse, then mark (3)

D. If both Assertion and Reason are false statements, then mark (4)

Answer: C

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