

MEDZONE



Physiology

2024/2025

بِسْمِ اللَّهِ الرَّحْمَنِ الرَّحِيمِ
وَالَّذِينَ يُؤْتُونَ مَا آتَوْا وَقُلُوبُهُمْ وَجَلَةٌ أَنَّهُمْ إِلَىٰ رَبِّهِمْ رَاجِعُونَ ﴿٦١﴾
> أُولَٰئِكَ يُسْرِعُونَ فِي الْخَيْرَاتِ وَهُمْ لَهَا سَابِقُونَ ٦١

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ALL respiratory Physiology

1. **Alveoli can be found in:**
 - a. Main Bronchi.
 - b. Lobar Bronchi.
 - c. Segmental Bronchi.
 - d. Terminal Bronchiole.
 - e. Respiratory Bronchiole.
2. **Which one of the following is the normal value of FEV1 in an adult?**
 - a. 95%.
 - b. 65%.
 - c. 50%.
 - d. 80%
3. **Which of the following is the most important gas maintaining alveolar ventilation?**
 - a. Oxygen.
 - b. Hydrogen.
 - c. Carbon dioxide.
 - d. Nitrogen.
4. **In which of the following condition hyperbaric oxygen is not useful?**
 - a. Congenital heart disease.
 - b. CO poisoning.
 - c. N2 toxicity.
 - d. Gas gangrene.
5. **Administration of O2 is of value in all EXCEPT**
 - a. Hypoxic hypoxia.
 - b. Stagnant hypoxia.
 - c. Anaemic hypoxia.
 - d. Histotoxic hypoxia.
6. **Which of the following cells secrete lung surfactant?**
 - a. Type I pneumocytes.
 - b. Type II pneumocytes.
 - c. Pulmonary vessels.
 - d. Goblet cells.

7. **Pneumotxic center functions primarily to**
- Intermittently inhibit inspiration.
 - Prolong expiration.
 - Decrease the respiratory rate.
 - Discharge in: piratory action potentials.
8. **Which of the following is produced by decreased PCO_2 , decreased H^+ and increased PO_2 ?**
- Hyperventilation.
 - Hypoventilation.
 - Hypercapnia.
 - Hypoxia.
9. **Which of the following about Herring-Breuer inflation reflex in human being is true?**
- It decreases the respiratory rate.
 - It is an important factor in normal control of ventilation?
 - It is not activated until the tidal volume increases above 1 lit,
 - It is activated only when tidal volume is less than 1 litre
10. **Which of the following is the intrapleural pressure at the end of deep inspiration?**
- 30 mm Hg.
 - 6 mm Hg.
 - +30 mm Hg.
 - +6 mm Hg.
11. **Which of the following values is the intrapulmonary pressure at the end of inspiration?**
- 0 mm Hg.
 - 1 mm Hg.
 - +1 mm Hg.
 - 3 mm Hg.
12. **Which of the following forms nearly carries all the oxygen in the blood?**
- Oxyhemoglobin.
 - Dissolved oxygen.
 - Bicarbonate.

d. Carboxyhemoglobin.

- 13. From the circadian rhythm of bronchial tone we would expect asthma to be worse at**
- a. 6 pm
 - b. 6 am
 - c. 9 pm
 - d. 3 am
 - e. midnight
- 14. Regarding Hb-O₂ dissociation curve, which of the following is incorrect?**
- a. Acidosis shifts the curve to the right.
 - b. Hypothermia decreases P₅₀.
 - c. Hypercapnia increases P₅₀.
 - d. Decreased 2,3-DPG shifts the curve to the right.
- 15. At standard conditions, which of the following is wrong?**
- a. At PO₂ of 100 mmHg, Hb-O₂ saturation is 97%.
 - b. At PO₂ of 70 mmHg, Hb-O₂ saturation is 93%.
 - c. At PO₂ of 26 mmHg, Hb-O₂ saturation is 50%.
 - d. At PO₂ below 40 mmHg, O₂ starts to dissociate from myoglobin.
- 16. Which of the following about the chemical control of respiration is correct?**
- a. The carotid bodies respond to changes of Po₂, H⁺ & P CO₂.
 - b. PO₂ is only detected by the central chemoreceptors.
 - c. Severe hypoxia strongly stimulates the central chemoreceptors.
 - d. The central chemoreceptors respond to changes in plasma pH.
- 17. By which of the following CO₂, can increase respiration?**
- a. By stimulating pulmonary stretch receptors,
 - b. By indirect stimulation of central chemoreceptors.
 - c. By inhibiting peripheral chemoreceptors.
 - d. By increasing CSF pH.
- 18. Which of the following lung volumes & capacity cannot be measured by spirometer?**
- a. Vital capacity
 - b. Total lung capacity
 - c. Tidal volume
 - d. Inspiratory capacity

19. Which of the following is approximately the normal value of anatomical dead space?
- a. 50 ml
 - b. 100 ml
 - c. 150 ml
 - d. 250 ml
20. Which of the following is a function of the lung?
- a. Secretion of erythropoietin.
 - b. Blood formation
 - c. Secretion of angiotensin converting enzyme.
 - d. Secretion of Renin
21. Vasoactive substances inactivated in the lung include
- a. Bradykinin.
 - b. Serotonin.
 - c. Noradrenaline.
 - d. Prostaglandin.
 - e. All of the above,
22. Which of the following forms represents the main bulk of carbon dioxide in the body?
- a. Dissolved CO_2
 - b. Bicarbonate
 - c. Carbamino compound
 - d. Carboxyhemoglobin
23. With regard to pulmonary function
- a. Restrictive lung disease: FEV1 less than FVC
 - b. Obstructive disease: FEV1 less than FVC
 - c. In normal lung, FEV1/FVC-70%
 - d. Obstructive lung disease: FEV1/FVC-80-90%
24. Which one of the following regarding control of ventilation is true?
- a. Apneustic center is in the medulla.
 - b. Impulses from pneumotaxic center responsible for respiratory rhythm.
 - c. The expiratory area is active during normal breathing.
 - d. Carotid body chemoreceptors respond mostly to changes in PCO_2 .

25. **Regarding ventilation which of the following is correct?**
- a. The most important muscles of ventilation are the intercostals.
 - b. The internal intercostal muscle assists inspiration.
 - c. Compliance is less in children than in adults.
 - d. The apex of the lung is better ventilated than the base but has a smaller volume of ventilation.
26. **About carbon dioxide which of the following is true?**
- a. Carried mostly as carbamino compounds in the blood.
 - b. Carried more effectively by oxygen saturated Hb.
 - c. The rate of its diffusion across the respiratory membrane is 20 times that of O
 - d. The tidal CO₂ is normally about 7.3 ml.
27. **Which of the following statement is TRUE?**
- a. Surfactant acts to keep alveoli dry.
 - b. Medium sized bronchi is the chief site of airway resistance
 - c. Intrapleural pressures reduces during inspiration
 - d. All of the above.
28. **Which of the following is associated with shift of the O₂-Hb dissociation curve to the right?**
- a. Increased p50
 - b. Increased affinity of hemoglobin for oxygen
 - c. Decrease in 2,3 DPG
 - d. Increase in H
29. **Which of the following about lung surfactant is correct?**
- a. It is increased in cigarette smokers.
 - b. It increases the lung compliance
 - c. It increases the surface tension in alveoli.
 - d. It is produced by type 2 macrophages.
30. **Which of the following is the main bulk of carbon dioxide in the body?**
- a. Carbamino groups.
 - b. Dissolved in blood.
 - c. Haemoglobin.
 - d. Bicarbonate.

31. **In the control of ventilation, increased which of the following increases the medullary (central) chemoreceptors response?**
- a. PO_2 .
 - b. H concentration.
 - c. PCO_2 .
 - d. PCO
32. **Which of the following refers to Haldane's effect?**
- a. The increased capacity of deoxygenated Hb to carry CO
 - b. h. The chloride shift that occurs to maintain electrical neutrality.
 - c. The carriage of dissolved CO, necording to Henry's law.
 - d. The shape of the CO, dissociation curve.
33. **Which of the following about Lung compliance is true?**
- a. Increased if pulmonary surfactant is decreased.
 - b. Increased by fibrosis of the lung.
 - c. Compliance of both lungs 200 ml/cm H_2O .
 - d. Compliance of the lungs and chest wall 200 ml/cm H_2O .
34. **Regarding carbon dioxide transport, which of the following is wrong?**
- a. The solubility of CO, in blood is much higher than that of O_2 .
 - b. Reduced Hb has greater affinity for H than oxy Hb.
 - c. Reduced Hb has greater affinity for CO_2 than oxy Hb.
 - d. pH of blood nereases as CO, increases in blood.
35. **Which of the following regarding tidal CO, is incorrect?**
- a. It is the volume of CO_2 that is added to each 100 ml of arterial blood during its passage through the tissues.
 - b. It is normally about 3.7 ml.
 - c. it is transported mostly as carbamino compound.
 - d. 10% of tidal CO_2 carried by plasma and 90% by RBCs.
36. **Regarding the O_2 -Hb dissociation curve, which of the following is incorrect?**
- a. At PO_2 70 mmHg. Hb is about 93% saturated with O_2 .
 - b. At PO_2 26 mmHg. Hb is about 50% saturated with O_2 .
 - c. The curve is eft shifted by a fall in pl.
 - d. The curve is left shifted by a fall in temperature

37. Which of the following characterizes pulmonary surfactant?

- a. It acts to decrease lung compliance.
- b. It is synthesized early in foetal life.
- c. It promotes instability of alveoli.
- d. 4. It helps keep alveoli dry

38. Regarding physiological dead space, which of the following is incorrect

- a. It is equal to anatomical dead space + alveolar dead space.
- b. Normally it should be equal to the alveolar dead space.
- c. Normally 150 ml.
- d. Can be estimated using the Boirs equation.

39. Regarding hypoxia, which of the following is incorrect?

- a. Hypoxic hypoxia can occur at high altitudes.
- b. CO poisoning results in anaemic hypoxia.
- c. Histotoxic hypoxia is caused by toxic agents causing inadequate tissue oxygenation,
- d. Hypoxia causes stimulation of central chemoreceptors.

40. Regarding neural control of breathing which of the following is true?

- a. Voluntary control is coordinated in the brainstem.
- b. The limbic system cannot alter the pattern of breathing.
- c. The hypothalamus alters breathing as a part of thermoregulation.)
- d. The respiratory centre is located in the medulla only.

41. Which of the following represents the total lung capacity?

- a. Vital capacity & tidal volume
- b. b Residual volume & vital capacity
- c. Functional residual capacity & vital capacity
- d. Tidal volume & residual volume

42. Laplace's law:

- a. Explains the observed elastic recoil of the chest.
- b. Determines the change in volume per unit change in pressure.
- c. Tells us the pressure is inversely related to tension.
- d. Explains the tendency of small alveoli to collapse

43. Regarding the rate of diffusion through respiratory membrane which of the following is true?
- a. It is proportional to the square of the surface area.
 - b. It is inversely related to thickness which is only 0.2 μm .
 - c. CO_2 diffuses much more rapidly than O_2 because it has a lower molecular weight.
 - d. It is an active process described by Fick's law.
44. In Caissons disease pain in the joints and muscles is due to
- a. Formation of N_2 bubbles.
 - b. Formation of CO_2 bubbles.
 - c. Due to fatigue.
 - d. Due to increase in barometric pressure.
45. Surface area of alveoli in an average adult lung is approximately:
- a. 10-20 m^2
 - b. 20-40 m^2
 - c. 70-100 m^2
 - d. 150-200 m^2
46. Which of the following values represents the normal anatomical dead space?
- a. 100 ml
 - b. 150 ml
 - c. 200 ml
 - d. 250 ml
47. Which of the following represents the amount of oxygen dissolved in arterial blood at rest?
- a. 0.03 ml O₂/100ml blood.
 - b. 0.3 ml O₂, 100ml blood.
 - c. 3 ml O₂/100ml blood.
 - d. 30 ml O₂/100ml blood.
48. In which of the following the basic respiratory rhythm is generated?
- a. Apneustic center
 - b. Nucleus parabrachialis
 - c. Dorsal medulla
 - d. Pneumotaxic center

e. Cerebrum

- 49. Which of the following is the normal value of (intra-alveolar pressure at the end of a quiet inspiration?**
- a. 240 cm¹20**
 - b. 24 cmH₂O**
 - c. 0 cm H₂O**
 - d. 14 cmH₂O**
 - e. 140 cm^l120**
- 50. Which one of the following would increase in obstructive, but not in restrictive, lung disease?**
- a. Vital capacity**
 - b. Maximum breathing capacity**
 - c. FEV₁**
 - d. Functional residual capacity**
 - e. Breathing frequency**
- 51. Which one of the following is higher at the apex of the lung than at the base when a person is standing?**
- a. V/Q ratio**
 - b. Blood flow**
 - c. Ventilation**
 - d. PaCO₂**
 - e. Lung compliance**
- 52. Which of the following conditions causes a decrease in arterial O₂ saturation without a decrease in O₂ tension?**
- a. Bronchial asthma**
 - b. Carbon monoxide poisoning)**
 - c. A low V/Q ratio**
 - d. Hypoventilation**
 - e. Right-to-left shunt**
- 53. Which of the following may contribute to the increased ventilation by stimulating both Peripheral and central chemoreceptors?**
- a. A decrease in arterial oxygen content**
 - b. A decrease in arterial blood pressure**
 - c. An increase in arterial carbon dioxide tension**

d. A decrease in arterial oxygen tension

e. An increase in arterial pH

54. Which of the following is most probably to occur by complete transection of the brainstem above the pons?

a. Result in cessation of all breathing movements

b. Prevent any voluntary holding of breath

c. Prevent the central chemoreceptors from exerting any control over ventilation

d. Prevent the peripheral chemoreceptors from exerting any control over ventilation

e. Abolish the Hering-Breuer reflex

55. Which of the following is most likely to occur due to deficiency of pulmonary surfactant?

a. Decrease surface tension in the alveoli

b. Decrease the change in intrapleural pressure required to achieve a given tidal volume

c. Decrease lung compliance

d. Decrease the work of breathing

e. Increase functional residual capacity (FRC)

56. A female mother gives birth to a premature six-month male newborn who suffers difficulty of breathing, tachypnea with cyanosis. Which of the following is most likely decreased in this newborn

a. Airway resistance

b. Alveolar surface tension

c. Alveolar surfactant

d. work of breathing

57. During a normal inspiration, more air goes to the alveoli at the base of the lung than to the alveoli at the apex of the lung because

a. The alveoli at the base of the lung have more surfactant

b. The alveoli at the base of the lung are more compliant)

c. The alveoli at the base of the lung have higher V/Q ratios

d. There is a more negative intrapleural pressure at the base of the lung

e. There is more blood flow to the base of the lung

58. Which of the following increases the affinity of hemoglobin to oxygen?

- a. Metabolic acidosis**
- b. Exercise**
- c. Hypoxemia**
- d. Anemia**
- e. Carbon monoxide poisoning**

59. Enzymes within the lung are responsible for the activation which of the following substances?

- a. Angiotensin II**
- b. Bradykinin**
- c. Prostaglandins**
- d. Serotonin**
- e. Leukotrienes**

60. When a person ascends to a high altitude, alveolar ventilation increases. Alveolar ventilation continues to increase over the next several days because

- a. The central chemoreceptors become more sensitive to low oxygen tensions**
- b. The peripheral chemoreceptors increase their firing rate**
- c. The plasma concentration of 2,3-DPG increases**
- d. The pH of the cerebrospinal fluid decreases**
- e. The oxygen-carrying capacity of hemoglobin increases**

61. The clinical sign of cyanosis is caused by

- a. An increase in the affinity of hemoglobin for oxygen**
- b. A decrease in the percent of red blood cells (hematocrit)**
- c. An increase in the concentration of carbon monoxide in the venous blood**
- d. A decrease in the concentration of iron in the red blood cells**

62. An increase in the concentration of deoxygenated (reduced) hemoglobin) The percentage of hemoglobin saturated with oxygen will increase if

- a. The arterial PCO₂ is increased**
- b. The hemoglobin concentration is increased**
- c. The temperature is increased**
- d. 4. The arterial PO₂ is increased)**

e. The arterial pH is decreased

- 63. Which of the following will return toward normal during acclimatization to high altitude"**
- a. Arterial hydrogen ion concentration**
 - b. Arterial carbon dioxide tension**
 - c. Arterial bicarbonate ion concentration**
 - d. Arterial hemoglobin concentration**
 - e. Alveolar ventilation**
- 64. Which one of the following statements characterizes pulmonary compliance?**
- a. It decreases with advancing age**
 - b. 6. It is inversely related to the elastic recoil properties of the lung**
 - c. It increases in patients with pulmonary edema**
 - d. It is equivalent to DP/DV**
 - e. It increases when there is a deficiency of surfactant**
- 65. Which of the following stimulates the activity of the central chemoreceptors?**
- a. An increase in the PCO_2 of blood flowing through the brain**
 - b. A decrease in the PO_2 of blood flowing through the brain**
 - c. A decrease in the oxygen content of blood flowing through the brain**
 - d. A decrease in the metabolic rate of the surrounding brain tissue**
 - e. An increase in the pH of the CSF**
- 66. In an acclimatized person at high altitudes, oxygen delivery to the tissues may be adequate at rest because of**
- a. An increase in hemoglobin concentration**
 - b. The presence of an acidosis**
 - c. A decrease in the number of tissue capillaries**
 - d. The presence of a normal arterial PO_2**
 - e. The presence of a lower-than-normal arterial PCO_2**
- 67. When the respiratory muscles are relaxed, the lungs are at**
- a. Residual volume (RV)**
 - b. Expiratory reserve volume (ERV)**
 - c. Functional residual capacity (FRC)**
 - d. Inspiratory reserve volume (IRV)**

e. Total lung capacity (TLC)

68. Measurement of the lecithin-sphingomyelin (L-S) ratio in amniotic fluid assesses

a. The placenta's ability to oxygenate the fetus

b. Fetal adrenal function

c. Fetal kidney development

d. Fetal brain development

e. Fetal lung maturity

69. Which of the following would increase the P50 of an oxyhemoglobin curve?

a. decrease in PCO₂ as in decreased metabolism

b. decrease in pH

c. decrease in Temperature

d. decrease in Oxygen

e. c. decrease in 2,3-DPG

70. Reduction of functional hemoglobin associated with anemia, methemoglobinemia, or carbon monoxide poisoning does not produce hyperpnea because the

a. Blood flow to the carotid body is decreased

b. Total arterial oxygen content is maintained within the normal range

c. Carotid body chemoreceptors are stimulated

d. Central chemoreceptors are stimulated

e. PO₂ of arterial blood is normal

71. A premature new-born was suffering from difficulty of breathing and was diagnosed as having respiratory distress syndrome (RDS). This newborn is expected to have increase in...

a. alveolar surface tension

b. elasticity of the chest wall

c. expansion of the chest wall

d. lung compliance

72. In this newborn, the decreased surfactant will lead to defect in

a. Alveolar arterial flow

b. Alveolar Interdependence

c. Alveolar stability

d. Alveolar venous flow

73. A 25-year-old man is running in a marathon on a sunny day. Most of change in the length of the thoracic cavity in this man attributes to the contraction of....

- a. Anterior serrati muscles**
- b. Diaphragm muscle**
- c. Scaleni muscles**
- d. Strenomastoid muscle**

74. A 34-year-old athlete runs in a marathon. He was very sweaty with increase in both hear and respiratory rate. This athlete has increased diffusing capacity of oxygen due increase in the.....

- a. number of active alveoli and pulmonary capillaries**
- b. thickness of the respiratory membrane**
- c. solubility of oxygen**
- d. molecular weight of oxygen**

75. A 65-year-old patient with left-sided ventricular failure presented with shortness of breat and chronic cough. Chest x-ray showed pulmonary congestion. This patient has a decrease in pulmonary O₂ diffusion due to increased

- a. molecular weight of oxygen**
- b. respiratory membrane surface area**
- c. The respiratory membrane thickness**
- d. The surfactant secretion**

76. This patient will most probably have

- a. Decreased arterial PO₂ and decreased PCO₂**
- b. Decreased arterial PO₂ and increased PCO₂**
- c. Increased arterial PO₂ and decreased PCO₂**
- d. Increased arterial PO₂ and increased PCO₂**

77. A 44-year-old man presented with shortness of breath and chronic cough. He mentioned that he is working in a factory with daily inhalation of hazardous fumes. The condition was diagnosed as having interstitial lung fibrosis)

In this patient, the respiratory membrane diffusion capacity will greatly decreased due to increased...

- a. The airway resistance**
- b. The respiratory membrane surface area**
- c. The respiratory membrane thickness**
- d. The surfactant secretion**

78. This patient will most probably have low partial pressure of oxygen in

- a. Alveoli**
- b. Blood**
- c. Conducting airways**
- d. Respiratory bronchioles**

79. A 22-year old asthmatic man came to your clinic with shortness of breath and cough. In this patient, which of the following pulmonary function tests reflects the degree of severity of bronchial obstruction?

- a. FEV1/FVC ratio)**
- b. Inspiratory capacity**
- c. Residual volume**
- d. Total lung capacity**

80. In this patient the mostly increased spirometric parameter is the.....

- a. Inspiratory capacity**
- b. Inspiratory reserve volume**
- c. Residual volume**
- d. Tidal volume**

81. A patient with pontine haemorrhage that leads to damage of Pneumotaxic centre of respiration. In this patient, the respiratory rate will be

- a. 4 breaths/min**
- b. 14 breaths/min**
- c. 24 breaths/min**
- d. 34 breaths/min**

- 82. The change in the type of respiration in this patient is due to increased activity of ...**
- a. The Apneustic centre**
 - b. The nucleus of tractus solitarius (NTS)**
 - c. The ventral respiratory group**
 - d. The peripheral stretch receptors of the lung**
- 83. On an animal experiment, the researcher blocked the carotid and aortic bodies, in this case which of the following best stimulate the respiration?**
- a. Rise in arterial PCO_2 ,**
 - b. Rise in arterial H^+ concentration**
 - c. Decrease in arterial PO_2**
 - d. Decrease in cerebral PCO_2 ,**
- 84. A 45-year-old obese, diabetic female presented to emergency room with sudden severe shortness of breath, sharp left sided chest pain and diffuse sweating. She was diagnosed as having pulmonary embolism. This patient would have**
- a. Decreased V/Q ratio**
 - b. Increased VA/Q ratio**
 - c. Decreased V**
 - d. Increased Q**
- 85. This lady will most probably have....**
- a. Wasted perfusion**
 - b. Wasted ventilation**
 - c. Increased perfusion**
 - d. Increased ventilation**
- 86. This patient alveolar air PO_2 will be around...**
- a. 50 mmHg**
 - b. 100 mmHg**
 - c. 150 mmHg**
 - d. 250 mmHg,**
- 87. His patient central chemoreceptors are only sensitive to.....**
- a. changes in pH in blood.**
 - b. changes in pH in CSF**
 - c. changes in PO_2 in blood.**

d. changes in PO₂ in CSF.

88. 65-year-old male patient presented to ER with cerebrovascular stroke that lead to damage of pneumotaxic centre of respiration. The expected type of respiration in this patient will develop is...

- a. Deep respiration**
- b. Rapid respiration**
- c. Rapid shallow respiration**
- d. Shallow respiration**

89. In the above-mentioned patient, the change in the type of respiration in this patient is due to...

- a. The Apneustic centre will take the upper hand**
- b. The dorsal respiratory group will take the upper hand**
- c. The ventral respiratory group will take the upper hand**
- d. The nucleus of tractus solitarius (NTS) will take the upper hand**

90. In the above-mentioned patient, his inspirations will be intermittently inhibited by...

- a. The dorsal respiratory group**
- b. The ventral respiratory group**
- c. The cerebral cortex**
- d. The Hering-Breuer Reflexes**

91. A mountain climber stayed at a height of 4000 m. The time period required for maximum haematological adaptation is approximately

- a. 37.5 days**
- b. 47 days**
- c. 45.5 days**
- d. 67 days**

92. After prolonged stay at the same altitude, the most important cellular enzymatic change in this climber will be increased.....

- a. 2,3 BPG**
- b. Adenyl cyclase**
- c. Carbonic anhydrase**
- d. G6PD**

93. A 15 years old boy came to you with high grade fever, fatigue and cough with profuse yellowish sputum. Chest X-ray showed bronchitis. In this patient, the afferent impulses of cough reflex carried through
- Glosso-pharyngeal nerve
 - Hypoglossal nerve
 - Trigeminal nerve
 - Vagus nerve
94. This patient will respond to this situation by
- Deep inspiration, vocal cords closed, forced expiration
 - Deep inspiration, uvula depress, forced expiration
 - Slowing of respiration
 - Taking deep sustained respiration
95. In cough reflex, the aim of response is to
- Ca. Expel large volume of air with high pressure through mouth cavity)
 - Expel large volume of air with high pressure through nasal cavity.
 - Expel tidal expiratory volume with high pressure through mouth cavity.
 - Expel tidal expiratory volume with high pressure through nasal cavity
96. An athlete is running a 500 meter dash. One of the main stimulus which increases the respiratory rate in this athlete is the.....
- Lactic acid
 - Adenosine
 - Decreased PaCO_2 ,
 - Increased plasma pH
97. A young healthy adult male ascended from the sea level to an altitude of 12,000 ft in 2 hrs. He did not experience any difficulty after reaching the destination.

The immediate changes expected to have found in the person upon reaching the altitude are increased

- Erythropoietin release and RBC production
- O_2 diffusing capacity and O_2 carrying capacity
- Pulmonary ventilation and cardiac output
- Vascularity and tissue enzymes

98. In this person, the initial change in ventilation is most likely due to stimulation of
- Arterial chemoreceptors
 - Central chemoreceptors
 - Juxta-pulmonary receptors
 - Pulmonary stretch receptors
99. A young healthy adult male ascended an altitude of 15,000 ft quickly, his body must adapt to the thinner air and the lack of oxygen almost immediately by increased
- respiratory rate, depth and cardiac output
 - O₂ carrying capacity of the blood by increased RBCs number
 - Increased vascularity and tissue enzymes
 - Increased cellular mitochondria and oxidative enzymes.
100. The same climber above; is expected to develop....
- respiratory alkalosis
 - respiratory acidosis
 - metabolic alkalosis
 - metabolic acidosis
101. In the same climber mentioned above, the developed acid/base imbalance is mainly adjusted by....
- increased reabsorption of bicarbonate by the kidney
 - increased respiratory rate with excessive removal of CO₂.
 - increased excretion of bicarbonate in the urine
 - increased excretion of ammonium chloride in the urine
102. A provisional climber trying to climb an altitude of 20,000 ft above sea level. He was taking a long breaks or intervals.

The type of breathing in the same person that develop during sleep is

- Apnoea
- Alternating apnoea and hyperpnea
- Rapid deep breathing
- Hyperpnea

103. Regarding Carbon dioxide transport in the blood which of the following is not true?

- a. It combines with the haemoglobin molecule.
- b. It combines with plasma proteins.
- c. It is transported in Physical solution in plasma
- d. It has greater quantity in red blood cells than in plasma,

104. A shift of the oxygen dissociation curve of blood to the right

- a. Occurs in the pulmonary capillaries.
- b. Occurs if blood temperature drops.
- c. Decreases oxygen delivery to the tissues.
- d. Increases the P50 the PO₂ value giving 50 per cent blood oxygen saturation).

105. A healthy, 45-year-old man is reading the newspaper. Which of the following muscles are used for quiet breathing?

- a. Diaphragm and external intercostals
- b. Diaphragm and internal intercostals
- c. Diaphragm only
- d. Internal intercostals and abdominal recti
- e. Sternocleidomastoid muscies

106. A healthy, 25-year-old medical student participates in a 10-km charity (aid) run for athe Egyptian Heart Association. Which of the following muscles does the student use (contract) during expiration?

- a. Diaphragm and external intercostals
- b. Diaphragon and internal intercostals
- c. Diaphragm only
- d. Internal intercostals and abdominal recti
- e. Sternocleidomastoid muscles

107. The pleural pressure of a normal 56-year-old woman is approximately 5 cm 1120 during resting conditions immediately before inspiration (i.e., at functional residual capacity). What is the pleural pressure (in cm 1120) during inspiration?

- a. a +1
- b. +4
- c. 0

d. -3

e. -7

108. In a respiratory disease, hypersecretion of mucous in the small airways stimulated rapidly adapting irritant receptors in the mucosa. There was wheezy chest.

The most probable respiratory symptom produced from the irritation of receptors would be

a. Chest pain

b. Cough

c. Dyspnea

d. Sneeze

e. Wheeze

109. Which of the following about carbon dioxide is true?

a. It is carried as carboxyhaemoglobin on the haemoglobin molecule.

b. Its addition to the blood increases binding and affinity of blood to oxygen

c. It stimulates ventilation when breathed at a concentration of 20 per cent.

d. Content is greater than oxygen content in arterial blood.

110. Which of the following does not fall in early inspiration?

a. Intrapulmonary pressure.

b. Intrathoracic pressure.

c. Intra-abdominal pressure.

d. Pressure in the superior vena cava.

111. At a high altitude where atmospheric pressure is halved, there is an increase in which of the following

a. Ca. Pulmonary ventilation,

b. Arterial PO₂.

c. Arterial hydrogen concentration.

d. Cerebral blood flow.

112. During inspiration which is of the following occurs?

a. Venous return to the heart is decreased.

b. More energy is expended than during expiration

c. Lung expansion is assisted by surface tension forces in the alveoli.

d. Lung expansion begins when intrapleural pressure falls below atmospheric.

113. The residual volume is

- a. The gas remaining in the lungs at the end of a maximal expiration**
- b. Greater on average in women than in men.**
- c. 3-4 litres on average in young adults.**
- d. Measured directly using a spirometer.**

114. A rise in arterial PCO₂ leads to which of the following?

- a. Decrease in ventilation due to stimulation of peripheral chemoreceptors.**
- b. Increase in ventilation due to stimulation of central chemoreceptors.**
- c. Decrease in plasma H⁺ level.**
- d. Decrease in the plasma bicarbonate level.**

115. Which of the following would likely to occur during inspiration?

- a. Venous return to the heart is increased by more negative Intrapleural pressure**
- b. Less energy is expended than during expiration.**
- c. Lung expansion is assisted by surface tension forces in the alveoli.**
- d. Lung expansion begins when intrapleural pressure falls below atmospheric**

116. which of the following intrapleural pressure is positive?

- a. Forced expiration**
- b. Forced inspiration**
- c. Tidal inspiration**
- d. Tidal expiration**

117. Which of the following is true at functional residual capacity (relaxation volume) or mid-thoracic position?

- a. Intrapulmonary pressure atmospheric pressure)**
- b. Intrapulmonary pressure > atmospheric pressure**
- c. Intrapulmonary pressure < Intrapleural pressure**
- d. Intrapleural pressure is positive**

118. Which of the following conditions increases lung compliance?

- a. Pulmonary emphysema**
- b. Deficiency of lung surfactant**
- c. Pulmonary fibrosis**

d. Acute pulmonary edema

119. Regarding the respiratory centre which of the following is not true?

- a. Sends impulses to inspiratory muscles during quiet breathing.**
- b. Sends impulses to expiratory muscles during quiet breathing.**
- c. Is involved in the swallowing reflex.**
- d. Is involved in the vomiting reflex.**

120. Which of the following about the carotid bodies is true?

- a. Are stretch receptors in the walls of the internal carotid arteries.**
- b. Have a blood flow per unit volume similar to that in the brain.**
- c. C. Are influenced more by blood PO₂ than by its oxygen content.**
- d. Are not stimulated by rise of H⁺ concentration in the blood.**

121. Pulmonary surfactant increases

- a. The surface tension of the fluid lining alveolar walls.**
- b. In effectiveness as the lungs are inflated.**
- c. In amount when pulmonary blood flow is interrupted.**
- d. In amount in fetal lungs during the last month of pregnancy**

122. The lung function which markedly increased in air trapping disease in this boy is..

- a. RV**
- b. ERV**
- c. FVC**
- d. TLC**

123. In healthy individual breathing spontaneously, which of the following of the following pressure is positive with reference to atmospheric pressure

- a. Alveolar pressure during inspiration**
- b. Alveolar pressure during expiration**
- c. Intrapleural pressure during inspiration**
- d. Intrapleural pressure during expiration**

124. Which of the following is the maximum amount of gas that can be exhaled after maximal inspiration?

- a. Vital capacity**
- b. Total lung capacity**
- c. Expiratory reserve volume**
- d. Functional residual capacity**

- 125. Which of the following is the maximum volume of air that can be inhaled or exhaled in one minute by voluntary effort?**
- a. Total lung capacity
 - b. Vital capacity
 - c. Effective pulmonary ventilation
 - d. Maximum voluntary ventilation
- 126. Which of the following muscle is not involved in forced expiration?**
- a. Internal intercostal muscles
 - b. External intercostal muscle
 - c. Transversus abdominus
 - d. Rectus abdominus
- 127. Which of the following can be measured by spirometry**
- a. Residual volume
 - b. Vital capacity
 - c. Functional residual capacity
 - d. Total lung capacity
- 128. Alveolar ventilation increases several-fold during strenuous exercise. Which of the following factors is most likely to stimulate ventilation during strenuous exercise?**
- a. Collateral impulses from higher brain centers
 - b. Increased mean arterial pH
 - c. Increased mean arterial P_{O_2}
 - d. Decreased mean venous P_{O_2}
 - e. Decreased mean arterial P_{CO_2}
- 129. Transpulmonary (transmural) pressure:**
- a. Is the pressure difference between alveoli and atmosphere.
 - b. Is increased during inspiration.
 - c. Is decreased when intra-pleural pressure becomes more negative.
 - d. None of the above.
- 130. Lung compliance:**
- a. It is the change in pressure per unit change in volume.
 - b. Decreases when surfactant decreases.
 - c. Increases when surface tension increases.
 - d. Is increased in lung fibrosis.

131. Apnea is caused by the following conditions EXCEPT:

- a. Voluntary effort.
- b. Apnea after hyperventilation.
- c. During swallowing (pharyngeal stage).
- d. Decreased arterial PO₂.

132. The displacement of CO₂ from the blood to alveoli is facilitated by:

- a. Decreased surface area of respiratory membrane.
- b. Binding of O₂ with Hb in the lungs.
- c. Increased thickness of respiratory membrane.
- d. All of the above.

133. Hypercapnea:

- a. Stimulates central chemoreceptors.
- b. Decreases respiratory rate.
- c. Inhibits respiratory center.
- d. a and c are correct.

134. Presence of carbon monoxide in the blood:

- a. Stimulates respiration.
- b. It binds only with reduced Hb.
- c. It decreases arterial PO₂.
- d. None of the above is correct.

135. Valvular (tension) pneumothorax:

- a. Is defined by presence of fluid in pleural sac.
- b. Intra-pleural pressure is positive.
- c. Increases pulmonary ventilation.
- d. None of the above is correct.

136. Regarding dead space:

- a. It includes the air in the air conducting passages.
- b. It is measured by nitrogen.
- c. It causes difference in composition between alveolar air and expired air.
- d. All of the above.

137. Surfactant:

- a. It increases work of breathing.
- b. Causes collapse of alveoli during expiration.
- c. Increases the compliance of the lung.

d. Prevents lung expansion during inspiration.

138. Regarding cough reflex:

- a. Is produced mainly by stimulation of mechanoreceptors in the bronchial wall.**
- b. Afferent nerve fibers pass via vagus nerve.**
- c. Cough begins with forced expiration followed by deep inspiration with closed glottis.**
- d. Cough begins with forced expiration followed by deep inspiration with opened glottis.**

139. Recoil tendency of the lungs:

- a. Is only present in abnormal lungs.**
- b. Is prevented by surface tension.**
- c. Is prevented by negative intra-pleural pressure.**
- d. Is increased by surfactant.**

140. Intra-pleural pressure:

- a. Is equal to -3 mmHg at end of normal inspiration.**
- b. Is equal to -6 mmHg at end of normal expiration.**
- c. Becomes positive in Valsalva's experiment.**
- d. Becomes positive in Muller's experiment.**

141. Intra-alveolar pressure:

- a. Is negative during normal expiration.**
- b. Is positive during normal inspiration.**
- c. Is negative during deep inspiration with closed glottis.**
- d. a and b are correct.**

142. Surfactant:

- a. Is secreted by type II alveolar endothelial cells.**
- b. Increases the compliance of the lungs.**
- c. Increases work of breathing.**
- d. Prevents inflations of the lungs after birth.**

143. Airway resistance:

- a. Is increased by sympathetic stimulation.**
- b. Does not affect work of breathing.**
- c. Is controlled by the radius of airway.**
- d. None of the above is correct.**

144. Regarding dead space:

- a. Anatomical dead space is slightly more than physiological dead space.
- b. Physiological dead space is increased during respiratory diseases that affect the functions of alveoli.
- c. Dead space causes less O₂ tension (P_{O2}) in the expired air compared to alveolar air.
- d. None of the above.

145. Which of the following conditions increases the delivery of oxygen to tissues:

- a. Decreased PCO₂.
- b. Increased H⁺ concentration.
- c. Decreased temperature.
- d. All of the above.

146. Oxygenation of venous blood at the lungs increases O₂ tension of the blood (P_{O2}). This increase in P_{O2}:

- a. Stimulates respiratory center and leads to hyperventilation.
- b. Decreases the saturation of Hb.
- c. Affects the carbon dioxide dissociation curve.
- d. None of the above.

147. Bohr's effect is the effect of:

- a. CO₂ on the affinity of hemoglobin to O₂.
- b. O₂ on the affinity of hemoglobin to CO₂.
- c. 2,3 D.P.G on the affinity of hemoglobin to O₂.
- d. Increased saturation of hemoglobin with O₂.

148. Chloride shift (Hamburger) phenomenon:

- a. It occurs when oxygen enters the blood from alveoli.
- b. It decreases osmotic pressure inside RBCs.
- c. It increases the hematocrite value of venous blood.
- d. None of the above is correct.

149. Central chemoreceptors respond mainly to:

- a. Hypoxemia.
- b. Respiratory alkalosis.
- c. Hyperventilation.
- d. Hypercapnea.

150. Concerning nervous mechanism that control respiration:

- a. Apneusis is a normal pattern of respiration.
- b. Stimulation of (J) receptors produces hiccup reflex.
- c. Vomiting affects respiration and leads to apnea.
- d. a and c are correct.

151. Which of the following is a characteristic feature of hypoxic hypoxia:

- a. PO₂ in the arterial blood is reduced.
- b. Oxygen carrying capacity of blood is reduced.
- c. Utilization of oxygen by tissue is reduced.
- d. Blood flow to the tissue is reduced.

152. Concerning respiration during normal and resting conditions:

- a. Expiration is produced by contraction of expiratory muscles.
- b. Alveolar pressure is less than atmospheric pressure.
- c. Intra-pleural pressure gradually decreases (becomes more negative) during expiration.
- d. None of the above.

153. Regarding inspiration during normal resting conditions:

- a. Occurs when the diaphragm relaxes.
- b. Alveolar pressure is less negative than intrapleural pressure.
- c. It decreases the anatomical dead space.
- d. It's caused by depression of chest cage.

154. The major muscle of respiration is:

- a. Abdominal muscles.
- b. Diaphragm.
- c. External intercostals muscle.
- d. Internal intercostals muscle.

155. Concerning the mechanics of respiration:

- a. Inspiration is normally passive process.
- b. Expiratory muscles act during rest.
- c. Lungs expand by increased negativity of intrapleural pressure.
- d. Expiration is normally active process.

156. Which of the following is true during inspiration:

- a. Intrapleural pressure is positive.
- b. Alveolar pressure equals atmospheric pressure.

- c. Alveolar pressure is positive.
- d. Intrapleural pressure becomes more negative.

157. **Which of the following is wrong:**

- a. Surfactant helps lung expansion.
- b. Low surface tension in the alveoli decreases the compliance.
- c. Surfactant decreases work of breathing.
- d. Work of breathing is increased in obstructive lung diseases.

158. **Which of the following represents the pressure difference that acts to distend lungs:**

- a. Alveolar pressure.
- b. Airway opening pressure.
- c. Transthoracic pressure.
- d. Transpulmonary pressure.

159. **Lung compliance is decreased in all the following conditions EXCEPT:**

- a. Premature baby.
- b. Emphysema.
- c. Lung fibrosis.
- d. Pulmonary edema.

160. **Hypocapnea:**

- a. Increases respiratory rate.
- b. Stimulates central chemoreceptors.
- c. Inhibits respiratory center.
- d. a and c are correct.

161. **Carbon monoxide is toxic because:**

- a. It causes hypoxic hypoxia.
- b. It does not bind with ferrous of the Hb.
- c. At decreases arterial PO₂.
- d. None of the above is correct.

162. **All of the following exerts non chemical (neural) influence on respiration EXCEPT:**

- a. J receptors.
- b. Acidosis of arterial blood.
- c. Sneezing reflex.
- d. Proprioceptors.

163. Which of the following is correct:

- a. Central chemoreceptors are located in the cerebral cortex.
- b. Central chemoreceptors are stimulated mainly by hypoxia.
- c. Voluntary control of breathing is located in the pons and medulla.
- d. Autonomic (Involuntary) control of breathing is located in the pons and medulla.

164. Which of the following is the primary regulating factor of central the chemoreceptors:

- a. Arterial PO_2 .
- b. Arterial PCO_2 .
- c. Arterial concentration of H^+ .
- d. Hemoglobin content.

165. Alveolar surfactant acts to increase pulmonary:

- a. Surface tension.
- b. Compliance.
- c. Airways resistance.
- d. Blood flow.

166. During normal respiration (inspiration & expiration) the intrapleural pressure:

- a. Is higher than the atmospheric pressure.
- b. Is always lower than the alveolar pressure.
- c. Is always negative.
- d. b and c are correct.

167. Regarding dead space:

- a. Physiological dead space can be measures by the nitrogen meter method.
- b. Anatomical dead space can be measured by using the Bohr's equation.
- c. It reduces alveolar ventilation in shallow rapid breathing.
- d. It causes an increase in PCO_2 in expired air relative to alveolar PCO_2 .

168. Very low level of oxygen in the inspired air is expected to:

- a. Stimulates the respiratory center via central chemoreceptors.
- b. Increases the pulmonary ventilation.
- c. Causes hypoxemia that inhibits aortic chemoreceptors.
- d. All of the above.

169. **As blood passes through systemic capillaries, what happens to the affinity of Hb for oxygen and what happens to the Hb-O₂ dissociation curve:**
- a. Hb affinity for O₂ increases and the dissociation curve shifts to the left.
 - b. Hb affinity for O₂ increases and the dissociation curve shifts to the right.
 - c. Hb affinity for O₂ decreases and the dissociation curve shifts to the left.
 - d. Hb affinity for O₂ decreases and the dissociation curve shifts to the right.

170. **A stroke that destroyed the respiratory center of medulla would be expected to lead to:**
- a. Immediate stop of breathing.
 - b. Apneustic breathing.
 - c. Rapid breathing (hyperpnea).
 - d. None of the above.

171. **Cyanosis indicates a higher than normal blood concentration of:**
- a. Carbon dioxide.
 - b. Carbon monoxide.
 - c. Diphosphoglycerate (DPG).
 - d. Reduced hemoglobin.

172. **Carbon dioxide carried in blood mainly:**
- a. As carbaminohemoglobin in the red blood cells.
 - b. As the bicarbonate ion in the plasma after first entering the red blood cells.
 - c. As carbonic acid in the plasma.
 - d. In a dissolved form.

173. **If the barometric pressure (of dry air) is 600 mmHg and the percentage of oxygen is 20%, the partial pressure of oxygen is:**
- a. 20 mmHg.
 - b. 120 mmHg.
 - c. 30 mmHg.
 - d. 300 mmHg.

174. **Concerning the lung compliance:**
- a. $C = \Delta P / \Delta V$.
 - b. It increases when surface tension increase.
 - c. It increases in fibrosis.

d. It decreases when surfactant decrease.

175. Concerning O₂ transport, the oxygen capacity of the blood is determined by:

a. Amount of O₂ dissolved in the blood.

b. Affinity of Hb for oxygen.

c. Amount of Hb in the blood.

d. All of the above are correct.

176. Physiological dead space:

a. Normally is equal to the anatomical dead space.

b. Is smaller than the anatomical dead space.

c. Can be greater than anatomical dead space.

d. a and c are correct.

177. Sever decrease in blood flow to the tissue may cause:

a. Anemic hypoxia.

b. Stagnant hypoxia.

c. Hypoxic hypoxia.

d. Histotoxic hypoxia.

178. The normal value for dead space volume of an adult person is about:

a. 150 / L.

b. 150 ml.

c. 150 ml/min.

d. 150 ml %.

179. The peripheral chemoreceptors respond mainly to:

a. Hypoxia.

b. Alkalosis.

c. Acidosis.

d. Hypercapnea.

180. Arterial PCO₂ is increased in a normal individual while:

a. Descending a mountain.

b. Hyperventilating.

c. Hypoventilating.

d. Breathing a gas mixture with high O₂.

181. Oxygen is transported in the blood mainly as:

a. Bicarbonate.

- b. Carboxyhemoglobin.**
- c. Carbaminohemoglobin.**
- d. Oxyhemoglobin.**

182. Expired gas when compared with atmospheric air has:

- a. Less O₂.**
- b. Less CO₂.**
- c. Less water vapor.**
- d. More nitrogen.**

183. The normal oxygen content of arterial blood is:

- a. 14 ml / mg.**
- b. 19 ml %.**
- c. 19 mg / ml.**
- d. 19 mg %.**

184. Concerning lung compliance:

- a. Its normal value is 200 ml / mmHg.**
- b. It is not affected by the surface tension.**
- c. It decreases in lung fibrosis.**
- d. $C = \Delta P / \Delta V$.**

185. Voluntary type of respiration originates from:

- a. Cerebellum.**
- b. Medulla.**
- c. Lungs.**
- d. Cerebral Cortex.**

186. If the tidal volume is 400ml, respiratory rate is 10 / min, and dead space volume is 100 ml, the pulmonary ventilation is:

- a. 3000 ml / min.**
- b. 4000 ml / min.**
- c. 5000 ml / min.**
- d. 6000 ml / min.**

187. Concerning the Lungs, which of the following is true:

- a. Its lining is formed mainly of Type 2 Alveolar cells that release surfactant.**
- b. The total surface area of lung is 70 – 80 square meters.**
- c. The alveolar Type 1 cells secrete the elastin and collagen fibers.**

- d. The pulmonary interstitial tissue contains some WBCs.**
- e. The conduction zone is responsible for conditioning of temperature in hot climate.**

188. Concerning the respiratory cycle:

- a. composed of 2 phases (inspiration & expiration) in normal conditions.**
- b. one of the causes that lead to expiration is lung distensibility.**
- c. at eupnea, the pulmonary ventilation ranges between 6 – 8 Liters.**
- d. during exercise, the duration of expiratory pause becomes less than in resting state.**
- e. contraction of external intercostals leads to increase in intra-thoracic pressure.**

189. During respiration:

- a. transverse diameter is increased by diaphragm contraction during inspiration.**
- b. external intercostals contraction helps in the generation of negative intra-pulmonary pressure.**
- c. external intercostals contraction helps in the inspiration only during exercise .**
- d. sternomastoid and scaleni helps only in the process of forced expiration.**
- e. at normal resting expiration, contraction of internal intercostals is the main cause of air outflow.**

190. Regarding the process of expiration, all the following are true EXCEPT:

- a. it is caused by increase in intra-pulmonary pressure in relation to atmospheric pressure.**
- b. it is always a passive process.**
- c. it happens when the diaphragm and external intercostals muscles relaxe.**
- d. during normal breath, 500 ml of air rushes out of the lungs.**
- e. the sternomastoid muscle may be used during inspiration in asthmatics persons.**

191. Which of the following is NOT true regarding central mechanism of respiration:

- a. the respiratory centers are located in the Midbrain, Pons and Medulla in brain stem.**

- b. the medullary centers are formed of dorsal and ventral respiratory groups.**
- c. the inspiratory center is located bilaterally in dorsal portion of medulla.**
- d. the inspiratory center is characterized by rhythmic and ramp manner.**
- e. the ventral respiratory group discharge leads to contraction of expiratory muscles.**

192. In relation to respiratory centers:

- a. the medullary centers have bilateral connection.**
- b. the medullary centers have reciprocal innervation.**
- c. fibers stimulating insp. medullary center send collaterals inhibits exp. Center at the same time.**
- d. all of the above are correct.**
- e. only a and b are correct.**

193. Regarding medullary respiratory centers:

- a. during quite breathing, the dorsal respiratory group generates inspiratory ramp signals.**
- b. the ventral respiratory group is activated during normal expiration.**
- c. the expiratory center is located in the dorsal part of medulla.**
- d. all of the above is correct.**
- e. none of the above is correct.**

194. Which of the following is NOT correct:

- a. during pneumotaxic center activation, the inspiratory ramp will be switched off.**
- b. with strong pneumotaxic center signals, the respiratory rate may reach 30 – 40 bpm.**
- c. strong pneumotaxic center signals lead to decrease duration of inspiration.**
- d. weak pneumotaxic center signals may prolong the duration of inspiration to reach 2 seconds.**
- e. the apneustic center is located in upper pons.**

195. The inspiration is switched off (inhibited) centrally by:

- a. pneumotaxic center.**
- b. vagi (Hering-Bruer inflation reflex).**
- c. stimulation of stretch receptors in the wall of bronchi and bronchioles.**

- d. all of the above.
- e. none of the above.

196. **The respiration (respiratory center) is stimulated by:**

- a. hypocapnea.
- b. alkalosis.
- c. increase in PCO_2 .
- d. increase in PO_2 .
- e. none of the above.

197. **Regarding chemical regulation of respiration:**

- a. the central chemo-receptors of respiration are located at ventro-lateral surface of medulla.
- b. the central chemo-receptors of respiration are integrated with respiratory center.
- c. the central chemo-receptors of respiration are stimulated by $\downarrow PCO_2$ in venous blood.
- d. only a & b are correct.
- e. none of the above is correct.

198. **Increase in respiratory rate may be caused by the following EXCEPT:**

- a. exercise.
- b. hypoxia.
- c. strong pneumotaxic center stimulation.
- d. decrease in CO_2 tension.
- e. acidosis.

199. **The peripheral chemo-receptors are located:**

- a. near to the respiratory center.
- b. close to the aortic arch.
- c. in the subclavian artery.
- d. in the interstitial lung tissue.
- e. none of the above.

200. **Concerning peripheral chemo-receptors:**

- a. stimulated only by arterial PCO_2 .
- b. stimulated mainly by arterial PCO_2 .
- c. is not affected by arterial O_2 tension.
- d. is stimulated in anemic patients due to $\downarrow PO_2$.

e. none of the above.

201. Which of the following is NOT true about nervous regulation of respiration:

- a. stimulation of stretch receptor in wall of bronchioles will inhibits the inspiratory center.**
- b. (Hering-Bruer inflation reflex) is one of the regulators of respiration.**
- c. the impulses from stretch receptors from bronchial wall are transmitted through vagus nerve.**
- d. inhalation of cigarette smoke may leads to bronchoconstriction.**
- e. inhalation of irritants will not affect the respiratory rate.**

202. Which of the following is NOT true:

- a. the sneezing, coughing and swallowing reflexes protects the airways from harmful irritants.**
- b. the coughing reflex is triggered by stimulation of irritant receptors in the nose.**
- c. the sneezing reflex helps the respiratory system to get rid of irritants.**
- d. the swallowing reflex helps in preventing food aspiration into the airways.**
- e. during swallowing, the glottis is closed by the mean of swallowing reflex.**

203. Regarding respiratory pressures:

- a. at end of inspiration, the intra-pulmonary (intra-alveolar) pressure becomes zero (atmospheric).**
- b. at end of expiration, the intra-pulmonary pressure is negative (less than the atmospheric).**
- c. during deep inspiration with closed glottis, the intra-pulmonary pressure is (-80 mmHg).**
- d. during (Vulsalva's maneuver), the intrapulmonary pressure is - 80 .**
- e. only a & c are correct.**

204. Which of the following values is NOT correct:

- a. the intra-pleural (intra-thoracic) pressure is negative during normal quite breathing.**
- b. the intra-pleural pressure is (- 6 mmHg / - 8 cm H₂O) at end of normal inspiration.**

- c. the intra-pleural pressure is ($- 3 \text{ mmHg} / - 4 \text{ cm H}_2\text{O}$) at end of normal expiration.
- d. the intra-pulmonary pressure is ($+ 40 \text{ mmHg}$) during forced expiration with closed glottis.
- e. the intra-pleural pressure is ($- 30 \text{ mmHg}$) at end of deep inspiration with closed glottis.

205. **Regarding surfactant:**

- a. its effectiveness is directly proportional to its concentration.
- b. its effectiveness is inversely proportional to the surface area of fluid lining alveoli.
- c. it prevents collapse of alveoli during inspiration.
- d. all of the above is correct.
- e. only a & b are correct.

206. **The lung alveoli could be prone to collapse in:**

- a. premature baby.
- b. after long open heart surgery.
- c. in respiratory distress syndrome.
- d. all of the above.
- e. only a & c are correct.

207. **Which of the following doesn't cause surfactant deficiency:**

- a. hyperthyroidism.
- b. cigarette smoking.
- c. respiratory distress syndrome.
- d. $\downarrow$ cortisone hormone.
- e. both a and d.

208. **Regarding dead space:**

- a. the alveolar dead space (DS) normally = 0 (zero).
- b. normally, the physiological DS = anatomical DS = alveolar DS = 150 ml.
- c. physiological DS = Anatomical DS + Alveolar DS.
- d. normally, alveolar DS is more than anatomical DS.
- e. a and c are correct.

209. **The lung compliance is:**

- a. decreased in emphysema.
- b. increases in old age.

- c. increase in lung fibrosis.
- d. increase in case of surfactant deficiency.
- e. none of the above.

210. Concerning airway resistance:

- a. 50% of airway resistance lies in the upper respiratory tract.
- b. resistance = pressure / flow.
- c. normally, it's about (2 Cm H₂O/L/sec).
- d. it is measured in Cm H₂O/L/sec.
- e. all of the above is correct.

211. The site of the most important physiological control of airways resistance is:

- a. nose, pharynx and larynx.
- b. alveolar sacs.
- c. medium sized bronchi and bronchioles.
- d. pulmonary capillaries.
- e. none of the above.

212. In respect of airway resistance:

- a. affected by autonomic nervous system.
- b. the vagal stimulation leads to bronchodilatation.
- c. it is inversely related to lung volume.
- d. it is decreased by mucous secretion.
- e. only a and c are correct.

213. At sea level, which of the following is NOT correct:

- a. PO₂ in atmospheric air = 100 mmHg.
- b. the partial pressure of CO₂ (PCO₂) in alveolar air = 40 mmHg.
- c. total pressure of gas mixture = barometric pr – water vapor partial pr = 713 mmHg .
- d. PO₂ in alveolar air = 80 mmHg.
- e. the atmospheric (barometric) pressure = 760 mmHg.

214. Which of the following is NOT correct:

- a. PO₂ in atmospheric air = 160 mmHg.
- b. PCO₂ in alveolar air = 40 mmHg.
- c. PO₂ in alveolar air = 100 mmHg.
- d. PO₂ in arterial blood = 100 mmHg.

e. PCO₂ in venous blood = 40 mmHg.

215. Which of the following is NOT correct:

- a. the pulmonary membrane is composed of 4 layers, 2 of them are fluids.**
- b. in aqueous media, CO₂ diffuses about 20 times as rapidly as oxygen .**
- c. solubility of CO₂ in water is more than that of O₂.**
- d. in lung diseases, hypoxia occurs faster than hypercapnea.**
- e. the pulmonary membrane surface area is normally about 70 m².**

216. The pulmonary membrane surface area increases in:

- a. old age.**
- b. exercise.**
- c. emphysema.**
- d. lung collapse.**
- e. none of the above.**

217. The diffusion of gases through pulmonary membrane is:

- a. inversely proportional with pressure gradient of gases across the membrane.**
- b. inversely proportional with the solubility of gas in aqueous media.**
- c. inversely proportional.**
- d. directly proportional with the Molecular Weight of gas.**
- e. affected by pulmonary edema.**

218. Regarding Oxygen in the blood, all of the following is true EXCEPT:

- a. PO₂ in arterial blood is 100 mmHg.**
- b. the ↑ in O₂ dissolved in blood leads to ↑ percentage of hemoglobin (Hb) saturation with O₂.**
- c. ↑ PO₂ leads to its dissociation from Hb.**
- d. combined O₂ with Hb is the main source of Oxygen to the tissues.**
- e. at (PO₂ = 100 mmHg), the O₂ content in arterial blood = 19 ml / 100 ml of blood.**

219. Regarding Oxyhemoglobin (O₂-Hb) dissociation curve, which is not true:

- a. it describes the affinity of Hb to O₂ at different PO₂ tensions**
- b. it is studying the relation between PO₂ and O₂ saturation**
- c. it is sigmoid shaped.**
- d. decreases in PCO₂ in blood shifts the curve to the right.**

