

Respiration

1) Which of the following is not part of the respiratory zone?

- a- alveolar sacs
- b- Alveolar ducts
- c- Terminal bronchioles
- d- Respiratory bronchiole

2) Inspiration occurs when the:

- a. Diaphragm contracts
- b. The alveolar pressure equals the atmospheric pressure
- c. The alveolar pressure increases
- d. The intra-pleural pressure becomes less negative

3) The muscles of inspiration include all of following, EXCEPT:

- a) diaphragm.
- b) external intercostals.
- c) sterno-cleido-mastoideus.
- d) internal intercostal.

4) The recoil tendency of the lungs:

- a) results from tendency of the lung to expand.
- b) is due to surface tension of the fluid lining the alveoli.
- c) increases during emphysema.
- d) decreases in lung fibrosis.

5) During inspiration there is decrease in the following except:

- a) Intra-alveolar pressure
- b) Intra-thoracic pressure
- c) Intra-atrial pressure
- d) Intra-abdominal pressure

6) Which of the following represents the pressure difference that acts to distend the lungs?

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

7) Intra-alveolar pressure:

- a- Is negative throughout normal quiet breathing
- b- Is zero during pause between inspiration and expiration
- c- Is greater than 5-6 mmHg during quiet expiration
- d- Is more negative than 5-6 mmHg during quiet inspiration

8) The intrapleural pressure at the end of inspiration is:

- a- - 4 mmHg
- b- + 4 mmHg
- c- - 6 mmHg
- d- + 6 mmHg

9) The intra-pleural pressure, all are correct except:

- a) Is always subatmospheric
- b) Helps in lung expansibility
- c) Is done by elastic recoil of lung against expansion of thoracic cage
- d) Is 40 cmH₂O during inspiration and 30 cmH₂O during expiration

10) Which of the following cells produce surfactant in lung alveoli?

- a- Endothelial cells
- b- Goblet cells
- c- Type I alveolar cells
- d- Type II alveolar cells e- Dust cells

17) **Bronchoconstriction** is produced by:

- a- Histamine
- b- Noradrenalin
- c- Vasopressin
- d- Adrenaline

18) The volume of air **inspired** above the tidal volume is called:

- a) **Inspiratory reserve volume**
- b) Residual volume
- c) Vital capacity
- d) Inspiratory capacity

19) The tidal volume in a normal man at rest is about:

- a. **0.5 L**
- b. 1.2 L
- c. 2.5 L
- d. 4.9 L

20) 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**

21) **Tidal volume** is air:

- a- Remaining in the lungs after forced expiration
- b- **Exchanged during normal breathing**
- c- Inhaled after quiet inspiration
- d- Forcibly expelled after normal expiration

11) **Surfactant:**

- a- Is the only cause of lung expansion
- b- Is produced by type-I alveolar cells
- c- Is commonly deficient in full term neonates
- d- Acts as surface tension lowering agent

12) **Surfactant:**

- a- Is a glycoprotein phospholipid
- b- Is secreted by type I pneumocytes type II
- c- Increases the surface tension of the alveolar fluid decrease
- d- May be deficient in respiratory distress syndrome premature babies

13) **The action of the ribs during breathing:**

- a- Carries the larynx downward
- b- Results in the contraction of the diaphragm, during expiration
- c- Increase antero-posterior and transverse diameters of thoracic cavity.
- d- Is that they are lowered during inhalation.

14) **In quiet breathing, expiration is:**

- a- Passive due to elastic tissue alone
- b- Passive due to surface tension in the alveoli and elastic tissue recoil
- c- Active due to contraction of internal intercostal muscles
- d- Active due to contraction of diaphragm

15) **Which of the following occurs during inspiration?**

- a- Diaphragm contracts and flattens
- b- Intrathoracic pressure does not change
- c- External intercostals relax
- d- Thoracic volume decreases

16) **Forced expiration**

- a- Is called hyperpnoea.
- b- Involves contraction of internal intercostal and abdominal muscles
- c- Is caused by contraction of external intercostal muscles
- d- Is that in which the intrathoracic pressure markedly decreased

22) Total lung capacity is equal to:

- a- Vital capacity x Tidal volume
- b- Functional residual capacity + Expiratory reserve volume
- c- Anatomical dead space + Alveolar dead space
- d- Residual volume + Vital capacity

23) Inspiratory capacity is:

- a- The total amount of air that can be inspired after a tidal expiration
- b- The total amount of exchangeable air
- c- Another name for functional residual capacity
- d- The amount of air inspired after a tidal inspiration

24) Vital capacity:

- a- Is increased in pregnancy
- b- Is dependent on the strength of the respiratory muscle
- c- Is higher in females than males
- d- All of the above are correct

25) The residual volume is:

- a) The air remaining in the lung after maximal inspiration
- b) A dynamic lung volume
- c) Measured directly using spirometer
- d) Measured by dilution method

26) If tidal volume is 0.5 L, respiratory rate is 12/min and dead space volume is 0.15 L, the pulmonary ventilation is:

- a) 4.2 L/min
- b) 4.2 ml/min
- c) 6 L/min
- d) 6 ml/min

27) **Functional residual capacity equals:**

- a) Residual volume + tidal volume.
- b) Residual volume + expiratory reserve volume.
- c) total lung capacity - tidal volume.
- d) tidal volume + inspiratory reserve volume.

28) **The vital capacity is reduced by all, EXCEPT:**

- a) lung fibres
- b) kyphosis
- c) athletes.
- d) decreased secretion of surfactant

29) **One of the following is NOT a function of dead space? formative**

- a- Warms expired air to body temperature.
- b- Saturates inspired air with water vapor,
- c- Removes bacteria and other particulate matter,
- d- Conducts the warmed air to the respiratory membranes

30) **Concerning dead space:**

- a) It is about 150 L in normal persons
- b) It is not present in normal persons
- c) Anatomical dead space can not be measured directly
- d) Physiological dead space equals anatomical dead space in healthy

31) **Concerning alveolar ventilation, all is true, except:**

- a- May be reduced while the pulmonary ventilation is normal.
- b- Is decreased by shallow rapid respiration.
- c- Equals $350 \text{ ml} \times 16$ at rest.
- d- Equals tidal volume $\times$ respiratory rate.

32) Which of following is a component of respiratory membrane?

- a- Plasma membrane of the alveolar cell
- b- Plasma membrane of the capillary endothelial cell
- c- Fused basal laminae of the alveolar and the capillary endothelial cell
- d- All of the above

33) The following factors affect the rate of gas diffusion through the respiratory membrane:

- a- Thickness of the respiratory membrane
- b- Surface area of the membrane
- c- Partial pressure difference between the two sides of the membrane
- d- All of the above

34) With respect to gas exchange across the alveolar membrane:

- a- The oxygen saturation in venous blood is 40%
- b- On average, the hemoglobin in 100ml of blood can combine with 20 ml of Oxygen
- c- Acidosis causes the oxygen - Hb dissociation curve to shift to the left
- d- Decreased CO₂ concentration causes the oxygen - Hb dissociation curve to shift to the right

35) Gas diffusion across the pulmonary membrane occurs through:

- a) simple diffusion.
- b) active transport.
- c) facilitated diffusion
- d) several layers of alveoli epithelium.

36) Most CO₂ is transported in the blood in the form of:

- a- Dissolved gas
- b- Carbaminohemoglobin
- c- Bicarbonate ion
- d- Carboxyhemoglobin

37) About 70% of the carbon dioxide is transported to the lungs:

- a- In the form of bicarbonate ions
- b- In the form of carbonic acid
- c- In the form of Carbaminohemoglobin
- d- In chemical combination with albumin

38) With respect to gas exchange across the alveolar membrane:

- a- Oxygen diffusion across the alveolar membrane is more rapid than carbon dioxide diffusion
- b- The intracellular partial pressure of CO_2 is 100 mmHg
- c- The partial pressure of CO_2 in tissue fluid is 45 mmHg
- d- The partial pressure of CO_2 in venous blood leaving tissues is 40 mmHg

39) Carbonic anhydrase:

- a- Is present in plasma
- b- Is present in erythrocytes
- c- Catalyses the reaction between carbon dioxide and hemoglobin
- d- Catalyses decomposition of citric acid into bicarbonate & hydrogen ions

40) Oxygen is mainly transported as:

- a) Carboxyhemoglobin
- b) Carbaminohemoglobin
- c) Oxyhemoglobin
- d) Dissolved gas in the blood

41) The oxygen content of arterial blood is about:

- a) 19 mg%
- b) 19 ml%
- c) 19 ml/mg
- d) 19 mg/min

42) Factors that cause shift of oxygen dissociation curve to right are:

- a- Increased 2, 3 DPG
- b- Acidosis.
- c- Increased temperature.
- d- All of the above.

43) During chloride shift:

- a- HCO_3 enters the RBC in exchange for Cl^-
- b- Red cell in arterial blood shrinks in size.
- c- Blood becomes more acidic.
- d- RBCs size in arterial blood is increased

44) Factors that shift oxygen dissociation curve to the left include:

- a- Acidosis
- b- Increased temperature.
- c- Carbon monoxide poisoning.
- d- Increased 2, 3 DPG

45) How much oxygen is normally carried in the blood?

- a- 2 ml oxygen/100 ml blood
- b- 5 ml oxygen/100ml blood
- c- 10 ml oxygen/100ml blood
- d- 20 ml oxygen/100ml blood

46) The oxygen-hemoglobin dissociation curve will shift to the right with:

- a- Acute alkalosis
- b- Decrease in PCO_2
- c- Decrease in temperature
- d- Exercise

47) **CO₂ is transported mainly as:**

- a) Carbonic acid
- b) **HCO³⁻**
- c) Carboxy hemoglobin
- d) Carbonate

48) **In the arterial blood: all are correct, except:**

- a) **The PCO₂ is 46 mmHg**
- b) The carbamino-compounds are less than in the venous blood
- c) CO₂ present as bicarbonate is 42 ml/100 ml blood
- d) CO₂ in physical solution is 3 ml/100 blood

49) **Tidal CO₂ means:**

- a) Volume of CO₂ produced in the body/min
- b) **Volume of CO₂ given to each 100 ml blood at the tissues**
- c) Carried mainly as bicarbonate
- d) Decreased during exercise

50) **During the chloride shift phenomena:**

- a) Bicarbonate ion enter the red cell in exchange for chloride
- b) **Red cell size in venous blood is increased**
- c) Blood pH rises
- d) Potassium ion concentration inside RBC decreases

51) **When compared with alveolar air, the expired air has:**

- a) Less oxygen
- b) Less water vapour
- c) **Less CO₂**
- d) More O₂ and CO₂

52) **The respiratory center receives inhibitory impulses from:**

- a) Hypothalamus
- b) Cerebral cortex
- c) Aortic bodies
- d) **Pneumotaxic center**

53) **Respiratory chemoreceptors:**

- a- In the carotid and aortic-bodies are most important in the ventilator response to an elevated PCO_2
- b- In the carotid and aortic bodies are strongly stimulated by the high arterial O_2 content
- c- In the medulla are responsive to changes in arterial PCO_2
- d- All of the above are correct

54) Which of the following discharge spontaneously during quiet breathing?

- a- Stretch receptors in lung
- b- Motor neurons of respiratory muscles
- c- **Dorsal respiratory group of neurons**
- d- Ventral respiratory group of neurons

55) **Pneumotaxic center functions primarily to:**

- a- Limit inspiration
- b- Prolong expiration
- c- Decrease rate
- d- Discharge inspiratory action potentials

56) **The respiratory center is located in the:**

- a) Hypothalamus
- b) **Pons and medulla**
- c) Cerebral cortex
- d) Cerebellum

57) **An immediate stoppage of respiration occurs in the following:**

- a) Transection of the spinal cord below the 7th cervical vertebra
- b) **Transection of spinal cord at the level of the second cervical vertebra**
- c) Transection between the pons and medulla
- d) Section of both vagi



58) **The apneustic center:**

- a) Is present in the lower pons
- b) Can initiate rhythmic inspirations
- c) Sends excitatory impulses to the Inspiratory center
- d) **All of the above**

59) **Peripheral chemoreceptors are stimulated by:**

- a- **Hypoxia**
- b- Anemia
- c- Hypocapnia
- d- Alkalosis

60) **The activity of the central chemoreceptors is stimulated by:**

- 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

61) **Non-chemical regulation of respiration include all of the following, EXCEPT:**

- a) pain sensation through hypothalamus.
- b) swallowing.
- c) coughing,
- d) **hypoxia.**

62) **If the vagus nerves are cut, the respiratory rate:**

- a) increases
- b) **decreases.**
- c) remains constant.
- d) stops.

63) Hypoxic hypoxia:
a- Is characterized by normal oxygen tension in arterial blood and normal saturation of hemoglobin with oxygen.
b- Is accompanied with cyanosis.
c- Is produced by carbon monoxide poisoning.
d- Is accompanied with low hemoglobin content.

64) Hypoxic hypoxia is caused by:

- a) Hyperventilation
- b) Anemia
- c) Ascending to high altitude
- d) Severe cold

65) Pulmonary fibrosis would be expected to produce:

- a) Histotoxic hypoxia
- b) Stagnant hypoxia
- c) Decreased vital capacity
- d) Cyanosis

66) Concerning CO-poisoning:

- a) Hemoglobin content is normal
- b) Oxygen tension is below normal normal correction
- c) Oxygen content is normal subnormal
- d) The oxyhemoglobin dissociation curve is shifted to the right left

67) Anemic hypoxia is caused by all of the following, except:

- a) CO-poisoning
- b) Blood loss
- c) Anemia
- d) Polycythemia

- 73) Cyanosis:
- a) may be caused by high levels of Carboxyhemoglobin in the blood.
 - b) occurs more easily in anemic than in polycythemic patients.
 - c) is severe in cyanide poisoning.
 - d) Observed in stagnant and hypoxic hypoxia.

74) Expiration during rest occurs when:

- a- The diaphragm contracts
- b- The respiratory center gets active
- c- The pressure inside the alveoli becomes less than atmospheric pressure
- d- The diaphragm relaxes

75) The recoil tendency of the lungs:

- a) results from tendency of the lung to expand.
- b) is due to surface tension of the fluid lining the alveoli.
- c) increases during emphysema.
- d) decreases in lung fibrosis.

76) During inspiration there is decrease in the following except:

- a- Intra-alveolar pressure
- b- Intra-thoracic pressure
- c- Intra-atrial pressure
- d- Intra-abdominal pressure

77) During normal inspiration, the intra-alveolar pressure:

- a- Does not change
- b- Becomes about 1 mmHg negative to the atmospheric pressure
- c- Decreases to 6 mmHg
- d- Becomes positive at the end of inspiration

68) **Stagnant hypoxia is caused by:**

- a) A large increase in RBC count (polycythemia)
- b) A decrease in Hb content (anemia)
- c) Ascending to high altitude
- d) None of the above

69) **Anemic hypoxia is caused by:**

- a) Lung fibrosis
- b) Congestive heart failure
- c) Cyanide poisoning
- d) CO-poisoning

70) **Cyanosis is caused by which of the following:**

- a) An increase in the affinity of hemoglobin for oxygen
- b) A decrease in the percent of red blood cells
- c) An increase amount of carbon monoxide
- d) An increase in the concentration of deoxygenated hemoglobin

correction

more than

71) **Cyanosis:**

- a- Can be seen in a person if his capillary blood contains 5 mg reduced hemoglobin per 100 ml blood.
- b- Is observed in histotoxic hypoxia.
- c- Is seen in carbon monoxide poisoning
- d- Is present in severe lung disease

72) **Coughing:**

- a) is initiated by irritation of the alveoli.
- b) is associated with relaxation of airways smooth muscle.
- c) depends on contraction of the diaphragm
- d) differs from sneezing in that the glottis is initially closed.

d.

78) The most likely response in a patient with pneumothorax upon entry of air into the chest would be:

- a- The lungs collapse inward and the chest wall collapses inward
- b- The lungs collapse inward and the chest wall springs outward
- c- The lungs expand outward and the chest wall springs inward
- d- The lungs expand outward and the chest wall springs outward

79) Concerning the alveolar pressure:

- a- It is negative only during inspiration
- b- It is always negative
- c- It is negative between breaths
- d- It is higher during inspiration than during expiration

80) The intra-pleural pressure, all are correct except:

- a- Is always subatmospheric
- b- Helps in lung expansibility
- c- Is done by elastic recoil of lung against expansion of thoracic cage
- d- Is 50 cmH₂O during inspiration and 3 cmH₂O during expiration

81) A major function of surfactant is to increase:

- a- Alveolar surface tension
- b- Pulmonary compliance
- c- Release of 62 from hemoglobin in alveolar capillaries
- d- The work of breathing

82) The action of the ribs during breathing:

- a- Carries the larynx downward
- b- Results in the contraction of the diaphragm, during expiration
- c- Increase antero-posterior and transverse diameters of thoracic cavity.
- d- Is that they are lowered during inhalation.

83) Inspiration:

- a- is accomplished by increasing the volume of the lungs.
- b- Takes place when the air pressure in the lungs equals atmospheric pressure
- c- Is accompanied by an increase in intrapleural pressure
- d- Occurs when the lung volume is decreased

84) Which of the following occurs during inspiration?

- a- Diaphragm contracts and flattens
- b- Intrathoracic pressure does not change
- c- External intercostals relax
- d- Thoracic volume decreases

85) Which of the following are muscles of inspiration?

- a- Abdominal muscles and external intercostals
- b- Diaphragm and abdominal muscles
- c- Diaphragm and external intercostals
- d- Diaphragm and internal intercostals

86) Forced expiration

- a- Is called hyperpnoea.
- b- Involves contraction of internal intercostal and abdominal muscles
- c- Is caused by contraction of both internal and external intercostals
- d- Is that in which the intrathoracic pressure markedly decreased

87) Bronchoconstriction is produced by:

- a- Histamine
- b- Noradrenaline
- c- Vasopressin
- d- Adrenaline

88) 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)

89) The residual volume:

- a- Cannot be measured directly with a spirometer
- b- Is part of vital capacity
- c- Is part of the expiratory reserve volume
- d- Is the volume at which the lungs tend to recoil outwards

90) Surfactant:

- a- Is completely formed at 6 months of intrauterine life
- b- Is secreted by type II alveolar cells
- c- Is responsible for static hysteresis
- d- Increased with cigarette smoking

91) Deficient surfactant secretion may lead to all, except:

- a- Respiratory distress syndrome
- b- Pulmonary edema
- c- Decreased work of breathing
- d- Normal respiratory rate

92) Which of the following lung volumes and capacities can not be measured directly by an ordinary spirometer?

- a) VC
- b) FRC
- c) TV
- d) IRV

98) **Maximal breathing capacity:**

- a) increases in pregnancy.
- b) is measured by dilution method.
- c) is measured by spirometer
- d) equals 3500 ml/minute.

99) **Gas diffusion across the pulmonary membrane occurs through:**

- a) simple diffusion.
- b) active transport.
- c) facilitated diffusion
- d) several layers of alveoli epithelium.

100) **By spirometry alone it is impossible to find out values for:**

- a) functional residual capacity.
- b) total lung capacity,
- c) residual volume,
- d) all of the above.

101) **The residual volume:**

- a) Is measured by nitrogen meter method
- b) Increases with emphysema
- c) Normally equal to 35% of total lung capacity
- d) Decreases in old age

102) **The functional residual capacity includes:** 2

- a) The residual volume + the tidal volume
- b) The ideal volume + the expiratory reserve volume
- c) The tidal volume + the inspiratory reserve volume
- d) The residual volume + the expiratory reserve volume

93) After forced expiration, the lung contains:

- a) Functional residual capacity
- b) Residual volume
- c) Minimal air
- d) Total lung capacity

94) Vital capacity is: 3

- a) The sum of the Inspiratory and expiratory reserve volumes
- b) Increased in old age
- c) The volume of air expired from full inspiration to full expiration
- d) Greater in women than in men

95) FEV₁:

- a) is normally 55% of vital capacity in health.
- b) reduced in obstructive lung disease.
- c) is greater than FVC in healthy subject.
- d) increases in bronchial asthma.

96) Functional residual capacity (FRC): 2

- a) Volume of air remaining in the lung after end of forced expiration
- b) Volume of air remaining in the lung after quite inspiration
- c) Volume of air remaining in the lung by the end of quite expiration
- d) When the lung contains FRC, the intra-pleural pressure is 6 mmHg

97) All the following volumes can be measured by spirometry, except:

- a) The tidal volume
- b) The expiratory reserve volume
- c) The vital capacity
- d) The functional residual capacity

103) The volume of air inspired above tidal volume is called:

- a) The expiratory reserve volume
- b) The vital capacity
- c) The inspiratory reserve volume
- d) The functional residual capacity

104) Concerning the pulmonary volumes, all the following are correct, except:

- a) The tidal volume in a normal adult is 500 ml air
- b) The residual volume cannot be measured by spirometry
- c) The vital capacity increases in restrictive lung disease
- d) The total lung capacity = The vital capacity + the residual volume

105) The residual volume is:

- a) The air remaining in the lung after maximal inspiration
- b) A dynamic lung volume correction static
- c) Measured directly using spirometer
- d) Measured by dilution method

106) The breathing reserve is the:

- a) Maximum breathing capacity minus respiratory minute volume
- b) Maximum breathing capacity minus tidal volume
- c) Maximum breathing capacity divided by minute volume
- d) Maximum breathing capacity divided by tidal volume

107) Concerning dead space:

- a) It is about 150 L in normal persons
- b) It is not present in normal persons
- c) Anatomical dead space can not be measured directly
- d) Physiological dead space equals anatomical dead space in healthy

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108) **Concerning dead space:**

- a) Dead space volume equals the alveolar ventilation
- b) Anatomical dead space measures the volume of air in the conducting airways only
- c) Physiological dead space measures the volume of air in the alveoli and conducting airways
- d) Anatomical dead space volume is usually greater than the physiological dead space

109) **Dead space:**

- a) Volume of air that undergoes gas exchange
- b) Explain the difference between alveolar and pulmonary ventilation
- c) Normally, physiological dead space is more than anatomical dead space
- d) Can be measured by respirometer

110) **In a normal adult, the dead space contributes to:**

- a) 10% of the tidal volume
- b) 20% of the tidal volume
- c) 30% of the tidal volume
- d) 40% of the tidal volume

111) **Compliance of the lung:**

- a) Measures the recoil tendency of the lung
- b) Is expressed as change in volume per unit change in pressure
- c) Is expressed as change in pressure per unit change in volume
- d) Is less than the total thoracic compliance (combined compliance of the lung and chest wall)

112) **The lung compliance:**

- a) Measures the recoil tendency of lung
- b) Is a measure of the expansibility of the lung
- c) Is increased in fibrosis
- d) Does not change in emphysema

113) Which of the following is correct concerning lung compliance?

- a) If can be obtained from the pressure-volume curve
- b) Lung compliance is highest at TLC
- c) Lung compliance is highest at residual volume
- d) Total thoracic compliance = lung compliance + chest wall compliance

114) Work of breathing increases in all, except:

- a) Increased lung compliance
- b) Narrowing of respiratory passages
- c) Hyaline membrane diseases
- d) Restrictive lung diseases

115) Lung compliance:

- a) Is a measure of recoil tendency of the lungs
- b) Decreases in emphysema increase
- c) Increases during lung fibrosis decrease
- d) Is ratio of changes of lung volume to changes in transmural pressure

116) Concerning the ventilation/perfusion ratio all the following are correct, except:

- a) Is normally 0.8
- b) Is uniform throughout the lung
- c) It increases in the apex
- d) Decreases in the base

117) Increased airway resistance occurs in all, except:

- a) Sympathetic stimulation bronchodilatation
- b) Bronchial asthma
- c) Parasympathetic stimulation
- d) Old age

118) **Concerning ventilation perfusion ratio:**

- a) There is more ventilation than perfusion at the base of the lung
- b) The ratio is constant throughout the lung
- c) The ratio is 8.0 for the whole lung
- d) The ratio is less at the base than at the apex of the lung

119) **Which of the following is higher at the apex of the lung that standing?**

- a) Blood flow
- b) V/Q ratio
- c) Ventilation
- d) Lung compliance

120) **Alveolar ventilation. All are true, except:**

- a) May be reduced while the pulmonary ventilation is normal
- b) Is decreased by shallow rapid respiration
- c) Equals $350 \text{ ml} \times 16$ at rest
- d) Equals tidal volume $\times$ respiratory rate

121) **Which of the following is a component of the respiratory membrane?**

- a- Plasma membrane of the alveolar cell
- b- Plasma membrane of the capillary endothelial cell
- c- Fused basal laminae of the alveolar and the capillary endothelial cell
- d- All of the above

122) **The following factors affect the rate of gas diffusion through the respiratory, membrane:**

- a- Thickness of the respiratory membrane
- b- Surface area of the membrane
- c- Partial pressure difference between the two sides of the membrane .
- d- All of the above

123) Concerning distribution of ventilation and perfusion:

- a- Gradient of change in ventilation is greater than that for perfusion
- b- Ventilation increases as we go up the lung
- c- Perfusion increases as we go up the lung
- d- VA/Q ratio at apex is greater than at base

124) Which one of the following is higher at the apex of the lung than at the base when a person is standing?

- a. VA/Q ratio
- b. Blood flow
- c. Ventilation
- d. PaCO_2

125) Ventilation/perfusion (VA/Q) ratio:

- a- Is lower at the apices of the lungs than at bases in the upright position
- b- Is expected to increase in obstructive lung disease
- c- May be determined from the respiratory minute volume and the pulmonary blood flow
- d- Is expected to increase following blockage of a major pulmonary artery

126) Most CO_2 is transported in the blood in the form of:

- a- Dissolved gas
- b- Carbaminohemoglobin
- c- Bicarbonate ion
- d- Carboxyhemoglobin

127) About 70% of the carbon dioxide is transported to the lungs:

- a- In the form of bicarbonate ions
- b- In the form of carbonic acid
- c- In the form of Carbaminohemoglobin
- d- In chemical combination with albumin

128) With respect to the binding of carbon monoxide to haemoglobin:

- a- The binding site of carbon monoxide to Hb is different from that of oxygen
- b- Hemoglobin has a higher affinity for carbon monoxide than for oxygen
- c- 97% of carbon monoxide transported by blood is in solution in the water of plasma
- d- The carbon monoxide-Hb dissociation curve lies to the right of the oxygen-Hb dissociation curve

129) Carbon dioxide is transported in blood in the following forms, except:

- a- In solution in the water of plasma
 - b- As bicarbonate ion
 - c- Combined to hemoglobin to form Carboxyhemoglobin
 - d- Bound to plasma proteins
- correction carbaminohemoglobin

130) With respect to gas exchange across the alveolar membrane:

- a- Oxygen diffusion across the alveolar membrane is more rapid CO₂
- b- The intracellular partial pressure of CO₂ is 100 mmHg
- c- The partial pressure of CO₂ in tissue fluid is 45 mmHg
- d- The partial pressure of CO₂ in venous blood leaving tissues is 40 mmHg

131) Adult hemoglobin:

- a) has more affinity for O₂ than myoglobin.
- b) has less affinity for O₂ than fetal Hb.
- c) has 2 alpha and 2 gamma polypeptide chain.
- d) has iron in the ferric state.

132) Oxygen-Hb dissociation curve shift to the left by:

- a) acidosis.
- b) adult Hb.
- c) fetal Hb.
- d) hyperthermia.

133) Tidal CO_2 :

- a) the amount of CO_2 in the tidal air.
- b) carried mainly in the form of carbamino compound.
- c) is about 20 ml.
- d) is the amount of CO_2 added to each 100 ml arterial blood.

134) During the chloride shift phenomena:

- a) bicarbonate ion enter the red cell in exchange for chloride.
- b) red cell size in venous blood is increased.
- c) blood pH rises.
- d) potassium ion concentration inside RBC decreases.

135) Most of venous CO_2 is in the form of:

- a) bicarbonate.
- b) carbonic acid.
- c) dissolved CO_2 .
- d) carbamino haemoglobin.

136) During the chloride shift phenomena:

- a) Bicarbonate ion enter the red cell in exchange for chloride
- b) Red cell size in venous blood is increased
- c) Blood pH rises
- d) Potassium ion concentration inside RBC decreases

137) In chloride shift phenomena at the tissues:

- a) Chloride ions increases in plasma
- b) Bicarbonate ions increase in plasma
- c) Na^+ ions diffuses out of RBCs
- d) K^+ ions diffuses in the RBCs

138) **Carbonic anhydrase:**

- a- Is present in plasma
- b- Is present in erythrocytes
- c- Catalyses the reaction between carbon dioxide and hemoglobin
- d- Catalyses decomposition of carbonic acid into bicarbonate & hydrogen

139) **How much oxygen is normally carried in the blood?**

- a- 2 ml oxygen/100 ml blood
- b- 5 ml oxygen/100ml blood
- c- 10 ml oxygen/100ml blood
- d- 20 ml oxygen/100ml blood

140) **The oxygen-hemoglobin dissociation curve will shift to the right with:**

- a- Acute alkalosis
- b- Decrease in PCO_2
- c- Decrease in temperature
- d- Exercise

141) **Which of the following variables must be known to calculate Inspiratory reserve volume?**

- a- Tidal volume and expiratory reserve volume
- b- Tidal volume and residual volume
- c- Tidal volume, vital capacity and expiratory reserve volume
- d- Tidal volume, vital capacity and residual volume

142) **All about diffusion of O_2 across a membrane is correct, except:**

- a- Increasing the thickness of the membrane would decrease flow of O_2
- b- Increasing the area of the membrane would increase the flow of O_2 .
- c- If you increased the alveolar concentration of C_2 , you would increase the total flow of O_2 across the alveolar membrane
- d- The lower the diffusion coefficient, the higher the flow.

143) **Oxygen unloading:**

- a- Increases with increased P_{aCO_2}
- b- Decreases with increase in temperature
- c- Decreases with increase in 2, 3 DPG
- d- Increases with exposure to carbon monoxide poisoning

144) **Concerning the interaction of respiratory centers in the brainstem and their effect on respiration:**

- a- Sectioning the brainstem above the pons, near the inferior colliculus of the midbrain results in immediate respiratory arrest
- b- The medullary center is a discrete group of neurons whose rhythmicity is abolished when the brain is transected above and below this area
- c- Transection above the apneustic center results in prolonged expiration and very short inspiration

d- Transection of the afferent fibers of the vagus and glossopharyngeal nerves results in prolonged inspiration and shortened expiration

145) **The most potent stimulator of the respiratory center is:**

- a- Decrease in the blood oxygen tension
- b- Decrease in the blood hydrogen ion concentration
- c- Decrease in the carbon dioxide tension in the cerebrospinal fluid
- d- Increase in the blood carbon dioxide tension

146) **The largest amount of CO_2 is transported by the blood as:**

- a) CO_2 in plasma.
- b) H_2CO_3 in plasma.
- c) $HbCO_2$.
- d) HCO_3^- ion in plasma.

147) Medullary Inspiratory neurons are stimulated by:

- a) afferent impulses from proprioceptors.
- b) Vagal afferent from lung stretch receptors.
- c) increased hydrogen ion concentration in arterial blood.
- d) afferent impulses from arterial baroreceptors.

148) Regarding the nervous control of respiration:

- a) the apneustic centre sends inhibitory impulses to inspiratory centre,
- b) the Inspiratory centre is present in the medulla.
- c) the cerebral cortex has no effect on respiration.
- d) Pneumotaxic centre stimulates inspiration.

149) Non-chemical influence on respiration include all of the following, EXCEPT:

- a) pain sensation through hypothalamus.
- b) swallowing.
- c) coughing,
- d) hypoxia.

150) Destruction of the pneumotaxic centre and cutting of the vagus nerves lead to:

- a) apnea.
- b) hyperventilation.
- c) periodic breathing
- d) apneusis.

151) If the vagus nerves are cut, the respiratory rate:

- a) increases
- b) decreases.
- c) remains constant.
- d) disappears.

152) **Respiratory chemoreceptors:**

- a- In the carotid and aortic-bodies are most important in the ventilator response to an elevated PCO_2
- b- In the carotid and aortic bodies are strongly stimulated by the low arterial O_2 content in anemic patients
- c- In the medulla are responsive to changes in arterial PCO_2
- d- All of the above are correct

153) Which of the following discharge spontaneously during quiet breathing?

- a- Stretch receptors in lung
- b- Motor neurons of respiratory muscles
- c- Dorsal respiratory group of neurons
- d- Ventral respiratory group of neurons

154) **Pneumotaxic center functions primarily to:**

- a- Limit inspiration
- b- Prolong expiration
- c- Decrease rate
- d- Discharge inspiratory action potentials

155) **Peripheral chemoreceptors are stimulated by:**

- a- Hypoxia
- b- Anemia
- c- Hypocapnia
- d- Alkalosis

156) **All about peripheral chemoreceptors is true, except:**

- a- Are located in the carotid sinus correction body
- b- Are located in the aortic body
- c- Are more sensitive to changes in PO_2 than the central chemoreceptors
- d- Have a rich blood supply

157) The carotid and aortic bodies increase their rate of discharge in response to:

- a- Blood H^+ concentration
- b- Blood O_2 content,
- c- The partial pressure of CO_2 .
- d- Dissolved oxygen in CSF

158) Concerning alveolar ventilation, all is true, except:

- a- May be reduced while the pulmonary ventilation is normal.
- b- Is decreased by shallow rapid respiration.
- c- Equals $350 \text{ ml} \times 16$ at rest.
- d- Equals tidal volume $\times$ respiratory rate.

159) The respiratory center receives inhibitory impulses from:

- a) Hypothalamus
- b) Cerebral cortex
- c) Aortic bodies
- d) Pneumotaxic center

160) The main function of the Pneumotaxic center is:

- a) To limit the duration of inspiration
- b) To activate the apneustic center
- c) To mediate the Herring Breuer reflexes
- d) Inhibited by Vagal afferents

161) Concerning the respiratory centers:

- a) Apneustic center is a medullary center
- b) Ramp signal increase 3 second and stop 2 second
- c) Bilateral vagotomy is associated with increase the tidal volume
- d) Damage of the apneustic centers causes apneustic respiration

167) Peripheral chemoreceptors respond mainly to:

- a) Alkalosis
- b) Hypoxia
- c) Hypothermia
- d) Hyperventilation

168) Hypoxic hypoxia is caused by:

- a) Hyperventilation
- b) Anemia
- c) Ascending to high altitude
- d) Severe cold

169) Concerning CO-poisoning:

- a) Hemoglobin content is normal
- b) Oxygen tension is below normal
- c) Oxygen content is normal
- d) The oxyhemoglobin dissociation curve is shifted to the right

170) Anemic hypoxia is caused by all of the following, except:

- a) CO-poisoning
- b) Blood loss
- c) Anemia
- d) Polycythemia

171) Stagnant hypoxia is caused by:

- a) A large increase in RBC count (polycythemia)
- b) A decrease in Hb content (anemia)
- c) Ascending to high altitude
- d) None of the above

162) An increase in the activity of the afferent nerves associated with Hering-Breuer reflex indicates that:

- a) inspiration is occurring.
- b) expiration is occurring.
- c) pulmonary congestion.
- d) PO₂ in arterial blood is less than 60 mmHg.

163) The basic respiratory rhythm is generated in the :

- a) Pneumotaxic centre.
- b) nucleus parabrachialis.
- c) dorsal medulla.
- d) apneustic centre.

164) The apneustic center:

- a) Is present in the lower pons
- b) Can initiate rhythmic inspirations
- c) Sends excitatory impulses to the Inspiratory center
- d) All of the above

165) Concerning the chemoreceptors:

- a) The aortic bodies are the main central chemoreceptors
- b) Central chemoreceptors are not normally responding to hypercapnia
- c) Peripheral chemoreceptors are stimulated mainly by alkalosis
- d) Impulses from the carotid bodies to the RC are carried through the glossopharyngeal nerve

166) Peripheral and central chemoreceptors are stimulated simultaneously as a result of:

- a) A decrease in arterial oxygen content
- b) A decrease in arterial oxygen tension
- c) An increase in arterial carbon dioxide tension
- d) An increase in arterial pH

177) **Cyanosis:**

- a) is due to the presence of reduced Hb more than 5 gm% in blood.
- b) is seen in histotoxic hypoxia.
- c) is commonly seen in anemic person.
- d) is due to increased % of oxygenated Hb.

178) **Hypoxic hypoxia is caused by:**

- a) more oxygen in air.
- b) poisoning of oxidative enzyme.
- c) high altitude
- d) too little Hb in blood.

179) **Cyanosis is caused by:**

correction more than 5 gm/100ml

- a) presence of 5 mg of reduced hemoglobin per 100 ml blood.
- b) carbon monoxide poisoning.
- c) low Hb percentage.
- d) slow blood flow.

180) **Hypoxic hypoxia is caused by:**

- a) more oxygen in air.
- b) poisoning of oxidative enzyme.
- c) high altitude .
- d) too little Hb in blood.

181) **Cyanosis:**

- a) can be seen in a person if his capillary blood contains 5 mg reduced hemoglobin per 100 ml blood.
- b) is observed in histotoxic hypoxia.
- c) is seen in carbon monoxide poisoning.
- d) is present in severe ventilation perfusion imbalance.

182) **Hypoxic hypoxia:**

- a) is characterized by normal oxygen tension in arterial blood and normal saturation of hemoglobin with oxygen,
- b) is accompanied with cyanosis.
- c) is produced by carbon monoxide poisoning.
- d) is accompanied with low hemoglobin content.

172) Anemic hypoxia is caused by:

- a) Lung fibrosis
- b) Congestive heart failure
- c) Cyanide poisoning
- d) CO-poisoning

173) Cyanosis is caused by which of the following:

- a) An increase in the affinity of hemoglobin for oxygen
- b) A decrease in the percent of red blood cells
- c) An increase amount of carbon monoxide
- d) An increase in the concentration of deoxygenated hemoglobin

174) Cyanosis:

- a) is due to pressure of 5 mg reduced hemoglobin per 100 ml blood
- b) is observed in anemia,
- c) is observed in hypoxic hypoxia
- d) is observed in cyanide poisoning.

175) Anemic hypoxia include all of the following, EXCEPT:

- a) lower Hb content.
 - b) low number of RBCs.
 - c) low PO₂ in physical solution in arterial blood.
 - d) increased 2,3 DPG.
- correction normal oxygen tension

176) Regarding cyanosis, all are true, EXCEPT:

- a) is more likely with a person with a high than with a low Hb level.
- b) is produced when there is at least 5 gms of reduced Hb/100 ml blood.
- c) is seen in histotoxic type of hypoxia.
- d) when it is central in origin the tongue is also affected.