

Respiration

Fill in the Blank

1. The serve as the conducting portion of the respiratory system, and the are the gas-exchanging portion.
2. Pulmonary ventilation is another name for the mechanical act of
3. The respiratory quotient is the ratio of to
4. The exchange of O₂ and CO₂ between the external environment and tissue cells is known as
5. The vocal folds are found in the among the respiratory passages.
6. The serves as a common passageway for both the respiratory and digestive systems.
7. is the inflammation of the pleural sac.
8. The most profound changes in thoracic volume can be accomplished by contraction of the
9. The pressure is the pressure exerted by the weight of the air in the atmosphere.
10. According to law, at any constant temperature, the pressure of a gas varies inversely with the volume of the gas.
11. The nerve supplies the diaphragm.
12. Contraction of the external muscles elevates the ribs.
13. is a respiratory disease characterized by collapse of the smaller airways and a breakdown of alveolar walls.
14. When it relaxes, the diaphragm resumes an elevated, ...-shaped position.
15. As the resistance of the air passages increases, the airflow through them if the pressure gradient remains constant.
16. The primary factor that determines the % Hb saturation is the
17. Pulmonary surfactant contributes to lung stability by surface tension.

18. The effect refers to the reduced affinity of Hb for O₂ in the presence of increased CO₂ and H⁺.
19. refers to a ventilation rate that exceeds the metabolic needs of the body.
20. The primary respiratory control center that provides output to the respiratory muscles is located in the
21. A drop in the oxygen levels in arterial blood the central chemoreceptors.
22. The VRG consists of and neurons.
23. The peripheral chemoreceptors are located in the and aortic bodies.
24. is the transient cessation of breathing.
25. If a person ascended a mountain where the atmospheric pressure was only 500 mmHg, what would the PO₂ of the air be, assuming that the air consisted of 21% O₂?
26. If the concentration of carbon dioxide at sea level (760 mm Hg) is 0.04 of 1.0%, the partial pressure of this gas is mm of Hg.
27. If the vital capacity of a person is 4800 ml, while the TV 500 ml and the ERV 900 ml, the IRV is ml.

True/False

1. The respiratory system is the only system involved with the exchange of gas between the cells of an organism and the external environment.
2. Exhaled air passes from the larynx through the trachea.
3. The respiratory airways filter, warm, and humidify incoming air.
4. The intrapleural cavity is located inside the lungs.
5. All respiratory airways are held open by cartilaginous rings.
6. The alveoli are encircled by capillaries.
7. The intrapleural pressure is negative to maintain lung inflation.
8. The pleural cavity normally is not in direct communication with the lungs or atmosphere.
9. At the end of inspiration and at the end of expiration, intra-alveolar pressure is always equal to atmospheric pressure.
10. Intrapleural pressure is usually less than atmospheric pressure.
11. The abdominal muscles are expiratory muscles.
12. The internal intercostal muscles are inspiratory muscles because they lift the ribs upward and outward to enlarge the thoracic cavity.
13. At a constant temperature, the pressure that a gas exerts depends on the volume that it occupies.
14. In the breathing cycle, the atmospheric pressure normally does not change.
15. The quantity of air that will flow into and out of the lungs depends solely on the radius of the respiratory airways.
16. Inspiration is always an active process.
17. Expiration is always a passive process.
18. Stimulation of the sympathetic nervous system and epinephrine release lead to an increase in airway resistance.
19. Elastic recoil refers to the tendency of the chest wall to expand.
20. Pulmonary surfactant increases alveolar surface tension and does not affect lung expansion.
21. Pulmonary surfactant is secreted by Type II alveolar cells.
22. Pulmonary surfactant reduces the work of breathing and increases lung stability by increasing alveolar surface tension.

23. Newborn respiratory distress syndrome is caused by an excess of pulmonary surfactant.
24. If there is a deficient supply of pulmonary surfactant, the lungs become more compliant.
25. A highly compliant lung is easier to stretch than a less compliant one.
26. Emphysema can be brought on by recurrent episodes of asthma and/or chronic bronchitis..
27. According to LaPlace's law, the magnitude of the inward-directed collapsing pressure of a spherical bubble is directly proportional to both the surface tension and the radius of the bubble.
28. Patients suffering from chronic obstructive pulmonary disease generally have more trouble exhaling than inhaling.
29. Boyle's law states that the pressure exerted by a gas varies directly with the volume of the gas.
30. To produce a normal tidal volume, the expiratory muscles must be stimulated.
31. Deep breaths usually result in the greatest alveolar ventilation rates.
32. If a person is breathing rapidly, it is safe to assume that he or she is getting adequate ventilation.
33. The skeletal muscles for breathing are located in the walls of the lungs.
34. The 500 ml of air that is inspired is the same 500 ml of air that enters the alveoli during a single breath.
35. O_2 moves from the alveoli to the blood by active transport.
36. During external respiration, the PO_2 is greater in the alveoli than in the blood of the pulmonary capillaries.
37. The tidal volume is the sum of the vital capacity, expiratory reserve volume, and inspiratory reserve volume.
38. The quantity of O_2 that will diffuse between the alveolar air and pulmonary blood depends solely on the partial pressure gradients that exist between the alveoli and blood.
39. Systemic arterial PO_2 is greater than tissue PO_2 .
40. A molecule of nitrogen exerts more pressure than a molecule of oxygen because nitrogen is a larger molecule.

41. The partial pressure of nitrogen in the atmosphere is greater than the partial pressure of oxygen in the atmosphere.
42. O₂ is much more soluble in blood than CO₂ is.
43. Carbonic anhydrase catalyzes the formation of the oxyhemoglobin.
44. In the plateau region of the Hb-O₂ curve, a large decrease in P_{O2} results in a small decrease in Rb saturation, whereas in the steep portion of the curve, a small decrease in P_{O2} results in a large decrease in percent Rb saturation.
45. The combination of Hb and CO₂ is known as carbaminohemoglobin.
46. The peripheral chemoreceptors are not activated during carbon monoxide poisoning despite the fact that the total O₂ content in the blood can become lethally low.
47. Administering O₂ to patients with severe chronic lung disease will not depress their drive to breathe.
48. Respiration is reflexively inhibited by alkalosis caused by a reduction in concentration of non-carbon-dioxide-generated H⁺, the result of which is accumulation of H⁺ -generating carbon dioxide to restore the acid-base balance toward normal.
49. The respiratory center is located in the cerebral cortex.
50. The most important factor controlling respiration is the P_{O2} of arterial blood.
51. A slight decrease in arterial P_{O2} below normal is a more potent stimulus toward increasing respiration than is a slight increase in P_{eo}; above normal.
52. When the inspiratory neurons stop firing, the expiratory muscles contract.
53. The inspiratory and expiratory neurons both display pacemaker activity.
54. The pneumotaxic and apneustic centers are located in the cerebellum.

Multiple Choices

1) As regards the conducting zones of the lungs, all are true, EXCEPT:

- a) It defends against microbes.
- b) It warms and moistens the air.
- c) It provides a high resistance pathway for air flow.
- d) It removes foreign particles by the help of mucosa.

2) Bronchial smooth muscle contracts in response to:

- a) Local beta adrenoceptor stimulation.
- b) Circulating noradrenaline.
- c) Bronchial mucosal irritation.
- d) Anticholinergic drugs.

3) During inspiration;

- a) Intra pleura pressure rises.
- b) Intra abdominal pressure falls.
- c) PO₂ in the dead space decreases.
- d) Intrapulmonary pressure decreases.

4) Concerning the mechanics of breathing:

- a) Expiration is normally an active process.
- b) The expiratory muscles act during rest.
- c) The internal intercostals muscles are important inspiratory muscles.
- d) The external intercostals muscles elevate the lower ribs and push the sternum outward increasing the anteroposterior diameter.

5) During a forced expiration, actively contracting muscles include the:

- a) External intercostals.
- b) Abdominal muscles.
- c) Diaphragm.
- d) Sternomastoid.

6) Intrapleural pressure is:

- a) The pressure inside the lungs.
- b) Generally greater than atmospheric pressure.
- c) Generally slightly greater than alveolar pressure.
- d) Generally less than atmospheric pressure.

7) Concerning respiratory pressures:

- a) Intrapleural pressure is positive.
- b) Alveolar pressure is higher than atmospheric pressure.
- c) Alveolar pressure equals atmospheric pressure.
- d) Intrapleural pressure is more negative during inspiration than it is during expiration.

8) Which of the following pressures is sub atmospheric at rest:

- a) Alveolar pressure.
- b) Transpulmonary pressure.
- c) Pleural pressure.
- d) Tracheal pressure.

9) Regarding surfactant

- a) It increases the elastic recoil of the lung.
- b) It is increased in hypofunction of thyroid gland or adrenal cortex.
- c) It is increased by inhalation of 100% O₂ for long time.
- d) Is decreased in hyaline membrane disease of newly born.

10) Pulmonary surfactant

- a) Increases the surface tension of the fluid lining alveoli.
- b) Increases in amount, when pulmonary blood flow is interrupted.
- c) Increases lung compliance.
- d) When decreases, leads to poor oxygenation of the blood before birth.

11) Which of the following is true regarding surfactant;

- a) It is increased in lungs of heavy smokers.
- b) It is increased in premature babies
- c) It is formed by type I pneumocytes.
- d) Its deficiency leads to collapse of small alveoli.

12) Deficiency of lung surfactant results in;

- a) Increase functional residual capacity.
- b) Pulmonary oedema.
- c) Decrease filtration forces in pulmonary capillaries
- d) Facilitates lung distension.

13) Deficiency of pulmonary surfactant causes all the following EXCEPT;

- a) Lung collapse.
- b) Increase work of breathing.
- c) Transport fluid from capillaries to alveoli.
- d) Increase in alveolar ventilation.

14) Respiratory distress syndrome:

- a) Is the collapse of the lung due to injury of thoracic wall.
- b) Is accompanied by more negative intrapleural pressure.
- c) Is accompanied by increased lung compliance.
- d) Causes death of the premature babies due to respiratory failure.

15) Regarding lung compliance, all are true EXCEPT:

- a) It is defined as the volume change per unit transpulmonary pressure change.
- b) It is a measure of lung distensibility.
- c) It is decreased in emphysema.
- d) It is measured by the slope of pressure-volume curve.

16) Concerning lung compliance;

- a) It is decreased in old age people.
- b) It is increased in patient with lung fibrosis.
- c) It is decreased with decreased surfactant.
- d) It is equivalent to $\Delta P / \Delta V$.

17) Which of the following would be expected to increase lung compliance:

- a) Pulmonary congestion.
- b) Pulmonary oedema.
- c) Respiratory distress syndrome.
- d) Emphysema.

18) Decreased lung compliance is observed in;

- a) Athletes.
- b) Old age people.
- c) Patients with emphysema.
- d) Patients with pulmonary fibrosis.

19) Compliance of the lungs is greater:

- a) When they are expanded above their tidal volume range.
- b) In infants than in adults.
- c) Than the compliance of the lung and thorax together.
- d) In recumbent than in standing subject.

20) The work of breathing;

- a) Is inversely related to lung compliance.
- b) Is decreased when the subject lies down.
- c) Is decreased in restrictive lung disease.
- d) Is decreased during exercise.

21) The highest airway resistance occurs at;

- a) Largest bronchi.
- b) Smallest bronchi,
- c) Medium sized bronchi.
- d) Alveoli.

22) Air way resistance can be increased by all the following EXCEPT:

- a) Beta adrenergic blocker.
- b) Narrowing of air passages as in bronchial asthma.
- c) Increasing vagal discharges to the lungs.
- d) Increasing airway calibre.

23) Which of the following lung volumes or capacities cannot be measured by spirometer:

- a) Tidal volume.
- b) Inspiratory reserve volume.
- c) Functional residual capacity.
- d) Inspiratory capacity.

24) Functional residual capacity is:

- a) The volume of air inspired or expired during normal breathing.
- b) The volume of air remaining in the lungs at the end of normal expiration.
- c) The volume of air expired after full inspiration.
- d) The volume of air remaining in the lungs at end of maximal expiration.

25) Total lung capacity is the sum of:

- a) Residual volume and functional capacity.
- b) Vital capacity and functional residual capacity.
- c) Vital capacity and tidal volume.
- d) Residual volume and vital capacity.

26) The timed vital capacity (FEV₁) is used to evaluate:

- a) Elastic properties of the lung.
- b) Pulmonary vascular resistance.
- c) Compliance of the lung.
- d) Airway resistance and obstructive lung disease.

27) Residual volume;

- a) Is the volume of air that remains in the lung after normal expiration.
- b) Is reduced in bronchial asthma.
- c) Is measured by dilution principle using inert helium.
- d) It equals 500 ml.

28) A spirometer can be used to measure directly:

- a) Total lung capacity (TLC).
- b) Inspiratory capacity (I.e.).
- c) Functional residual capacity (FRC).
- d) Residual volume (RV).

29) Regarding vital capacity:

- a) Is the volume of air expired from full inspiration to full expiration.
- b) Is equal in volume to the sum of the inspiratory and expiratory reserve volume.
- c) Is greater in women than n men of the same age and height.
- d) Increases with age.

30) About lung volumes and capacities, All are true EXCEPT:

- a) The residual volume is the volume of air remaining in the lung after maximum expiration.
- b) The residual volume can be measured by using the dilution principle.
- c) The vital capacity equals the total lung capacity minus residual volume.
- d) All lung capacities can be measured by respirometer.

31) Which of the following would increase in obstructive lung disease?

- a) Vital capacity.
- b) Maximum breathing capacity.
- c) FEV1
- d) Functional residual capacity.

32) The volume of air remaining in the lung at the end of normal expiration is the;

- a) Forced expiratory volume.
- b) Tidal volume.
- c) Residual volume.
- d) Residual volume + Expiratory reserve volume.

33) A patient with severe asthmatic attack has;

- a) High FEV1 / FVC.
- b) High V/Q
- c) High arterial P_{CO_2}
- d) High residual volume.

34) Which of the following volumes is largest in a healthy human:

- a) Expiratory reserve volume.
- b) Tidal volume.
- c) Dead space volume.
- d) Inspiratory reserve volume.

35) In obstructive airway disease as emphysema, all the following are reduced EXCEPT;

- a) Physiological dead space.
- b) Vital capacity.
- c) Forced expiratory volume in 1st second.
- d) Residual volume.

36) Regarding dead space, all are true EXCEPT;

- a) Is normally 150 ml.
- b) Is increased by ~ adrenergic blockers.
- c) Is increased by sympathetic stimulation.
- d) Causes the difference in composition between the expired air and alveolar air.

37) Respiratory dead space.

- a) Removes all particles from inspired air before it reaches the alveoli.
- b) Decreases when blood catecholamine levels rise.
- c) Decreases during a deep inspiration.
- d) Saturates inspired air with water vapour before it reaches the alveoli.

38) The diffusing capacity of gas across the pulmonary membrane

- a) Is greater for O₂ than CO₂.
- b) Is unaffected if one lung is excised.
- c) Decreases in exercise.
- d) May be expressed as volume per unit time per unit pressure gradient.

39) The movement of O₂ and CO₂ across the alveolar membrane depends on;

- a) Membrane transporters.
- b) The partial pressure gradient.
- c) The HB content.
- d) Lipid soluble carrier molecules.

40) Pulmonary diffusion capacity for O₂ is dependent on all EXCEPT

- a) PO₂ of blood in the pulmonary vein.
- b) Thickness of the alveolar capillary membrane.
- c) Total area of alveoli exposed to capillaries
- d) HB concentration of blood in pulmonary capillaries.

41) V/Q ratio (alveolar ventilation! perfusion ration)

- a) Is constant for a given individual all through the lungs.
- b) In a person with alveolar ventilation of 2 *LI* min⁻¹ & cardiac output of 5 *LI* min⁻¹ it equals 5.
- c) Is measured by dividing alveolar ventilation by cardiac output.
- d) At apex perfusion exceeds ventilation.

42) Compared with the apex of the lung, the base of the lung has;

- a) Higher pulmonary capillary P_{O_2}
- b) Higher Pulmonary capillary P_{CO_2}
- c) Higher ventilation / perfusion ration
- d) The same V/Q ratio.

43) The rate of diffusion for a gas is decreased by an increase in the:

- a) Partial pressure gradient.
- b) Thickness of the alveolar capillary membrane.
- c) Total surface area of the lung.
- d) Solubility of the gas.

44) Regarding alveolar ventilation:

- a) It equals tidal volume (TV) X respiratory rate (RR).
- b) Is increased by shallow-rapid breathing.
- c) Equals pulmonary minute ventilation minus dead space ventilation.
- d) Its normal value is 6 liters / minute.

45) An increase in the P_{50} of an oxyhemoglobin curve would result from a decrease in which of the following:

- a) Temperature.
- b) PH.
- c) Oxygen.
- d) 2,3, DPG.

46) The percentage of HB saturated with oxygen will increase if:

- a) The arterial PCO₂ is increased.
- b) The HB concentration is increased.
- c) The arterial PO₂ is increased.
- d) The arterial pH is decreased.

47) Shift of Hb- O₂ dissociation curve to the right is caused by:

- a) Decreased 2,3 DPG.
- b) Carbon monoxide poisoning.
- c) Increased PH.
- d) Strenuous exercise.

48) The oxyhaemoglobin dissociation curve is shifted to the left by:

- a) Increase the temperature.
- b) Exercise and metabolic acidosis.
- c) Acclimatization to high altitude.
- d) Hyperventilation.

49) Haemoglobin affinity for O₂ is increased under:

- a) Acidosis
- b) Acclimatisation to a high altitude
- c) Fever
- d) Decrease 2,3DPG.

50) The diffusion of O₂ across alveolar membrane is less than CO₂ because:

- a) The pressure gradient for O₂ transport is less than that for CO₂.
- b) The alveolar area available for O₂ diffusion is larger.
- c) CO₂ is more soluble in H₂O than O₂.
- d) CO₂ is actively transported.

51) Carbon dioxide is transported in the blood mainly in the form of:

- a) Physically dissolved in plasma.
- b) Carbaminohemoglobin.
- c) Carbonic acid.
- d) Bicarbonate.

52) The partial pressure of carbon dioxide (PCO_2) is higher

- a) In pulmonary veins than in pulmonary arteries
- b) In alveoli than in pulmonary arteries
- c) In systemic veins than in systemic arteries
- d) In systemic arteries than in the tissues

53) The CO_2 dissociation curve for whole blood shows that

- a) Its shape is sigmoid.
- b) Blood contains some CO_2 even when PCO_2 is zero
- c) Oxygenation of blood drives CO_2 out of the blood
- d) Adding CO_2 to the blood drives O_2 out of the blood

54) Which of the following are consequences of breathing 5% CO_2 in air:

- a) The PH of arterial blood increases.
- b) The O_2 dissociation curve of HB is shifted to the left.
- c) There is increase in arterial PCO_2 .
- d) There is a decrease in alveolar ventilation.

55) The respiratory centre:

- a) Is in the hypothalamus.
- b) Sends impulses to expiratory muscles during quiet breathing.
- c) Sends impulses to inspiratory muscles during quiet breathing
- d) Is not involved in swallowing reflex.

56) Peripheral and central chemoreceptors may both contribute to increases ventilation that occurs as a result of:

- a) A decrease in arterial O_2 content.
- b) A decrease in arterial O_2 Tension.
- c) An increase in arterial PH.
- d) An increase in arterial CO_2 tension.

57) Central chemoreceptors:

- a) Are stimulated when arterial O_2 decreases.
- b) Are stimulated when arterial pH decreases due metabolic acidosis.
- c) Are stimulated when arterial CO_2 tension decreases.
- d) Are stimulated by a rise in the acidity of CSF.

58) Hypoxia produces hyperventilation by a direct effect on the:

- a) Medullary central chemoreceptors.
- b) J- receptors.
- c) Lung stretch receptors.
- d) Carotid and aortic body chemoreceptors.

59) The activity of the central chemoreceptors is stimulated by:

- a) An increase in PCO_2 of blood flowing through the brain.
- b) A decrease in PO_2 of blood flowing through the brain.
- c) An increase in the PH of the C.S.F.
- d) A decrease in O_2 content of blood flowing through the brain.

60) Excess CO_2 in arterial blood affects respiration primarily by stimulating

- a) Peripheral chemoreceptors
- b) Central chemoreceptors
- c) J -receptors
- d) Arterial baroreceptors.

61) Ventilation is increased during:

- a) Periods when plasma bicarbonate level is raised.
- b) Periods when cerebrospinal fluid PH is reduced.
- c) Deep sleep.
- d) Exercise because of the fall in arterial PO_2 .

62) Which one of the following is the most likely cause of a high arterial PO_2

- a) Increase metabolic activity.
- b) Increase alveolar dead space.
- c) Depressed medullary respiratory centres.
- d) Increased alveolar ventilation.

63) The PO_2 in venous blood is higher than normal in:

- a) Congestive heart failure.
- b) Cyanide poisoning.
- c) Anaemia.
- d) Hypoventilation.

64) Hypoxic hypoxia can be caused by:

- a) Excessive blood loss.
- b) Diffusion impairment.
- c) Cyanide poisoning.
- d) Localised vascular obstruction.

65) Decreased arterial O_2 tension (PO_2) occurs as a result of:

- a) Low HB concentration.
- b) CO poisoning.
- c) Hypoventilation.
- d) Muscular exercise.

66) At a high altitude, where atmospheric pressure is halved, there is an increase

- a) Arterial P_{O_2} .
- b) Cerebral blood flow.
- c) Pulmonary ventilation.
- d) Arterial H^+ concentration.

67) In an acclimatized person at high altitudes, oxygen delivery to the tissues may be adequate at rest because of :

- a) The presence of an acidosis.
- b) The presence of a normal arterial P_{O_2}
- c) The presence of a lower arterial P_{CO_2} .
- d) An increase in haemoglobin concentration.

68) Acclimatization to high altitudes causes:

- e) Hypoventilation.
- f) Decreased 2,3 DPG.
- g) Shift of O_2 dissociation curve to the left.
- h) Polycythemia.

69) Concerning cyanosis:

- a) It occurs in histotoxic type of hypoxia.
- b) It occurs in severe anemia.
- c) It develops only in very cold weather.
- d) It appears in hypoxic hypoxia.

70) During exercise:

- a) P_{O_2} in venous blood would increase.
- b) P_{CO_2} in venous blood would increase.
- c) Ventilation / perfusion ratio would decrease.
- d) Physiological dead space would increase.

Matching

1. Indicate which lung volume or capacity is being described in the column below by filling in the appropriate letter in the blank. There is only one correct answer for each question and each answer may be used more than once.

- (a) vital capacity
- (b) respiratory rate
- (c) FEVI
- (d) tidal volume
- (e) residual volume
- (t) total lung capacity
- (g) functional residual capacity
- (h) alveolar ventilation

..... respiratory rate X (tidal volume - dead space volume)
.....maximum volume of air that the lungs can hold
.....the volume of air entering or leaving the lungs in a single breath during quiet breathing
.....the minimum volume of air remaining in the lungs after maximal expiration

2. Indicate which type of hypoxia would be present in each of the circumstances listed below by writing the appropriate letter in the blank using the following answer code.

- (a) anemic hypoxia
 - (b) circulatory hypoxia
 - (c) histotoxic hypoxia
 - (d) hypoxic hypoxia
- cyanide poisoning
.....high altitude
.....carbon monoxide poisoning
.....emphysema
.....hemoglobin deficiency
.....congestive heart failure

3. Indicate the effect the following changes would have on the rate of gas transfer using the following answer code:

- (a) this change would increase the rate of gas transfer
- (b) this change would decrease the rate of gas transfer
- (c) this change would have no effect on the rate of gas transfer

.....The effect of pulmonary fibrosis on O_2 and CO_2 exchange within the lungs.

..... The effect of emphysema on O_2 and CO_2 exchange within the lungs.

..... The effect of a fall in atmospheric P_{O_2} on O_2 exchange within the lungs.

.....The effect on O_2 exchange in the lungs of replacing part of the nitrogen with helium so that the inspired air consists of 60% N_2 , 19% He , and 21% O_2 .

4. Indicate which chemical factor is responsible for the effect described by writing the appropriate letter in the blank using the following answer code:

- (a) arterial P_{O_2} between 60 to 100 mm Hg
- (b) arterial P_{O_2} less than 60 mm Hg
- (c) arterial PCO_2 increased above normal
- (d) brain ECF H^+ increased above normal
- (e) arterial H^+ increased above normal

..... Stimulates the peripheral chemoreceptors and is important in the regulation of acid-base balance.

..... Directly depresses the central chemoreceptors.

Weakly stimulates the peripheral chemoreceptors.

..... Stimulates peripheral chemoreceptors as an emergency mechanism.

..... Directly stimulates the central chemoreceptors and represents the dominant control of ventilation.

..... Blood-borne factor that has no effect on the peripheral chemoreceptors.

Essay Questions

1. Give an account on respiratory muscles and their role in the respiratory cycle.
2. Describe the sequence of events that cause air to move into the lungs during inspiration and out during expiration.
3. Define pulmonary surfactant - Discuss its function and effects of its deficiency.
4. Explain the relation between alveolar pressure, size (radius) and surface tension in presence and in absence of pulmonary surfactant.
5. Define lung compliance, what are the factors that affect it.
6. Draw a labeled diagram representing the different lung volumes. Describe the factors affecting the vital capacity.
7. Define "Dead space" and mention its types, describe one method for measurement of dead space.
8. Discuss the structure of the respiratory membrane. What are the factors which affect gas diffusion through it.
9. Discuss the transport of O_2 by the blood.
10. Draw a labeled diagram representing the O_2 hemoglobin dissociation curve & factors affecting it.
11. Describe the O_2 hemoglobin dissociation curve-mention the cause of its shift to the right.
12. Draw the O_2 hemoglobin dissociation curve and explain the significance of upper flat part and lower steep part of the curve.
13. Give an account on CO_2 transport in blood and buffering of tidal CO_2 .
14. Explain the chloride shift phenomenon and its importance.
15. Describe the role of chemoreceptors in regulation of respiration.
16. Describe briefly the non-chemical factors in control of respiration.
17. Discuss the role of the vagus nerve in the regulation respiration
18. Describe the chemical control of respiration.
19. Define hypoxia what are its types, causes and characters.
20. What are the mechanisms of acclimatization to high altitudes.
21. Define the term hypoxia and cyanosis- Describe the types of hypoxia associated with cyanosis.
22. What are the effect of muscular exercise on respiration.

23. In addition to providing for gas exchange what are the other functions of the respiratory system.
24. Describe the mechanics of ventilation.
25. What factors influence the amount of gas exchange occurring at the respiratory membrane?
26. Describe how hemoglobin's saturation behavior varies.
27. How are respiratory events regulated?

ANSWERS

Fill in the Blank

- | | |
|--|-------------------------------|
| 1. respiratory airways, alveoli | 2. breathing |
| 3. CO ₂ produced, O ₂ consumed | 4. external respiration |
| 5. larynx | 6. pharynx |
| 7. pleurisy | 8. diaphragm |
| 9. barometric | 10. Boyle's |
| 11. phrenic | 12. intercostal |
| 13. emphysema | 14. dome |
| 15. decreases | 16. PO ₂ |
| 17. decreasing | 18. Bohr |
| 19. hyperventilation | 20. medulla of the brain stem |
| 21. depresses | 22. inspiratory, expiratory |
| 23. carotid | 24. apnea |
| 25. 105 mmHg | 26. 0.304 of 1 unit of Hg |
| 27. 3400 | |

True / False

1	False
2	False
3	True
4	False
5	False
6	True
7	True
8	True
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10	True
11	True
12	False
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54	False

Multi

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13
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23

Ma

1. h,
3. b,

Multiple Choices

1	C
2	C
3	D
4	D
5	B
6	D
7	D
8	C
9	D
10	C
11	D
12	B
13	D
14	D
15	C
16	C
17	D
18	D
19	C
20	A
21	C
22	D
23	C

24	B
25	D
26	D
27	C
28	B
29	A
30	D
31	D
32	D
33	D
34	D
35	D
36	B
37	D
38	D
39	B
40	D
41	C
42	B
43	B
44	C
45	B
46	C

47	D
48	D
49	D
50	C
51	D
52	C
53	C
54	C
55	C
56	D
57	D
58	D
59	A
60	B
61	B
62	C
63	B
64	B
65	C
66	C
67	D
68	D
69	D
70	B

Matching

1. h, g, d, e.

3. b, b, b, c

2. c, d, a, d, a, b.

4. e, a, c, b, d, a.