1. Explain the difference between breathing and respiration.
2. Know the pathway of air going in and out of the lungs
3. What are the major functions of the respiratory tract?
4. Know the respiratory diagram. Be able to explain the structure and function of each part
5. Why do we breathe?
6. What are pleural membranes?
7. What is the thoracic cavity?
8. What is the function of goblet cells in the respiratory system?
9. How are the lungs kept clean?
10. What is meant by negative pressure breathing?
11. What are the steps of inhalation?
12. What are the steps of exhalation?
13. What are tidal volume, vital capacity, reserve volume, residual volume, and dead space air?
14. How is breathing controlled?
15. Explain the process of external respiration. Where does it occur and know the associated equations
16. Explain the process of internal respiration. Where does it occur and know the associated equations.
17. In what ways is hemoglobin suited for its role?
18. What is the function of carbonic anhydrase?
19. Know the different respiratory infections – definitions, symptoms, and causes
20. Know the different respiratory disorders

21. Air that moves out during expiration has _____ compared to air breathed in.
   a) Warmed and gained moisture
   b) Warmed and lost moisture
   c) Cooled and gained moisture
   d) Cooled and lost moisture

22. In the diagram above, the vocal cords are located at:
   a) 1
   b) 2
   c) 3
   d) 4
   e) 5

23. In the diagram, the bronchi are located at
   a) 1
   b) 2
   c) 3
   d) 4
   e) 5

24. In the diagram, the diaphragm is located at
   a) 2
   b) 3
   c) 4
   d) 5
   e) 6

25. Trace the path of an inhaled air molecule.

26. Which respiratory organ normally allows both air and food passage?
   a) Bronchi
   b) Trachea
   c) Larynx
   d) Pharynx

27. The vocal cords are found in the
   a) Bronchi
   b) Nose
   c) Larynx
   d) Lungs

28. The Adam’s apple is actually a part of the
   a) Pharynx
   b) Larynx
   c) Glottis
   d) Trachea
29. Food is prevented from entering the trachea by the
   a) Pharynx   b) Larynx   c) Bronchioles   d) Epiglottis

30. Which part of the respiratory system is composed of C-shaped cartilaginous rings and cilia?
   a) Larynx   b) Trachea   c) Bronchioles   d) Alveoli

31. The greatest surface area for gas exchange occurs within the
   a) Trachea   b) Bronchi   c) Bronchioles   d) Alveoli

32. Which part of the respiratory system will have the least amount of cartilage and the thinnest walls?
   a) Larynx   b) Trachea   c) Bronchi   d) Bronchioles

33. Oxygen-poor blood becomes oxygen-rich blood with the direct help of the:
   a) Trachea   b) Bronchi   c) Bronchioles   d) Alveoli

34. It is impossible to save a premature baby at 4 or 5 months of pregnancy and there is a “wall” that prevents survival much earlier than six months. What causes this “wall”?
   a) The lung does not have sufficient blood supply to carry away oxygen
   b) The premature alveoli do not develop surfactant (lipoprotein) to prevent their collapse shut
   c) The nerves to the diaphragm do not trigger regular breathing
   d) Bronchioles are filled with fluid until the sixth month of pregnancy

35. There is a certain amount of air that cannot be forced out of the lungs. This is called
   a) Static air   b) Tidal volume   c) Inspiratory reserve air   d) Residual air

36. The air that is moved in and out with each normal breath is termed the
   a) Vital capacity   b) Inspiratory reserve volume   c) Residual volume   d) Tidal volume

37. The breathing rate is controlled by chemoreceptors that detect
   a) Levels of oxygen in the alveolar air space
   b) Levels of oxygen in the blood
   c) Levels of carbon dioxide in the alveolar air space
   d) Levels of carbon dioxide in the blood

38. The rate of breathing is chiefly dependent on chemical factors in the blood, of which the most important is
   a) Oxygen concentration
   b) Carbon dioxide concentration
   c) Hemoglobin concentration
   d) Nitrogen concentration

39. Aortic and carotid bodies are:
   a) Types of valves in the heart
   b) Present in the lungs
   c) Directly sensitive to changes in CO₂ and H⁺ in the blood
   d) Directly sensitive to oxygen changes

40. In mammals, punctures of the thoracic cavity, but not of the lung itself, will cause
   a) Collapse of the lung
   b) Inflation of the lung
   c) Increased rates of breathing
   d) Decreased need for breathing since twice as much oxygen will enter the lung

41. In humans, the lungs are caused to inflate when the
   a) Rib muscles contract
   b) Diaphragm muscle contracts
   c) Rib muscles and diaphragm contract
   d) Diaphragm relaxes

42. Which of the following statements is NOT true regarding the normal mechanism of ventilation?
   a) There must be a continuous column of air from the pharynx to the alveoli
   b) The lungs must lie within sealed-off thoracic cavity
   c) The inner and outer pleural membranes must be separated by a thin film of fluid
   d) The intrapleural pressure must be greater than the atmospheric pressure

43. If a lung is punctured in a car accident, that lobe fails to inflate even though there is no obstruction of the air passageway to that lobe. Why?
   a) The trauma must have damaged the nerve path controlling ribs on that side of the lung
   b) Negative feedback prevents the ribs and diaphragm on that side from causing pain
   c) When the chest volume expands, air can now rush in through the puncture without filling the alveoli
   d) Mucus or blood must be filling the lobe

44. When trying to stimulate breathing, it is better to give a mixture of carbon dioxide and oxygen than only oxygen because
   a) Pure oxygen causes you to breathe too rapidly
   b) Carbon dioxide and oxygen together exert a greater pressure than an equal amount of oxygen
   c) Carbon dioxide buildup in the blood stimulates the respiratory centre in the brain
   d) Oxygen causes lactic acid buildup, and the change in pH prevents breathing
45. Most of the carbon dioxide transported in the plasma is in the form of
   a) Oxyhemoglobin
   b) Bicarbonate ions
   c) Carbaminohemoglobin
   d) Carbon monoxide

46. Expired air will contain ___ than inspired air.
   a) Less oxygen but more carbon dioxide
   b) Less oxygen and less carbon dioxide
   c) More oxygen and more carbon dioxide
   d) More oxygen but less carbon dioxide

47. The entrance and exit of air into and out of the lungs is called
   a) Breathing
   b) External respiration
   c) Internal respiration
   d) Cellular respiration

48. How is most carbon dioxide transported in the blood?
   a) As gas bubbles of CO₂, just as in carbonated soft drinks
   b) As bicarbonate ions (HCO₃⁻)
   c) On the free hemoglobins since they have lost their oxygen in the tissues
   d) As carbon monoxide

49. The exchange of gases between the lungs and the blood occurs by the process of
   a) Diffusion
   b) Osmosis
   c) Filtration
   d) Active transport

50. The type of respiration in which gases are exchanged between the blood and the tissue fluid is termed
   a) Breathing
   b) External respiration
   c) Internal respiration
   d) Cellular respiration

51. Blood richest in oxygen is found in the
   a) Inferior vena cava
   b) Pulmonary arteries
   c) Pulmonary vein
   d) Systemic capillaries

52. By what route does CO₂ leave the body?
   a) Pulmonary artery → alveolus → bronchus → bronchiole → trachea → pharynx → larynx
   b) Pulmonary vein → bronchiole → alveolus → bronchus → trachea → pharynx → larynx
   c) Pulmonary artery → alveolus → bronchiole → bronchus → trachea → larynx → pharynx
   d) Pulmonary vein → alveolus → bronchus → bronchiole → trachea → larynx → pharynx

53. Comparing the graphs of saturation of hemoglobin in the lungs and in the tissues it is apparent that
   a) Hemoglobin becomes nearly completely saturated in the lungs and then loses all oxygen as it passes through tissues
   b) Cooler tissues allow more saturation of hemoglobin
   c) Higher pH of tissues allows more saturation of hemoglobin
   d) Lower pH and higher temperature of tissue promotes the release of oxygen by hemoglobin

54. Hemoglobin is useful because it
   a) Transports oxygen with a higher efficiency
   b) Transports carbon dioxide with high efficiency
   c) Transports food molecules and releases them to cells in need of nutrients
   d) Acts as a carriers for hormones

55. The type of respiration in which ATP is produced is called
   a) Breathing
   b) External respiration
   c) Internal respiration
   d) Cellular respiration

True/False

56. T/F The respiratory tract is lined throughout with ciliated epithelial cells. F
57. T/F the thoracic cavities are lined by pleural membranes and are completely separated from the abdominal cavity T
58. T/F The respiratory centre is located in the medulla of the brain. T
59. T/F As carbon dioxide reacts with water in blood, hydrogen ions are produced T
60. T/F During inspiration, the pressure in the lungs decreases and air comes rushing in T
61. T/F When nerve impulses pass to the diaphragm, the diaphragm relaxes and exhalation occurs. F
62. T/F Impulses from the fully inflated lungs to the breathing centre suppress the stimulating effect of carbon dioxide in the blood T
63. T/F The movement of oxygen and carbon dioxide between the lungs and the blood depends on diffusion gradients T
64. T/F Hemoglobin is a molecule that has a remarkable ability to form an irreversible and permanent combination with oxygen F