

Principles of Pathophysiology

1. **The study of how disease affects the functioning of the human body is called:**
 - a. psychology.
 - b. physiology.
 - c. pathophysiology.
 - d. anatomy.
2. **The process by which glucose and other nutrients are converted into energy is called:**
 - a. catabolism.
 - b. respiration.
 - c. metabolism.
 - d. depolarization.
3. **Production of energy occurs in what part of the cell?**
 - a. Endoplasmic reticulum
 - b. Nucleus
 - c. Mitochondria
 - d. Potassium pump
4. **Which of the following BEST defines adenosine triphosphate (ATP)?**
 - a. It is the form of energy produced in the mitochondria and is the cell's engine responsible for all cell function.
 - b. It is the form of energy produced in the endoplasmic reticulum and is the cell's engine responsible for all cell function.
 - c. It is the form of energy that is produced in the nucleus from glucose and other nutrients.
 - d. It is the form of energy that is produced in the mitochondria from glucose and DNA.
5. **The cellular structure that is responsible for synthesizing proteins is:**
 - a. mitochondria.
 - b. endoplasmic reticulum.
 - c. nucleus.
 - d. sodium pump.
6. **The movement of ions across the cell membrane is needed to accomplish repolarization. What cell structure is used to prepare for depolarization?**
 - a. Mitochondria
 - b. Nucleus
 - c. Endoplasmic reticulum
 - d. Sodium potassium pump
7. **Without this element, the cell would dehydrate and die.**
 - a. Glucose
 - b. Proteins
 - c. Water
 - d. Oxygen
8. **These substances, when dissolved, separate into charged particles.**
 - a. ATP
 - b. Electrolytes
 - c. Cations
 - d. Ions
9. **The basic nutrient of the cell and the building block for energy is:**
 - a. glucose.
 - b. protein.
 - c. oxygen.
 - d. water.

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10. **This type of metabolism occurs when energy is created with a balance of adequate oxygen and nutrients.**
 - a. Anaerobic
 - b. Aerobic
 - c. Hypoxic
 - d. Homeostatic

11. **The metabolism that creates large amounts of carbon dioxide and lactic acid but generates little energy is called:**
 - a. homeostatic.
 - b. hyperoxic.
 - c. aerobic.
 - d. anaerobic.

12. **Which system is responsible for the removal of bi-products of metabolism?**
 - a. Respiratory
 - b. Cardiovascular
 - c. Urinary
 - d. Digestive

13. **The weakest part of the cell is the:**
 - a. mitochondria.
 - b. DNA.
 - c. membrane.
 - d. nucleus.

14. **Cells make up tissues, tissues make up organs, and organs make up:**
 - a. humans.
 - b. sections.
 - c. systems.
 - d. groups.

15. **A patient breathing in room air should be receiving _____ percent oxygen.**
 - a. 21
 - b. 5
 - c. 16
 - d. 100

16. **What is FiO₂ ?**
 - a. The amount of oxygen delivered via an airway adjunct in liters per minute
 - b. The concentration of oxygen in our inhaled air, which is referred to as the fraction of inspired oxygen
 - c. The concentration of gases in our expired air, which is referred to as the fraction of used oxygen
 - d. The flow rate of gases provided to the patient by mask or nasal cannula

17. **Our blood transports oxygen from the lungs to the cells and returns with what byproduct of metabolism?**
 - a. Lactic acid
 - b. Carbonic acid
 - c. Carbon dioxide
 - d. Carbon monoxide

18. **What is a patent airway?**
 - a. A rigid suction device used to remove fluid and foreign objects from the pharynx to secure the airway
 - b. A term used by EMS practitioners to indicate that the patient has a secured and opened airway necessary for life
 - c. The condition of the patient's airway at the start of a lifesaving intervention
 - d. An airway that is in need of securing via an oral or nasal pharyngeal airway

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19. **What is the correct order of air flow from the nose to the alveoli in the lungs?**
 - a. Nose, pharynx, hypopharynx, epiglottis, trachea, crania, mainstem bronchi, alveoli
 - b. Mouth, pharynx, epiglottis, hypopharynx, trachea, mainstem bronchi, crania, alveoli
 - c. Nose, nasopharynx, pharynx, hypopharynx, larynx, trachea, bronchi, alveoli
 - d. Nose, hyperpharynx, pharynx, hypopharynx, trachea, mainstem bronchi, bronchi, alveoli
20. **You respond to a patient who is choking. The victim is suffering from the most common of airway obstructions. This would indicate that the problem is in the _____ airway.**
 - a. upper
 - b. bronchial
 - c. lower
 - d. alveoli
21. **The combination of chest muscles and diaphragm working together to have air move in and out of the chest is called:**
 - a. vital capacity.
 - b. tidal volume.
 - c. expiration.
 - d. inspiration.
22. **Not all inspired air reaches the alveoli; 150 mL is stopped in the airway leading to the alveoli. This is called:**
 - a. vital capacity.
 - b. bronchial air.
 - c. tidal volume.
 - d. dead air space.
23. **Janie is having difficulty breathing. Her current tidal volume is 350 mL, and she is breathing at 28 times per minute. What would be her minute volume?**
 - a. 9,800 mL
 - b. 12.5 mL
 - c. 342 mL
 - d. 378 mL
24. **How many milliliters of air are moved during a typical breath?**
 - a. 500 mL
 - b. 250 mL
 - c. 150 mL
 - d. 300 mL
25. **The seat of respiratory control is found in the:**
 - a. nose.
 - b. lungs.
 - c. chest.
 - d. medulla oblongata.
26. **Which of the following statements provides reasons for the disruption of respiratory control?**
 - a. A medical, structural, and mechanical failure that has initiated the cascade of life-threatening problems can interrupt this control.
 - b. A structural reason that has caused collapse of the upper and lower airways to block the flow of oxygen to the alveoli can interrupt this control.
 - c. Medical reasons, infections, trauma, toxins, and drugs, along with neurologic disorders, can interrupt this control.
 - d. Mechanical failure, soft-tissue damage, obstruction, and lack of perfusion can interrupt this control.

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27. **Choose the BEST description of the chest's mechanical functions.**
- The chest is a closed space with only one opening, the trachea, to inspire air; the diaphragm contracts down and the intercostal muscles expand the ribs, causing a negative pressure that fills the lungs with air.
 - The diaphragm contracts, causing the intercostal muscles that are attached to the lungs to also contract, which moves the air into the lungs.
 - With the chest being an airtight space, the act of breathing occurs when the muscles of the diaphragm and intercostal relax, which causes the lungs to expand and air to flow into the lungs.
 - The chest is a closed space, and the pleural space surrounds the lungs; when the diaphragm contracts and the intercostals expand, the chest and lungs move outward and downward, allowing expiration and gas exchange in the lungs.
28. **To exhale, the diaphragm and intercostal muscles relax to contract the chest, which creates a positive pressure. This is what type of process?**
- Inspiration
 - Active
 - Passive
 - Respiration
29. **The potential space between the lung and chest wall is called the:**
- carina space.
 - lung space.
 - dead space.
 - pleural space.
30. **If a hole is created in the chest wall, air could escape or be drawn in, or if bleeding develops within the chest, air and blood can accumulate in the pleural space. This would force the lung to:**
- increase respirations.
 - increase the minute volume.
 - collapse.
 - work harder with minimal problems.
31. **The disruption of lung tissue by mechanical forces or medical problems can upset the exchange of gas across the alveoli, a process called:**
- diffusion.
 - perfusion.
 - ventilation.
 - osmosis.
32. **The net result of respiratory challenges is low oxygen, also called _____ within the body.**
- anorexia
 - hypoglycemia
 - hypoxia
 - anoxia
33. **When carbon dioxide is not exchanged, the net result is high carbon dioxide, a condition called _____, within the body.**
- hyperemia
 - hypercapnia
 - hyperthermia
 - hyperglycemia
34. **What do chemoreceptors found in the body and vascular system measure?**
- Low oxygen and high carbon dioxide
 - High oxygen and low carbon dioxide
 - Low oxygen and low carbon dioxide
 - High oxygen and high carbon dioxide

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35. **In the normal drive to breathe, chemoreceptors are stimulated by:**
- diffusion.
 - low carbon dioxide.
 - high oxygen.
 - high carbon dioxide.
36. **The respiratory system moves air in and out; however, to _____ cells, the air that is inhaled must be matched up with the circulatory system.**
- defuse
 - hyperoxygenate
 - register
 - perfuse
37. **Carbon dioxide is transported back to the lungs in two ways: via the red blood cells and:**
- white blood cells.
 - oncotic pressure.
 - hydrostatic pressure.
 - plasma.
38. **The pressure that is created when the heart pushes the blood throughout the circulatory system is called:**
- hyperstatic pressure.
 - osmotic pressure.
 - oncotic pressure.
 - hydrostatic pressure.
39. **Plasma oncotic pressure is created by the movement of which of the following?**
- Large proteins
 - Contraction of the heart
 - Constriction of the vessels
 - Dilation of the vessels
40. **A disruption of the balance between oncotic pressure and hydrostatic pressure is critical to regulating:**
- oxygenation and perfusion.
 - blood pressure and cell hydration.
 - perfusion and circulation.
 - waste removal and urine.
41. **The common blood dysfunction that indicates a failure of the body to move oxygen and carbon dioxide is:**
- polyuria.
 - volume.
 - hypoxia.
 - vascular space.
42. **A condition that is caused by a decreased number of red blood cells is called:**
- polycythemia.
 - erythrocythemia.
 - leukemia.
 - anemia.
43. _____ blood has returned to the right side of the heart.
- Deoxygenated
 - Anemic
 - Red
 - Oxygenated

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44. **Which of the following describes the path blood takes as it leaves the heart and then returns?**
- Veins, venules, capillaries, arterioles, arteries
 - Arteries, venules, capillaries, arterioles, veins
 - Veins, arteries, capillaries, venules, arterioles
 - Arteries, arterioles, capillaries, venules, veins
45. **Certain blood vessels that contain specialized sensors that detect the level of internal pressure and transmit messages to the nervous system, which then triggers the smooth muscle in the vessel walls to make any needed size adjustments, are called:**
- pressure receptors.
 - stretch receptors.
 - chemoreceptors.
 - volume receptors.
46. **What is the name of the "fight or flight" response that stimulates blood vessels to constrict and prepares the body for fighting or running?**
- Parasympathetic
 - Neurohumoral
 - Polysympathetic
 - Sympathetic
47. **Injuries to the brain and spinal cord, sepsis, and severe allergic reactions can cause what similar cardiovascular problem?**
- Loss of SVR
 - Loss of tone
 - Hypertension
 - Permeability
48. **Stroke volume depends on a series of factors: one is the force the myocardial muscle exerts to move the blood. This is known as:**
- preload.
 - contractility.
 - automaticity.
 - afterload.
49. **Name the stroke volume factor that is a function of systemic vascular resistance that requires the heart to exert the pumping force it must overcome.**
- Preload
 - Afterload
 - Automaticity
 - Contractility
50. **What will stroke volume and minute heart rate determine?**
- Contractility
 - Blood pressure
 - Systemic vascular resistance
 - Cardiac output
51. **Rookie EMT Brenda has just finished her first run and she notices her heart rate is 130 beats per minute. She tells her partner who says that this is just the fight or flight response and it will slow down once she rests. What part of the nervous system will slow Brenda's pulse?**
- Parasympathetic
 - Peripheral
 - Central
 - Sympathetic

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52. **What is the name of the heart dysfunction caused by an electrical source that causes the heart to beat too fast?**
- Tachycardia
 - Trauma
 - Heart attack
 - Bradycardia
53. **What is the name for a balance between the circulatory system and ventilation?**
- V/Q match
 - C/V match
 - C/Q match
 - A/C match
54. **Shock occurs as a result of what?**
- Inadequate perfusion
 - C/Q match
 - V/Q match
 - Adequate perfusion
55. **The sympathetic nervous response causes which of the following to occur?**
- Breathe slower and deeper, blood vessels to dilate, heart to beat stronger and faster, skin to sweat, pupils to constrict, and skin to become pale
 - Breathe faster and deeper, blood vessels to constrict, heart to beat stronger and faster, skin to sweat, pupils to dilate, and skin to become pale
 - Breathe faster and deeper, blood vessels to constrict, heart to beat stronger and faster, skin to sweat, pupils to constrict, and skin to become warm
 - Breathe faster and deeper, blood vessels to dilate, heart to beat stronger and slower, skin to sweat, pupils to dilate, and skin to become pale
56. **You are called to a kindergarten class where a boy has fallen while climbing on playground equipment. The teacher saw him fall and hit his tummy on a step. He is sobbing and holding his abdomen. As you assess him, you find his skin cool and clammy, his pulse is 132, respiratory is 28. Why is the boy acting this way?**
- He is really upset and wants his mother.
 - He is embarrassed and is afraid that the other students will make fun of him.
 - He possibly has wet his pants and does not want anyone to know.
 - He possibly has internal injuries and is in shock.
57. **The human body is made up of _____percent water.**
- 60
 - 7.5
 - 17.5
 - 75
58. **Water that is found in the space between cells and blood vessels is called:**
- intravascular.
 - hydrostatic.
 - intracellular.
 - interstitial.
59. **Daniel is performing landscaping on a summer day when he suddenly becomes dizzy and feels like he might faint. This disruption of fluid balance is called:**
- hypotension.
 - hyperthermia.
 - tachycardia.
 - dehydration.

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60. **When the body's water moves from the bloodstream into the interstitial space, it is called:**
- edema.
 - hydrostatic.
 - dehydration.
 - hypovolemia.
61. **The layer of covering that protects the nervous system is called the:**
- skull.
 - spinal column.
 - meninges.
 - cerebrospinal fluid.
62. **An infection of the brain is called:**
- multiple sclerosis.
 - encephalitis.
 - rhinitis.
 - meningitis.
63. **The major organs of the endocrine system are the:**
- brain, pituitary, thyroid, and adrenal glands.
 - pituitary, thyroid, and adrenal glands.
 - kidneys, pancreas, and the brain.
 - liver, pancreas, and the kidneys.
64. **What is the most common digestive disorder?**
- Irritable bowel and gastric esophageal disease
 - Vomiting and diarrhea
 - Diarrhea and gastric esophageal disease
 - Bohemia and flatus
65. **When a person has an exaggerated response to a body invader, the person is said to have:**
- hypersensitivity.
 - antibody reaction.
 - histamine dump.
 - hyposensitivity.

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Test Name: Principles of Pathophysiology

1. c. pathophysiology.
2. c. metabolism.
3. c. Mitochondria
4. a. It is the form of energy produced in the mitochondria and is the cell's engine responsible for all cell function.
5. b. endoplasmic reticulum.
6. d. Sodium potassium pump
7. c. Water
8. b. Electrolytes
9. a. glucose.
10. b. Aerobic
11. d. anaerobic.
12. a. Respiratory
13. c. membrane.
14. c. systems.
15. a. 21
16. b. The concentration of oxygen in our inhaled air, which is referred to as the fraction of inspired oxygen
17. c. Carbon dioxide
18. b. A term used by EMS practitioners to indicate that the patient has a secured and opened airway necessary for life
19. c. Nose, nasopharynx, pharynx, hypopharynx, larynx, trachea, bronchi, alveoli
20. a. upper
21. b. tidal volume.
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28. c. Passive
29. d. pleural space.
30. c. collapse.
31. a. diffusion.
32. c. hypoxia
33. b. hypercapnia
34. a. Low oxygen and high carbon dioxide
35. d. high carbon dioxide.
36. d. perfuse
37. d. plasma.
38. d. hydrostatic pressure.
39. a. Large proteins
40. b. blood pressure and cell hydration.
41. b. volume.
42. d. anemia.
43. a. Deoxygenated
44. d. Arteries, arterioles, capillaries, venules, veins
45. b. stretch receptors.
46. d. Sympathetic
47. b. Loss of tone
48. b. contractility.
49. b. Afterload
50. d. Cardiac output
51. a. Parasympathetic

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- 52. a. Tachycardia
- 53. a. V/Q match
- 54. a. Inadequate perfusion
- 55. b. Breathe faster and deeper, blood vessels to constrict, heart to beat stronger and faster, skin to sweat, pupils to dilate, and skin to become pale
- 56. d. He possibly has internal injuries and is in shock.
- 57. a. 60
- 58. d. interstitial.
- 59. d. dehydration.
- 60. a. edema.
- 61. c. meninges.
- 62. b. encephalitis.
- 63. c. kidneys, pancreas, and the brain.
- 64. b. Vomiting and diarrhea
- 65. a. hypersensitivity.