

BMD 334 Human Physiology
Practice Exam 3
Sample 3

Name _____
Student ID _____

MULTIPLE CHOICE (2 points each). Questions 1-40 must be answered on the computer form to receive credit. Choose the one best answer.

1. **Which of the following controls fine voluntary movements of skeletal muscle?**
 - A) Corticospinal tract
 - B) Multineuronal pathway
 - C) Spinocerebellar tract
 - D) Dorsal column pathway
 - E) Spinothalamic tract

2. **Which of the following is an incorrect pairing between reflex and reflex class?**
 - A) Stretch reflex : Monosynaptic
 - B) Baroreceptor reflex : Autonomic
 - C) Stretch reflex : Spinal
 - D) Baroreceptor reflex : Cranial
 - E) Stretch reflex : Conditioned

3. **Which of the following statements about muscle receptors is true?**
 - A) Muscle spindles and golgi tendon organs both detect muscle length.
 - B) Muscle spindles and golgi tendon organs both detect muscle tension.
 - C) Muscle spindles detect muscle length; golgi tendon organs detect muscle tension.
 - D) Muscle spindles detect muscle tension; golgi tendon organs detect muscle length.

4. **Which of the following neurons innervates extrafusal muscle fibers?**
 - A) Alpha motor neurons
 - B) Beta motor neurons
 - C) Delta motor neurons
 - D) Gamma motor neurons

5. **During a voluntary muscle contraction,**
 - A) alpha and gamma motor neurons are coactivated.
 - B) alpha motor neurons are activated first, followed by gamma motor neurons.
 - C) gamma motor neurons are activated first, followed by gamma motor neurons.
 - D) only alpha motor neurons are activated.
 - E) only gamma motor neurons are activated.

6. **You try to hold up too much weight for your muscles to support. What receptors activate a reflex that causes relaxation of the muscles holding up the weight causing you to drop the weight, protecting the muscles?**
 - A) Nociceptors
 - B) Muscle spindles
 - C) Golgi tendon organs
 - D) Joint receptors
 - E) Baroreceptors

7. **Which of the following statements about pacemaker potentials in autorhythmic cells is true?**
- A) Sodium moves into the cell through I_f channels.
 - B) Potassium moves out of the cell through I_f channels.
 - C) Calcium moves into the cell through calcium-specific channels.
 - D) A and C
 - E) All of the above
8. **Which of the following best describes arteries?**
- A) Blood moves through arteries toward the heart.
 - B) Blood moves through arteries away from the heart.
 - C) Blood in arteries is oxygenated.
 - D) Blood in arteries is deoxygenated.
 - E) Two of the above are correct.
9. **Which of the following will have the greatest increase in resistance to blood flow?**
- A) Increasing the radius of the vessel 2 times
 - B) Decreasing the radius of the vessel 2 times
 - C) Increasing the blood viscosity 2 times
 - D) Decreasing the blood viscosity 2 times
 - E) Doubling the length of the vessel
10. **Which of the following chambers of the heart has the thickest walls?**
- A) Right atrium
 - B) Right ventricle
 - C) Left atrium
 - D) Left ventricle
 - E) None of the above: all walls are equal thickness
11. **When the pressure in the atrium is greater than that in the ventricles, which valve is open?**
- A) AV valves
 - B) Semilunar valves
 - C) Both
 - D) Neither
12. **Which of the following is the correct sequence of the conducting pathway of the heart?**
- A) AV node – SA node – Bundle of His – Purkinje Fibers
 - B) Bundle of His – Purkinje Fibers – AV node – SA node
 - C) SA node – AV node – Bundle of His – Purkinje Fibers
 - D) AV node – Purkinje Fibers – SA node – Bundle of His
 - E) SA node – AV node – Purkinje Fibers – Bundle of His
13. **The stroke volume**

- A) is equal to the end diastolic volume.
 - B) can be increased by increasing the strength of ventricular contraction.
 - C) is equal to cardiac output x heart rate (CO x HR).
 - D) A and C
 - E) All of the above
- 14. Which of the following statements about the ventricular contractile cell action potential is true?**
- A) Depolarization is caused by calcium moving into the cell.
 - B) The plateau phase is caused by sodium moving into the cell and calcium moving out of the cell.
 - C) Repolarization is caused by potassium moving out of the cell.
 - D) The resting membrane potential is not stable; there is a spontaneous depolarization.
 - E) All of the above.
- 15. Which of the following statements about cardiac muscle is true?**
- A) Calcium binds to troponin to expose binding sites on actin for myosin.
 - B) Action potentials are propagated to the interior of the cells along t-tubules to stimulate calcium release from the sarcoplasmic reticulum.
 - C) Calcium from the extracellular fluid triggers calcium release from the sarcoplasmic reticulum.
 - D) A and C
 - E) All of the above
- 16. A person has a resting heart rate of 110 beats per minute. This person suffers from**
- A) tachycardia.
 - B) bradycardia.
 - C) 1st degree heart block.
 - D) 2nd degree heart block.
 - E) 3rd degree heart block.
- 17. During the isovolumetric contraction phase of the cardiac cycle,**
- A) AV valves are open.
 - B) Pressure in the ventricles is increasing.
 - C) The ventricle is filling with blood.
 - D) A and C
 - E) All of the above
- 18. During the ventricular ejection phase of the cardiac cycle,**
- A) pressure in the left ventricle is greater than pressure in the aorta.
 - B) The semilunar valves are open.
 - C) the AV valves are closed.
 - D) A and C
 - E) All of the above
- 19. The first heart sound**
- A) occurs just after the P wave of the ECG.

- B) occurs just after the QRS complex of the ECG.
 - C) is simultaneous with closure of the AV valves.
 - D) A and C
 - E) B and C.
- 20. Activation of the sympathetic nervous system**
- A) will increase heart rate when norepinephrine binds to beta1 adrenergic receptors in the SA node.
 - B) facilitates opening of I_f channels in SA nodal autorhythmic cells.
 - C) facilitates opening of calcium channels in SA nodal autorhythmic cells.
 - D) A and B
 - E) All of the above
- 21. Sympathetic activity to ventricular contractile cells**
- A) phosphorylates calcium channels on the plasma membrane, which will increase the strength of ventricular contraction.
 - B) phosphorylates the Ca-ATPase on the sarcoplasmic reticulum, which will increase the rate of ventricular relaxation.
 - C) phosphorylates the myosin ATPase, which will increase the rate of ventricular contraction.
 - D) A and C
 - E) All of the above
- 22. Which type of blood vessel is the most elastic?**
- A) Arteries
 - B) Arterioles
 - C) Capillaries
 - D) Venules
 - E) Veins
- 23. Exchange between blood and tissue occurs in**
- A) arteries.
 - B) arterioles.
 - C) capillaries.
 - D) veins.
 - E) All of the above
- 24. Intrinsic controls of arteriole radius are important to**
- A) regulate blood flow to individual tissues.
 - B) regulate blood pressure.

- C) Both A and B
D) Neither A nor B
- 25. During sympathetic control of arteriole radius,**
A) activation of alpha receptors causes vasoconstriction.
B) activation of beta₂ receptors causes vasodilation.
C) the dominant effect is a vasoconstriction.
D) mean arterial pressure increases.
E) All of the above
- 26. When a person is at rest, there is arteriole tone (the arterioles are partially constricted). This is because**
A) arterioles contain rings of single unit smooth muscle that are partially contracted at rest.
B) arterioles are constricted by the sympathetic nervous system and there is some sympathetic activity at rest.
C) Both A and B
D) Neither A nor B
- 27. Which of the following would cause vasodilation?**
A) Release of histamine during an allergic reaction.
B) Build up of metabolites due to increased cellular activity.
C) Release of prostaglandins or bradykinin with tissue injury.
D) A and C
E) All of the above
- 28. The velocity of blood flow is slowest in the**
A) arteries.
B) arterioles.
C) capillaries.
D) venules.
E) veins.
- 29. There is sympathetic innervation of**
A) arterioles.
B) capillaries.
C) veins.
D) A and C
E) All of the above
- 30. Which of the following will facilitate venous return?**
A) Standing on your feet all day
B) Contraction of skeletal muscle
C) Activation of parasympathetic nervous system

- D) A and C
E) All of the above
- 31. Given the following information, determine whether there is net absorption or filtration across this capillary.**
Colloid osmotic pressure in the capillary = 20 mmHg
Colloid osmotic pressure in the interstitial fluid = 5 mmHg
Average capillary blood pressure (across entire length of capillary) = 10 mmHg
Interstitial fluid pressure = 5 mmHg
A) Filtration
B) Absorption
C) No net movement
- 32. Where are high pressure baroreceptors?**
A) Atria
B) Ventricle
C) Aortic arch and carotid artery
D) Pulmonary trunk and pulmonary artery
- 33. Where is the cardiovascular control center?**
A) Hypothalamus
B) Medulla
C) Frontal lobe
D) Hippocampus
E) Cerebellum
- 34. Which of the following is transported in the plasma portion of blood?**
A) Glucose
B) Clotting factors
C) Hormones
D) A and C
E) All of the above
- 35. Which of the following is found in red blood cells?**
A) Hemoglobin
B) Carbonic anhydrase
C) Most of the oxygen in the blood
D) A and C
E) All of the above
- 36. Where is the primary site for synthesis of plasma proteins?**
A) Spleen
B) Kidney
C) Bone marrow
D) Pancreas

- E) Liver
- 37. Which of the following is the most abundant class of white blood cells?**
- A) Monocyte
 - B) Lymphocyte
 - C) Neutrophil
 - D) Eosinophil
 - E) Basophil
- 38. Which of the following is a phagocyte?**
- A) Monocyte
 - B) Lymphocyte
 - C) Neutrophil
 - D) A and C
 - E) All of the above
- 39. Which of the following is false?**
- A) Red blood cells are produced in the bone marrow.
 - B) The spleen filters and destroys old red blood cells.
 - C) Iron is an essential mineral; that is, it is needed in the diet.
 - D) Iron is transported in the blood as ferritin.
 - E) Metabolites from destroyed red blood cells are further degraded by the liver.
- 40. Platelets**
- A) are derived from megakaryocytes.
 - B) secrete ADP, which facilitates platelet aggregation.
 - C) secrete epinephrine, which causes vasoconstriction.
 - D) are necessary for formation of a blood clot.
 - E) All of the above

Short answer and fill-in the blanks. PRINT answers directly on the exam as indicated. Points for each question are as indicated.

- 41. (5 points) Draw a typical lead II ECG below. Label the P, QRS, and T waves. Identify what each wave represents.**

P wave = _____

QRS complex = _____

T wave = _____

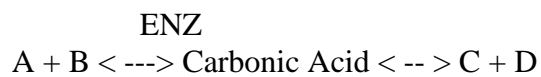
- 42. (3 points) For each of the following, indicate whether cardiac output will increase, decrease, or not change.**

Increase venous return _____

Increase sympathetic activity _____

Increase heart rate _____

- 43. (5 points) Name the components of the following chemical reaction.**



A = _____

B = _____

ENZ (enzyme) = _____

C = _____

D = _____

44. (4 points) Fill in the blanks with the correct word.

A blood clot will form around a platelet plug. Platelet plugs only occur around the damaged vessel

wall because healthy endothelial cells convert arachidonic acid to

_____, which prevents platelet adhesion.

To form a blood clot, _____ converts fibrinogen to

fibrin (loose). To form a tight meshwork of the fibrin, factor XIII must be activated;

_____ activates factor XIII.

_____ dissolves a clot.

45. (3 points) Your blood pressure is recorded as 110/70. Answer the following questions.

What is your pulse pressure? _____

What is your diastolic pressure? _____

What is your mean arterial pressure? _____

BONUS (3 points)

Name 3 specific causes of anemia. Do not list a class, but a specific cause. For example, if you want to use a diet deficiency one, name the specific deficiency.