

Chapter 12 Test Bank

Student: _____

1. Which of the following is NOT primarily a function of blood plasma?
 - A. transport of hormones
 - B. being in osmotic balance with red blood cells
 - C. having plasma proteins that exert an osmotic pressure favoring fluid absorption into the capillaries
 - D. providing clotting factors that are ready to be activated
 - E. transport of oxygen

2. Which of the following does NOT describe erythrocytes?
 - A. contain myoglobin
 - B. have a high surface-to-volume ratio
 - C. carry oxygen and carbon dioxide in blood
 - D. are red in color
 - E. when mature, have no nucleus

3. What is the term that describes the production of red blood cells?
 - A. hemagglutination
 - B. erythrocytosis
 - C. erythropoiesis
 - D. erythroblastosis
 - E. hemostasis

4. Which is TRUE about the condition anemia?
 - A. It can be caused by too little iron in the diet.
 - B. It can be caused by kidney failure.
 - C. It can be caused by abnormal hemoglobin.
 - D. It results in reduced oxygen-carrying capacity of the blood.
 - E. All of the above are true.

5. A female patient has a blood test. One ml of her blood is drawn, spun in a centrifuge, and the plasma volume is measured and found to be 0.6 ml. Two months later the same patient returns to the doctor and, after doing another blood test, the doctor tells the patient that she has become anemic compared to her previous visit. Which of the following is most likely to be the woman's hematocrit on the second visit?
 - A. 35%
 - B. 50%
 - C. 70%
 - D. 100%
 - E. 0.6 ml

6. A male patient complains of physical weakness and fatigue. A blood test shows his hematocrit to be 30%. Which of the following diagnoses is the least likely to explain his symptoms?

- A. internal bleeding
- B. dietary iron deficiency
- C. dietary vitamin B12 deficiency
- D. lung disease
- E. kidney disease

7. Where is most of the iron in a person's body located?

- A. in the bone marrow
- B. in the liver
- C. in the cytochromes
- D. in erythrocytes
- E. in the kidneys

8. Deficiency of which of the following results in the condition, pernicious anemia?

- A. iron
- B. vitamin B12
- C. erythropoietin
- D. vitamin D
- E. bilirubin

9. Consider the equation $F = P/R$.

It describes the flow (F) of fluid in a tube in which there is a pressure difference (P) between the two ends and a resistance (R) to flow. Based on this equation, which is a correct conclusion?

- A. The flow of fluid in a tube depends upon the absolute pressure at the beginning of the tube.
- B. The rate of fluid flow in a tube will increase if the pressure at the beginning is increased while the pressure at the end of the tube stays the same.
- C. The greater the resistance to flow in a tube, the greater the rate of flow for any given pressure difference.
- D. If both the resistance and the pressure gradient in a tube increase, the flow must also increase.
- E. The rate of flow in a tube will decrease if the resistance to flow is decreased.

10. Which of the following changes would most increase the resistance to blood flow in a blood vessel?

- A. halving the diameter of the vessel
- B. doubling the diameter of the vessel
- C. halving the length of the vessel
- D. doubling the length of the vessel
- E. decreasing the hematocrit from 50% to 40%

11.

Action potentials in the heart spread from cell to cell through:

- A. desmosomes.
- B. gap junctions.
- C. interneurons.
- D. valves.
- E. coronary vessels.

12. The pacemaker of the heart is normally what structure?

- A. sinoatrial node
- B. atrioventricular node
- C. mitral valve
- D. bundle of His
- E. left ventricle

13. Which is correct about the contraction sequence of the heart?

- A. The contraction and relaxation of of all four chambers happen at the same time.
- B. The right atrium and ventricle contract at the same time, and as they are relaxing the left atrium and left ventricle begin to contract.
- C. Contraction begins in this order: right atrium then right ventricle then left atrium then left ventricle.
- D. The two atria contract at the same time, and as they are relaxing, the two ventricles contract together.
- E. The atria and ventricles begin their contractions at the exact same time, but the atrial contraction only lasts half as long as the ventricle contraction.

14.

Which of the following statements concerning the differences between action potentials in skeletal muscle cells and in ventricular cardiac muscle cells is TRUE?

- A. Like skeletal-muscle cells, ventricular cardiac-muscle cells have a resting membrane potential closer to the sodium equilibrium potential than to the potassium equilibrium potential.
- B. Unlike skeletal-muscle cells, the initial depolarization of ventricular cells is mainly due to calcium influx, not sodium influx.
- C.

After sodium influx through voltage-gated channels occurs in ventricular cells, a prolonged influx of calcium occurs. No such calcium influx occurs in skeletal muscle cells.

D.

Action potentials in skeletal muscle cells are longer in duration than action potentials in cardiac muscle cells.

- E. The efflux of K^+ repolarizes skeletal muscle cells after an action potential, while repolarization in cardiac muscle cells is due to the efflux of Ca^{2+} .

15. Which of the following statements is true concerning the diastolic depolarization phase of a cell in the SA node?

- A. The cell will not depolarize until it receives sympathetic stimulation.

- B. The pacemaker potential is caused by Ca^{2+} entering the cell via L-type Ca^{2+} channels.
- C. The pacemaker potential is slower in achieving threshold when acetylcholine is applied to the SA node cells.
- D. During diastolic depolarization, there is a gradually increasing permeability to K^+ .
- E. The slope of the diastolic depolarization is decreased when norepinephrine is applied to the SA node cells.

16. Which would NOT occur as a result of the blockage of action potential propagation through the bundle of His?

- A. There would be a slowing of the frequency of contraction of the ventricles.
- B. The atria would contract more frequently than the ventricles.
- C. The SA node would no longer set the pace for atrial contraction.
- D. The atria and ventricles would no longer beat in synchrony.
- E.

The Purkinje fibers would not receive their typical action potentials from the bundle branches.

17. The plateau of the action potential in cardiac ventricular cells results from the opening of voltage-gated long-lasting _____ channels in the plasma membrane of the cell.

- A. Na^+
- B. K^+
- C. Ca^{2+}
- D. Cl^-
- E.

glucose

18. Which of the following statements about membrane potentials in different types of cardiac cells is TRUE?

- A. Myocardial cells have a resting membrane potential of about -90 mV; pacemaker cells do not have a true resting membrane potential.
- B. Once threshold depolarization is reached in both myocardial and pacemaker cells, the rapid upswing of the action potential is caused by the opening of voltage-gated Na^+ channels
- C. Voltage-gated transient (T-type) Ca^{2+} channels are present in all of the different types of cells of the heart.
- D. There are no L-type Ca^{2+} channels in cardiac muscle cells.
- E. The upstroke of the action potential is steeper in SA node cells than it is in Purkinje cells.

19. What best represents the QRS complex in an electrocardiogram?

- A. depolarization of the atria
- B. repolarization of the atria

- C. depolarization of the ventricles
- D. repolarization of the ventricles
- E. the delay at the AV node

20. Which of the following would be most likely to be determined with a patient's ECG recording?

- A. a heart murmur
- B. stroke volume
- C. cardiac output
- D. blockage of conduction of electrical signals between the atria and the ventricles
- E. a leaky atrioventricular valve

21. Which is TRUE about the comparison of excitation-contraction coupling in cardiac muscle with that in skeletal muscle?

- A. Extracellular Ca^{2+} plays a major role in cardiac but not skeletal muscle.
- B. The mechanism for Ca^{2+} release from the sarcoplasmic reticulum is the same in both types of muscle.
- C. Troponin sites are completely saturated immediately after Ca^{2+} release in both types of muscle.
- D. There is no net change in total intracellular Ca^{2+} concentration in either muscle.
- E. Intracellular Ca^{2+} stores are necessary for contraction in skeletal muscle, but not in cardiac muscle.

22. Which of the following statements about the absolute refractory period of cardiac muscle cells is TRUE?

- A. It lasts for the same length of time in cardiac muscle cells as it does in skeletal muscle cells.
- B. It is much longer than the refractory period of skeletal muscle cells.
- C. It allows for tetanic contractions of the heart to occur to assure smooth, coordinated ejection of blood from the ventricles.
- D.

Ventricular muscle cells are in the absolute refractory period from the beginning of contraction until the beginning of their next contraction.

E. During the absolute refractory period, a larger-than-normal stimulus will result in a premature ventricular contraction.

23. Which of the following statements about the refractory period of neuronal or muscle membranes is TRUE?

- A. In nerve cells, the absolute refractory period coincides with the period of increased K^{+} permeability.
- B. In skeletal-muscle cells, the absolute refractory period lasts about as long as the twitch.
- C. In ventricular cells, the absolute refractory period coincides with the period of increased Na^{+} and Ca^{2+} permeability.
- D. The relative refractory period in neuronal membranes lasts about the same length of time as the absolute refractory period in cardiac muscle cell membranes.
- E. The refractory period in an alpha-motor neuron membrane is much briefer than the refractory period in a skeletal muscle cell membrane.

24. Which of the following statements about the cardiac cycle is true?
- A. The duration of systole is greater than that of diastole.
 - B. During isovolumetric ventricular relaxation, blood flows from the atria into the ventricles.
 - C. Closure of the atrioventricular valves occurs at the onset of ventricular systole.
 - D. The QRS complex occurs at approximately the same time as the closure of the semilunar valves.
 - E. The first valves to go from closed to open after the atrial kick are the atrioventricular valves.

25. Which of the following statements regarding the cardiac cycle is TRUE?
- A. The AV valves are open during mid-to-late diastole.
 - B. The aortic valve is open during isovolumetric ventricular contraction.
 - C. The first heart sound is caused by the closing of the semilunar valves.
 - D. The dicrotic notch is a result of closure of the AV valves.
 - E. Closure of the AV valves occurs when the ventricles reach end-systolic volume.

26. During the cardiac cycle:
- A. the volume of blood leaving the left side of the heart is greater than that leaving the right side.
 - B. the pressure of blood leaving the right ventricle is greater than that leaving the left ventricle.
 - C. the duration of systole is greater than that of diastole.
 - D. the duration of diastole is greater than that of systole.
 - E. the contraction of the atria overlaps in time with with ventricular systole.

27. Which is TRUE about the function of the aortic valve?
- A. It prevents the backflow of blood into the aorta during ventricular diastole.
 - B. It prevents the backflow of blood into the left ventricle during ventricular diastole.
 - C. It prevents the backflow of blood into the left ventricle during ventricular ejection.
 - D. It prevents the backflow of blood into the aorta during ventricular ejection.
 - E. Its closure causes the first heart sound.

28. Which occurs during isovolumetric ventricular contraction?
- A. Rapid filling of the ventricles occurs.
 - B. No blood enters or leaves the ventricles.
 - C. The maximum volume of blood is ejected.
 - D. Ventricular pressure reaches its maximum value of the cardiac cycle.
 - E. The pressure in the ventricles decreases while the pressure in the atria increases.

29. What causes the opening and closing of the heart valves?
- A. stimulation by the sympathetic and parasympathetic nerves
 - B. a pressure difference on the two sides of the valve
 - C. Na^+ and K^+ fluxes during ventricular depolarization
 - D. turbulent flow in the atria and ventricles
 - E. the action of the papillary muscles and chordae tendineae

30. What is indicated by a heart murmur detected between the first and second heart sounds?
- A. insufficiency of a semilunar valve or stenosis of an AV valve
 - B. insufficiency of an AV valve or stenosis of a semilunar valve
 - C. heart failure
 - D. AV nodal conduction block
 - E. a myocardial infarction
31. Which best defines the cardiac output?
- A. the end-diastolic volume minus the end-systolic volume
 - B. the output of the aortic arch baroreceptors
 - C. the volume of blood in the arterial tree at any moment in time
 - D. the stroke volume divided by the heart rate
 - E. the product of the heart rate and the volume ejected from the ventricle during a cardiac cycle
32. Sinoatrial node cells:
- A. reach threshold only when action potentials generated by the AV node arrive through gap junctions.
 - B. exhibit spontaneous depolarization that is speeded by activation of their cholinergic receptors.
 - C. exhibit spontaneous depolarization that is speeded by activation of their beta-adrenergic receptors.
 - D. exhibit a steep upstroke due to the presence of the same type of Na^+ channels found in neuronal membranes.
 - E. are in-between atrial muscle cells and cells of the bundle of His.
33. Which is TRUE regarding the regulation of heart rate?
- A. Stimulation of parasympathetic nerves to the heart causes a slowing of heart rate.
 - B. Stimulation of sympathetic nerves to the heart causes an increase in heart rate.
 - C. A person whose heart lacks autonomic innervation has a faster heart rate at rest than a person with a normally innervated heart.
 - D. The slope of diastolic depolarization in SA node cell action potentials determines the heart rate.
 - E.

All of the choices are true.

34. The frequency of action potentials generated by the SA node is:
- A. increased by parasympathetic stimulation.
 - B. decreased by sympathetic stimulation.
 - C. increased by acetylcholine.
 - D. increased by epinephrine.
 - E. increased by an increase in blood pressure.
35. What is described by the Frank-Starling mechanism of the heart?
- A.

the relationship between end-diastolic volume and heart rate

- B. the relationship between end-systolic volume and stroke volume
- C. the relationship between length and tension in cardiac muscle cells
- D. the relationship between sympathetic stimulation and stroke volume
- E. the relationship between arterial blood pressure and stroke volume

36. According to the Frank-Starling mechanism of the heart:

- A. the left ventricle ejects a larger volume of blood with each systole than the right ventricle.
- B. the intrinsic rate of the heart's pacemaker is 100 beats/min.
- C. cardiac output increases with increased heart rate.
- D. stroke volume increases with increased venous return.
- E. both ventricles contract simultaneously.

37. Which of the following is NOT an effect of sympathetic stimulation of the heart?

- A. an increase in heart rate
- B. a decrease in the duration of systole
- C. a decrease in the slope of the pacemaker potential
- D. an increase in the amount of Ca^{2+} entering cardiac muscle cells
- E. an increase in the rate of cross-bridge cycling in ventricular muscle cells

38. Which of the following statements about blood vessel structure and function is FALSE?

- A. Veins are more compliant than arteries.
- B. The aorta and other large arteries serve as a pressure reservoir for the circulatory system.
- C. Arterioles are small vessels whose resistance to blood flow can be varied.
- D. Arterioles, capillaries, and veins all have valves that allow only one-way flow of blood.
- E. If your blood pressure is 100/70 your mean arterial blood pressure is ~80 mm Hg

39. Which of the following statements concerning regulation of blood flow is TRUE?

- A. Increased levels of metabolic waste products and decreased oxygen concentration in tissues promote hyperemia through the tissues.
- B. If blood flow to a tissue is blocked for a period of time and then the block is removed, the result is a reactive hyperemia in which blood flow through the affected tissue remains low.
- C. According to flow autoregulation, if blood pressure to an arteriole is decreased, blood flow will not return toward its original level until the original blood pressure is restored.
- D. High levels of CO_2 and metabolites tend to cause contraction in the smooth muscle of arteriole walls.
- E. The resistance to blood flow in brain and heart vascular beds does not vary in response to changes in local gas or metabolite concentrations.

40. Which of these best describes active hyperemia?

- A. increased metabolic activity that results in vasoconstriction
- B. increased metabolic activity that results in vasodilation
- C. decreased blood flow to tissues that results in vasoconstriction
- D. decreased blood flow to tissues that results in vasodilation

E. increased blood pressure that drives blood more rapidly through tissues

41. Which of the following statements concerning control of blood flow through arterioles is TRUE?

- A. Beta-adrenergic receptors are more abundant on most arteriolar smooth muscle than are alpha-adrenergic receptors.
- B. Binding of epinephrine to alpha-adrenergic receptors causes vasodilation.
- C. Increased stimulation of vascular smooth muscle by the parasympathetic nervous system causes increased vasoconstriction.
- D. If the arterial blood pressure to an organ suddenly decreases, arterioles in the organ will dilate in response.
- E. Body-wide constriction of arterioles results in a decrease in the total peripheral resistance (TPR).

42. Blood flow through most organs is regulated primarily by increasing or decreasing the _____ activity to arteriolar smooth muscles in the organ. Another form of regulation, called _____, depends upon the metabolic activity of the organ. Increased activity leads to increased interstitial-fluid metabolites, which cause _____ of the arterioles. The former is a type of _____ regulation of blood flow; the latter is an example of _____ regulation.

- A. sympathetic; active hyperemia; dilation; extrinsic; intrinsic
- B. sympathetic; reactive hyperemia; dilation; intrinsic; extrinsic
- C. parasympathetic; active hyperemia; constriction; extrinsic; intrinsic
- D. sympathetic; flow autoregulation; constriction; intrinsic; extrinsic
- E. parasympathetic; reactive hyperemia; dilation; extrinsic; intrinsic

43. If the arterial blood pressure in the brain is suddenly decreased, the flow through arterioles in the brain will immediately fall and then which of these will occur next?

- A. Brain arterioles will constrict to accelerate blood flow through the brain capillaries.
- B. Brain arterioles will dilate due to a decrease in levels of CO₂.
- C. Blood flow will remain at the new, lower level due to reactive hyperemia.
- D. Blood flow will rise to levels above normal due to excess O₂ levels.
- E. Blood flow will return toward its original level due to flow autoregulation.

44. Normally, the hydrostatic pressure difference between capillary fluid and interstitial fluid favors movement of fluid _____ a tissue capillary. The protein osmotic pressure difference between capillary fluid and interstitial fluid normally favors movement of fluid _____ a tissue capillary.

- A. into; into
- B. into; out of
- C. out of; out of
- D. out of; into

45. Which of the following statements concerning the capillaries is FALSE?

- A. Increasing capillary hydrostatic pressure decreases the likelihood that filtration will occur.
- B. Velocity of blood flow is slower in the capillaries than in the arteries.
- C. It is possible for a capillary to filter fluid at its arterial end and absorb fluid at its venous end.
- D. Large capillary pores are more likely to be found in liver capillaries than in brain capillaries.
- E. Large proteins that escape capillaries and enter the interstitial fluid are returned to the circulation via the

lymphatic system.

46.

Which of the following correctly compares the factors involved in bulk flow of fluid in systemic and pulmonary capillaries?

- A. The protein oncotic pressure inside pulmonary capillaries is significantly greater.
- B. There are no lymphatic vessels to remove fluid from lung interstitial fluid.
- C. The hydrostatic pressure inside pulmonary capillaries is significantly lower.
- D. The protein oncotic pressure is lower in pulmonary interstitial fluid than in typical systemic interstitial fluid.
- E. The Starling's forces overwhelmingly favor reabsorption all along the length of pulmonary capillaries.

47. Distinguishing characteristics of veins include which of the following?

- A. All veins carry deoxygenated blood.
- B. All veins carry blood toward the heart.
- C. All veins have thick, elastic walls.
- D. Veins have walls consisting only of endothelial cells.
- E. All veins have valves to ensure one-way movement of blood.

48. What determines the movement of blood in systemic veins?

- A. The blood pressure difference between systemic capillaries and the right atrium.
- B. The contraction and relaxation of skeletal muscles.
- C. The decrease of thoracic pressure and increase of abdominal pressure due to diaphragm movement.
- D. Valves in the veins.
- E. All of the above.

49. Which of the following is a result of increased sympathetic stimulation of vascular smooth muscle?

- A. Filtration of fluid from capillaries to interstitial fluid increases.
- B. Total peripheral resistance (TPR) decreases.
- C. The percentage of blood volume in the veins increases.
- D. Blood flow to the brain decreases.
- E. Venous return of blood to the heart increases.

50. Which of the following factors would NOT tend to increase systemic arterial blood pressure?

- A. increased sympathetic stimulation of the blood vessels
- B. increased blood volume
- C. increased venous return
- D. increased parasympathetic stimulation of the heart
- E. increased activity of the skeletal muscle pump

51. Which of the following is most likely to be a cause of hypotension?

- A. an increase in blood volume

- B. sweating, vomiting, or emotional responses
- C. decreased firing of the arterial baroreceptors
- D. increased release of epinephrine by the adrenal medulla
- E. a sudden decrease in firing of the parasympathetic nervous system

52. Jane donates a pint of blood to a blood bank. A few minutes later, which of the following would be increased compared to pre-donation values?

- A. her stroke volume and total peripheral resistance
- B. her heart rate and total peripheral resistance
- C. her heart rate and mean arterial pressure
- D. the percentage of her cardiac output flowing to her kidneys
- E. the blood flow to her brain

53. Jane donates a pint of blood to a blood bank. A few minutes later, which of the following would be decreased compared to pre-donation values?

- A. her stroke volume and total peripheral resistance
- B. her heart rate and total peripheral resistance
- C. her heart rate and mean arterial pressure
- D. the percentage of her cardiac output flowing to her kidneys
- E. blood flow to her brain

54. Which is a typical response of the body to hemorrhage?

- A. decreasing the heart rate below normal
- B. decreasing total peripheral resistance to below normal levels
- C. raising mean arterial pressure to above normal
- D. increasing cardiac output to above normal levels
- E. increasing bulk flow reabsorption of fluid into capillaries

55. Following hemorrhage, reflexes are triggered that attempt to compensate for the blood loss. As a result of the blood loss and the reflex mechanisms, which of the following will be true, compared to prehemorrhage values?

- A. Both cardiac output and total peripheral resistance will be increased.
- B. Both cardiac output and total peripheral resistance will be decreased.
- C. Cardiac output will be increased and total peripheral resistance will be decreased.
- D. Cardiac output will be decreased and total peripheral resistance will be increased.
- E. Hematocrit will be increased.

56. How would a hemorrhage immediately affect the activity of the baroreceptors?

- A. The baroreceptors would increase their rate of firing to all medullary cardiovascular center cell types.
- B. The baroreceptors would increase their rate of firing to cells in the medulla oblongata that activate sympathetic pathways and decrease their rate of firing to cells in the medulla oblongata that activate parasympathetic pathways.
- C. The baroreceptors would decrease their rate of firing to all medullary cardiovascular center cell types.
- D. The baroreceptors would decrease their rate of firing to cells in the medulla oblongata that activate sympathetic pathways and increase their rate of firing to cells in the medulla oblongata that activate

parasympathetic pathways.

E. A hemorrhage would not affect the activity of the baroreceptors.

57. Which of the following is most likely to occur when a soldier stands at attention--very still, with legs and spine straight?

- A. decreased pressure in the capillaries of the feet
- B. increased absorption of interstitial fluid by the capillaries of the feet
- C. increased storage of blood in the veins of the feet and legs
- D. increased venous return
- E. increased blood flow to the brain

58. During exercise, there is a decreased flow of blood to:

- A. the brain.
- B. the skin.
- C. the abdominal organs.
- D. the skeletal muscles
- E. the heart.

59. Which of the following does NOT contribute to increased stroke volume during exercise?

- A. increased contractility of cardiac muscle
- B. increased venous return
- C. increased length of filling time during diastole
- D. increased sympathetic stimulation of ventricular muscle
- E. increased end-diastolic volume

60. Which is the most likely effect of physical endurance training on a person's cardiac performance?

- A. a decrease in cardiac output
- B. an increase in maximal stroke volume
- C. an increase in maximal heart rate
- D. an increase in resting heart rate
- E. an increase in cardiac output when the person is at rest

61. Which of these correctly states differences between a trained athlete and a sedentary individual at rest?

A.

The athlete would have a lower heart rate and larger stroke volume.

B.

The athlete would have a higher heart rate and larger stroke volume.

C.

The athlete would have a lower heart rate and smaller stroke volume.

D.

The athlete would have a higher heart rate and smaller stroke volume.

E.

There would be no differences when the individuals were at rest.

62. Which of the following does not describe hypertension? Hypertension

A.

refers to a chronic state of elevated blood pressure.

B.

is usually defined as a systolic pressure greater than 140 mm Hg and a diastolic pressure greater than 90 mm Hg.

C.

is usually a result of chronically elevated cardiac output.

D.

may be caused by kidney disease.

E.

can sometimes be treated with drugs that increase excretion of water in the urine.

63. Arterial systolic pressure occurs _____ while arterial diastolic pressure occurs _____.

A. at the same time as closure of the semilunar valves; at the same time as closure of the atrioventricular valves

B. during the isovolumetric contraction phase of the cardiac cycle; during the isovolumetric relaxation phase of the cardiac cycle

C. at the same time as the P-wave of the electrocardiogram; at the same time as the T-wave of the electrocardiogram

D. when the the ventricle reaches end-systolic volume; when the ventricle reaches end-diastolic volume

E. during the middle of the phase of ventricular ejection; just before the semilunar valve opens

64. Which of the following drugs might be prescribed to alleviate hypertension?

A. an alpha-adrenergic receptor agonist

B. a beta-adrenergic receptor antagonist

- C. a cholinergic antagonist
- D. a drug that increases L-type Ca^{2+} channel currents
- E. a drug that increases T-type Ca^{2+} channel currents

65. Which of the drug treatments listed below is INCORRECTLY matched to a mode of action in treating hypertension?

- A. alpha-adrenergic receptor blockers - reduce TPR by decreased stimulation of arteriolar smooth muscle
- B. beta-adrenergic receptor antagonists - reduce cardiac output by slowing heart rate and reducing contractility
- C. antagonists of parasympathetic receptors - reduce TPR by decreased stimulation of arteriolar smooth muscle
- D.

angiotensin-converting enzyme (ACE) inhibitors - reduce TPR by reducing angiotensin 2 concentrations

E.

diuretics - reduce blood volume by increasing excretion of sodium and water in urine

F.

calcium channel blockers - reduce speed and force of contraction in vascular smooth muscle

G. ACE inhibitors - lowers peripheral resistance by promoting vasodilation

66. Which of the following is NOT likely to result in edema?

- A. blockage of lymph vessels
- B. prolonged standing
- C. liver disease
- D. heart failure
- E. elevated plasma protein concentrations

67. Atherosclerosis is:

- A. the major cause of heart attacks.
- B. a thinning in the walls of arteries.
- C. associated with low blood levels of cholesterol and heavy exercise.
- D. a disease in which the walls of arteries become more compliant.
- E. more common in younger people than in older people.

68. What is hemostasis?

- A. the maintenance of relatively stable conditions in the internal environment
- B. the prevention or stoppage of blood loss
- C. a disease in which blood clot formation is impaired
- D. a protein inside red blood cells that binds oxygen with high affinity

E. the set point for normal arterial blood pressure

69. Which of the following occurs first in hemostasis?

- A. activation of the fibrinolytic system
- B. platelet aggregation
- C. a clotting cascade that leads to the conversion of fibrinogen to stable fibrin
- D. conversion of prothrombin to thrombin
- E. conversion of plasminogen to plasmin

70. Platelets participate in hemostasis by:

- A. aggregating to form a plug and manufacturing fibrinogen.
- B. secreting nitric oxide and releasing chemicals that promote vasoconstriction.
- C. secreting prostacyclin, which prevents platelet aggregation on blood vessel endothelium.
- D. aggregating to form a plug and releasing chemicals that promote vasoconstriction.
- E. secreting tissue plasminogen activator (t-PA) whenever they come into contact with collagen.

71. Which is an intermediary protein that enables platelets to adhere to collagen?

- A. tissue plasminogen activator (t-PA)
- B. ATP
- C. von Willebrand factor (vWF)
- D. arachidonic acid
- E. activated protein C

72. Which of the following statements regarding blood clotting is TRUE?

- A. Blood clotting requires activation of thrombin.
- B. Blood clotting is enhanced by prostaglandin I₂ (PGI₂) and nitric oxide.
- C. A blood clot is a network of interlacing strands of fibrinogen.
- D. Blood clotting occurs too rapidly in individuals with the disease hemophilia.
- E. Injecting tissue plasminogen activator (t-PA) into a patient who is bleeding will aid blood clotting.

73. Which of the following statements about blood clotting is NOT true?

- A. It is the formation of a thrombus.
- B. It occurs after formation of a platelet plug in a damaged vessel.
- C. It requires the presence of erythrocytes.
- D. It is a result of a cascade of enzyme activation.
- E. It involves positive feedback by thrombin.

74. Which of the following statements regarding the dissolving of blood clots is FALSE?

- A. Activation of the reactions that lead to blood clotting ultimately lead to blood clot dissolution.
- B. Tissue plasminogen activator (t-PA) is secreted by endothelial cells.
- C. Blood clots are digested by plasmin.
- D. Plasminogen is an inactive precursor of the enzyme plasmin.

E. It involves aggregation of soluble fibrin fragments into fibrin.

75. Which of the following is NOT an anticoagulant or stimulator of blood clot dissolution?

- A. vitamin K
- B. aspirin
- C. thrombin
- D. heparin
- E. tissue plasminogen activator (t-PA)

76. Which correctly describes functions of Protein C?

- A. It activates platelets and converts prothrombin to thrombin.
- B. It activates clotting factor XII and platelets.
- C.

It binds to tissue factor and activates clotting factor VII.

- D. It inactivates thrombin and converts fibrinogen to fibrin.
- E. It inhibits clot formation and inactivates factors Va and VIIIa.

77. Blood loss is likely to stimulate the secretion of higher than normal plasma levels of erythropoietin.

True False

78. The primary stimulus for erythropoietin secretion is decreased iron concentrations in the liver.

True False

79. All blood vessels that carry well-oxygenated blood are called arteries.

True False

80. At rest, more blood flows per minute to the kidneys and abdominal organs than to the muscles and skin.

True False

81. At rest, more blood flows to the skin and abdominal organs than to the lungs.

True False

82. The myocardial cells receive their blood supply from the coronary arteries that branch off from the aorta.

True False

83. A major difference between cardiac muscle cells and the cells in the cardiac conducting system is that the contractile cells do not undergo spontaneous depolarization.

True False

84. The sinoatrial node is normally the heart's pacemaker because it has the fastest spontaneous rate of diastolic depolarization.

True False

85. The wave of ventricle free wall contraction starts at the apex of the heart and travels toward the base.

True False

86. An ectopic pacemaker is an area of the myocardial conducting system, other than the atrioventricular node, that initiates cardiac depolarization.

True False

87. The QRS wave of the ECG corresponds to depolarization of the atria.

True False

88. An electrocardiogram would be definitive for diagnosing diseases involving the valves of the heart.

True False

89. Cardiac muscle cannot undergo tetanus because its absolute refractory period lasts almost as long as the muscle twitch.

True False

90. Sympathetic stimulation of cardiac muscle cells produces stronger and faster contractions because the concentrations of Ca^{2+} in the sarcoplasm are reduced by inhibition of proteins that pump it out of the cell.

True False

91. Parasympathetic neurons release acetylcholine onto cells in the atria of the heart, but not onto cells of the ventricles.

True False

92. The determinant of whether heart valves are open or closed is the pressure difference across them.

True False

93. The left ventricle has to pump more blood than the right ventricle because the left ventricle has to pump blood through the systemic circulation, which is much larger than the pulmonary circulation.

True False

94. The left ventricle has a thicker wall than the right ventricle because the left ventricle has to pump blood against a higher pressure.

True False

95. The only time during the cardiac cycle that the AV valves are open is systole.

True False

96. During most of systole, left ventricular pressure exceeds aortic pressure, causing blood ejection.

True False

97. Long-term studies show that the risk for heart attack and stroke doubles for every 20 mm increase in diastolic pressure and 10 mm Hg in systolic pressure.

True False

98. Normal heart sounds are produced by vibrations caused by the closing of the AV valves at the end of diastole and the closing of the aortic and pulmonary valves at the end of systole.

True False

99. The inherent pacemaker discharge rate of the sinoatrial node is 72 beats per minute.

True False

100. Stimulation of parasympathetic nerves releases epinephrine into the blood plasma.

True False

101. Sympathetic stimulation of the heart increases action potential conduction velocity through the AV node.

True False

102. The Frank-Starling mechanism of the heart states that an increased venous return will normally result

in a higher heart rate.

True False

103. The stroke volume of the heart can be increased by recruiting more cardiac muscle fibers into activity.

True False

104. The Frank-Starling curve for heart muscle is analagous to a length-tension curve in skeletal muscle.

True False

105. Ventricular contractility is the strength of ventricular contraction at any given end-diastolic volume.

True False

106. Systolic pressure is the peak pressure in systemic arteries and occurs at the beginning of systole.

True False

107. Mean arterial pressure is most accurately calculated by determining the average of the systolic and diastolic pressures.

True False

108. The flow rate of blood through an organ is in part determined by the relative dilation or constriction of arterioles in that organ.

True False

109. The smooth muscle in arteriole walls can be stimulated either to contract or to relax, thereby either decreasing or increasing the amount of blood flowing through arteriolar beds.

True False

110. The hydrostatic pressure difference between the plasma inside the capillary beds and the interstitial fluid surrounding the cells favors filtration of fluid.

True False

111. The protein osmotic pressure difference between the plasma inside the capillary beds and the interstitial fluid surrounding the cells favors filtration of fluid.

True False

112. The amount of nutrients and waste products moved across the capillary wall by bulk flow is greater than the amount that diffuses across under normal conditions.
True False
113. Strong vasoconstriction of arterioles will probably result in greater filtration of fluid from the plasma of capillary beds downstream.
True False
114. Valves are important for promoting one-way flow of blood through the heart and some large veins.
True False
115. The main homeostatically-regulated variable of the cardiovascular system is the mean systemic arterial blood pressure.
True False
116. Total peripheral resistance in the circulatory system is primarily determined by the degree of vasoconstriction in the veins.
True False
117. Increasing the mean arterial pressure or the pulse pressure in the carotid artery will cause decreased firing of action potentials in the afferent neurons associated with the baroreceptors.
True False
118. The medullary cardiovascular center is the only part of the brain involved with the regulation of blood pressure.
True False
119. The condition of shock is an example of failure of homeostatic mechanisms to compensate when one or more parts of the reflex control system are damaged.
True False
120. An athlete who is nearing the end of a 2 kilometer run would be expected to have both an increased mean arterial blood pressure and an increased total peripheral resistance.
True False
121. During exercise, sympathetic stimulation of the heart and arteriolar smooth muscle is enhanced

because of reflexes triggered by elevated mean arterial pressure and elevated pulse pressure.

True False

122. Hypertension is often treated with drugs that increase total peripheral resistance.

True False

123. In a failing heart, stroke volume does not increase as steeply when end-diastolic volume increases.

True False

124. Left ventricular failure often results in increased net pulmonary capillary filtration into the interstitial fluid of the lungs and a resulting decrease in the diffusional exchange of O₂ and CO₂ between lung and blood.

True False

125. Increased concentrations of plasma proteins, increased venous pressure, and lymphatic obstruction all tend to cause tissue edema.

True False

126. Hemostatic mechanisms can generally stop blood loss from a small vein that is cut.

True False

127. The function of the platelet plug is to block the blood vessel so that blood cannot flow through it.

True False

128. Chemical mediators released from platelet granules and plasma membranes stimulate contraction of vascular smooth muscle.

True False

129. A blood clot is essentially an intricate network of interlacing strands of thrombin.

True False

130. In the clotting cascade, thrombin feeds back and further stimulates its own activation, which is a positive feedback mechanism.

True False

131. In the clotting cascade, factor Xa helps convert prothrombin to thrombin.

True False

132. The Starling forces which influence bulk flow of fluid between capillary plasma and interstitial fluid are identical everywhere in the body.

True False

133. When arterioles constrict it raises arterial blood pressure and increases the volume of forward flow into the veins, while constriction in veins reduces forward flow by decreasing pressure in the atria.

True False

134. The term AED (Automatic Electronic Defibrillator) refers to a recently developed device used to regulate blood pressure with the surprise benefit of being useful in contraception with some individuals within a narrowly defined age group.

True False

135. Thrombin is inactivated when it binds to heparin.

True False

136. The adaptive value of having a complex cascade system for blood clotting is that a defect of one participant in the cascade can be corrected by another enzyme later in the cascade.

True False

Chapter 12 Test Bank **Key**

1. Which of the following is NOT primarily a function of blood plasma?

A. transport of hormones

B. being in osmotic balance with red blood cells

C. having plasma proteins that exert an osmotic pressure favoring fluid absorption into the capillaries

D. providing clotting factors that are ready to be activated

E. transport of oxygen

2. Which of the following does NOT describe erythrocytes?

- A. contain myoglobin
- B. have a high surface-to-volume ratio
- C. carry oxygen and carbon dioxide in blood
- D. are red in color
- E. when mature, have no nucleus

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

3. What is the term that describes the production of red blood cells?

- A. hemagglutination
- B. erythrocytosis
- C. erythropoiesis
- D. erythroblastosis
- E. hemostasis

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

4. Which is TRUE about the condition anemia?

- A. It can be caused by too little iron in the diet.
- B. It can be caused by kidney failure.
- C. It can be caused by abnormal hemoglobin.
- D. It results in reduced oxygen-carrying capacity of the blood.
- E. All of the above are true.

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

5. A female patient has a blood test. One ml of her blood is drawn, spun in a centrifuge, and the plasma volume is measured and found to be 0.6 ml. Two months later the same patient returns to the doctor and, after doing another blood test, the doctor tells the patient that she has become anemic compared to her previous visit. Which of the following is most likely to be the woman's hematocrit on the second visit?

- A. 35%
- B. 50%
- C. 70%
- D. 100%
- E. 0.6 ml

Bloom's: Level 2. Understand
Learning Outcome: 12.01

Learning Outcome: 12.24
Section: 12.01
Section: 12.24
Topic: Cardiovascular System

6. A male patient complains of physical weakness and fatigue. A blood test shows his hematocrit to be 30%. Which of the following diagnoses is the least likely to explain his symptoms?
- A. internal bleeding
 - B. dietary iron deficiency
 - C. dietary vitamin B12 deficiency
 - D. lung disease**
 - E. kidney disease

Bloom's: Level 3. Apply
Learning Outcome: 12.01
Learning Outcome: 12.24
Section: 12.01
Section: 12.24
Topic: Cardiovascular System

7. Where is most of the iron in a person's body located?
- A. in the bone marrow
 - B. in the liver
 - C. in the cytochromes
 - D. in erythrocytes**
 - E. in the kidneys

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

8. Deficiency of which of the following results in the condition, pernicious anemia?
- A. iron
 - B. vitamin B12**
 - C. erythropoietin
 - D. vitamin D
 - E. bilirubin

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

9. Consider the equation $F = P/R$. It describes the flow (F) of fluid in a tube in which there is a pressure difference (P) between the two ends and a resistance (R) to flow. Based on this equation, which is a correct conclusion?
- A. The flow of fluid in a tube depends upon the absolute pressure at the beginning of the tube.
 - B. The rate of fluid flow in a tube will increase if the pressure at the beginning is increased while the pressure at the end of the tube stays the same.**
 - C. The greater the resistance to flow in a tube, the greater the rate of flow for any given pressure difference.
 - D. If both the resistance and the pressure gradient in a tube increase, the flow must also increase.

E. The rate of flow in a tube will decrease if the resistance to flow is decreased.

Bloom's: Level 2. Understand
Learning Outcome: 12.02
Section: 12.02
Topic: Cardiovascular System

10. Which of the following changes would most increase the resistance to blood flow in a blood vessel?

- A.** halving the diameter of the vessel
- B. doubling the diameter of the vessel
- C. halving the length of the vessel
- D. doubling the length of the vessel
- E. decreasing the hematocrit from 50% to 40%

Bloom's: Level 3. Apply
Learning Outcome: 12.02
Section: 12.02
Topic: Cardiovascular System

11.

Action potentials in the heart spread from cell to cell through:

- A. desmosomes.
- B.** gap junctions.
- C. interneurons.
- D. valves.
- E. coronary vessels.

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

12. The pacemaker of the heart is normally what structure?

- A.** sinoatrial node
- B. atrioventricular node
- C. mitral valve
- D. bundle of His
- E. left ventricle

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

13. Which is correct about the contraction sequence of the heart?

- A. The contraction and relaxation of all four chambers happen at the same time.
- B. The right atrium and ventricle contract at the same time, and as they are relaxing the left atrium and left

ventricle begin to contract.

C. Contraction begins in this order: right atrium then right ventricle then left atrium then left ventricle.

D. The two atria contract at the same time, and as they are relaxing, the two ventricles contract together.

E. The atria and ventricles begin their contractions at the exact same time, but the atrial contraction only lasts half as long as the ventricle contraction.

Bloom's: Level 1. Remember

Learning Outcome: 12.04

Section: 12.04

Topic: Cardiovascular System

14.

Which of the following statements concerning the differences between action potentials in skeletal muscle cells and in ventricular cardiac muscle cells is TRUE?

A. Like skeletal-muscle cells, ventricular cardiac-muscle cells have a resting membrane potential closer to the sodium equilibrium potential than to the potassium equilibrium potential.

B. Unlike skeletal-muscle cells, the initial depolarization of ventricular cells is mainly due to calcium influx, not sodium influx.

C.

After sodium influx through voltage-gated channels occurs in ventricular cells, a prolonged influx of calcium occurs. No such calcium influx occurs in skeletal muscle cells.

D.

Action potentials in skeletal muscle cells are longer in duration than action potentials in cardiac muscle cells.

E. The efflux of K^+ repolarizes skeletal muscle cells after an action potential, while repolarization in cardiac muscle cells is due to the efflux of Ca^{2+} .

Bloom's: Level 1. Remember

Learning Outcome: 12.04

Section: 12.04

Topic: Cardiovascular System

15. Which of the following statements is true concerning the diastolic depolarization phase of a cell in the SA node?

A. The cell will not depolarize until it receives sympathetic stimulation.

B. The pacemaker potential is caused by Ca^{2+} entering the cell via L-type Ca^{2+} channels.

C. The pacemaker potential is slower in achieving threshold when acetylcholine is applied to the SA node cells.

D. During diastolic depolarization, there is a gradually increasing permeability to K^+ .

E. The slope of the diastolic depolarization is decreased when norepinephrine is applied to the SA node cells.

Bloom's: Level 2. Understand

Learning Outcome: 12.04

16. Which would NOT occur as a result of the blockage of action potential propagation through the bundle of His?

- A. There would be a slowing of the frequency of contraction of the ventricles.
- B. The atria would contract more frequently than the ventricles.
- C.** The SA node would no longer set the pace for atrial contraction.
- D. The atria and ventricles would no longer beat in synchrony.
- E.

The Purkinje fibers would not receive their typical action potentials from the bundle branches.

Bloom's: Level 2. Understand
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

17. The plateau of the action potential in cardiac ventricular cells results from the opening of voltage-gated long-lasting _____ channels in the plasma membrane of the cell.

- A. Na^+
- B. K^+
- C.** Ca^{2+}
- D. Cl^-
- E.

glucose

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

18. Which of the following statements about membrane potentials in different types of cardiac cells is TRUE?

- A.** Myocardial cells have a resting membrane potential of about -90 mV; pacemaker cells do not have a true resting membrane potential.
- B. Once threshold depolarization is reached in both myocardial and pacemaker cells, the rapid upswing of the action potential is caused by the opening of voltage-gated Na^+ channels
- C. Voltage-gated transient (T-type) Ca^{2+} channels are present in all of the different types of cells of the heart.
- D. There are no L-type Ca^{2+} channels in cardiac muscle cells.
- E. The upstroke of the action potential is steeper in SA node cells than it is in Purkinje cells.

Bloom's: Level 2. Understand
Learning Outcome: 12.04

19. What best represents the QRS complex in an electrocardiogram?
- A. depolarization of the atria
 - B. repolarization of the atria
 - C. depolarization of the ventricles**
 - D. repolarization of the ventricles
 - E. the delay at the AV node

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

20. Which of the following would be most likely to be determined with a patient's ECG recording?
- A. a heart murmur
 - B. stroke volume
 - C. cardiac output
 - D. blockage of conduction of electrical signals between the atria and the ventricles**
 - E. a leaky atrioventricular valve

Bloom's: Level 2. Understand
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

21. Which is TRUE about the comparison of excitation-contraction coupling in cardiac muscle with that in skeletal muscle?
- A. Extracellular Ca^{2+} plays a major role in cardiac but not skeletal muscle.**
 - B. The mechanism for Ca^{2+} release from the sarcoplasmic reticulum is the same in both types of muscle.
 - C. Troponin sites are completely saturated immediately after Ca^{2+} release in both types of muscle.
 - D. There is no net change in total intracellular Ca^{2+} concentration in either muscle.
 - E. Intracellular Ca^{2+} stores are necessary for contraction in skeletal muscle, but not in cardiac muscle.

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

22. Which of the following statements about the absolute refractory period of cardiac muscle cells is TRUE?
- A. It lasts for the same length of time in cardiac muscle cells as it does in skeletal muscle cells.
 - B. It is much longer than the refractory period of skeletal muscle cells.**
 - C. It allows for tetanic contractions of the heart to occur to assure smooth, coordinated ejection of blood from the ventricles.
 - D.

Ventricular muscle cells are in the absolute refractory period from the beginning of contraction until the beginning of their next contraction.

E. During the absolute refractory period, a larger-than-normal stimulus will result in a premature ventricular contraction.

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

23. Which of the following statements about the refractory period of neuronal or muscle membranes is TRUE?

- A. In nerve cells, the absolute refractory period coincides with the period of increased K^+ permeability.
- B. In skeletal-muscle cells, the absolute refractory period lasts about as long as the twitch.
- C.** In ventricular cells, the absolute refractory period coincides with the period of increased Na^+ and Ca^{2+} permeability.
- D. The relative refractory period in neuronal membranes lasts about the same length of time as the absolute refractory period in cardiac muscle cell membranes.
- E. The refractory period in an alpha-motor neuron membrane is much briefer than the refractory period in a skeletal muscle cell membrane.

Bloom's: Level 2. Understand
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

24. Which of the following statements about the cardiac cycle is true?

- A. The duration of systole is greater than that of diastole.
- B. During isovolumetric ventricular relaxation, blood flows from the atria into the ventricles.
- C.** Closure of the atrioventricular valves occurs at the onset of ventricular systole.
- D. The QRS complex occurs at approximately the same time as the closure of the semilunar valves.
- E. The first valves to go from closed to open after the atrial kick are the atrioventricular valves.

Bloom's: Level 2. Understand
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

25. Which of the following statements regarding the cardiac cycle is TRUE?

- A.** The AV valves are open during mid-to-late diastole.
- B. The aortic valve is open during isovolumetric ventricular contraction.
- C. The first heart sound is caused by the closing of the semilunar valves.
- D. The dicrotic notch is a result of closure of the AV valves.
- E. Closure of the AV valves occurs when the ventricles reach end-systolic volume.

Bloom's: Level 2. Understand
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

26. During the cardiac cycle:

- A. the volume of blood leaving the left side of the heart is greater than that leaving the right side.
- B. the pressure of blood leaving the right ventricle is greater than that leaving the left ventricle.
- C. the duration of systole is greater than that of diastole.
- D.** the duration of diastole is greater than that of systole.
- E. the contraction of the atria overlaps in time with with ventricular systole.

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

27. Which is TRUE about the function of the aortic valve?

- A. It prevents the backflow of blood into the aorta during ventricular diastole.
- B.** It prevents the backflow of blood into the left ventricle during ventricular diastole.
- C. It prevents the backflow of blood into the left ventricle during ventricular ejection.
- D. It prevents the backflow of blood into the aorta during ventricular ejection.
- E. Its closure causes the first heart sound.

Bloom's: Level 1. Remember
Learning Outcome: 12.03
Learning Outcome: 12.05
Section: 12.03
Section: 12.05
Topic: Cardiovascular System

28. Which occurs during isovolumetric ventricular contraction?

- A. Rapid filling of the ventricles occurs.
- B.** No blood enters or leaves the ventricles.
- C. The maximum volume of blood is ejected.
- D. Ventricular pressure reaches its maximum value of the cardiac cycle.
- E. The pressure in the ventricles decreases while the pressure in the atria increases.

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

29. What causes the opening and closing of the heart valves?

- A. stimulation by the sympathetic and parasympathetic nerves
- B.** a pressure difference on the two sides of the valve
- C. Na^+ and K^+ fluxes during ventricular depolarization
- D. turbulent flow in the atria and ventricles
- E. the action of the papillary muscles and chordae tendineae

Bloom's: Level 2. Understand
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

30. What is indicated by a heart murmur detected between the first and second heart sounds?

- A. insufficiency of a semilunar valve or stenosis of an AV valve
- B.** insufficiency of an AV valve or stenosis of a semilunar valve
- C. heart failure
- D. AV nodal conduction block
- E. a myocardial infarction

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

31. Which best defines the cardiac output?

- A. the end-diastolic volume minus the end-systolic volume
- B. the output of the aortic arch baroreceptors
- C. the volume of blood in the arterial tree at any moment in time
- D. the stroke volume divided by the heart rate
- E.** the product of the heart rate and the volume ejected from the ventricle during a cardiac cycle

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

32. Sinoatrial node cells:

- A. reach threshold only when action potentials generated by the AV node arrive through gap junctions.
- B. exhibit spontaneous depolarization that is speeded by activation of their cholinergic receptors.
- C.** exhibit spontaneous depolarization that is speeded by activation of their beta-adrenergic receptors.
- D. exhibit a steep upstroke due to the presence of the same type of Na⁺ channels found in neuronal membranes.
- E. are in-between atrial muscle cells and cells of the bundle of His.

Bloom's: Level 2. Understand
Learning Outcome: 12.04
Learning Outcome: 12.06
Section: 12.04
Section: 12.06
Topic: Cardiovascular System

33. Which is TRUE regarding the regulation of heart rate?

- A. Stimulation of parasympathetic nerves to the heart causes a slowing of heart rate.
- B. Stimulation of sympathetic nerves to the heart causes an increase in heart rate.
- C. A person whose heart lacks autonomic innervation has a faster heart rate at rest than a person with a normally innervated heart.
- D. The slope of diastolic depolarization in SA node cell action potentials determines the heart rate.
- E.**

All of the choices are true.

Bloom's: Level 2. Understand
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

34. The frequency of action potentials generated by the SA node is:
- A. increased by parasympathetic stimulation.
 - B. decreased by sympathetic stimulation.
 - C. increased by acetylcholine.
 - D.** increased by epinephrine.
 - E. increased by an increase in blood pressure.

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

35. What is described by the Frank-Starling mechanism of the heart?
- A.

the relationship between end-diastolic volume and heart rate

- B. the relationship between end-systolic volume and stroke volume
- C.** the relationship between length and tension in cardiac muscle cells
- D. the relationship between sympathetic stimulation and stroke volume
- E. the relationship between arterial blood pressure and stroke volume

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

36. According to the Frank-Starling mechanism of the heart:
- A. the left ventricle ejects a larger volume of blood with each systole than the right ventricle.
 - B. the intrinsic rate of the heart's pacemaker is 100 beats/min.
 - C. cardiac output increases with increased heart rate.
 - D.** stroke volume increases with increased venous return.
 - E. both ventricles contract simultaneously.

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

37. Which of the following is NOT an effect of sympathetic stimulation of the heart?
- A. an increase in heart rate
 - B. a decrease in the duration of systole
 - C.** a decrease in the slope of the pacemaker potential
 - D. an increase in the amount of Ca^{2+} entering cardiac muscle cells

E. an increase in the rate of cross-bridge cycling in ventricular muscle cells

Bloom's: Level 2. Understand

Learning Outcome: 12.06

Section: 12.06

Topic: Cardiovascular System

38. Which of the following statements about blood vessel structure and function is FALSE?

- A. Veins are more compliant than arteries.
- B. The aorta and other large arteries serve as a pressure reservoir for the circulatory system.
- C. Arterioles are small vessels whose resistance to blood flow can be varied.
- D.** Arterioles, capillaries, and veins all have valves that allow only one-way flow of blood.
- E. If your blood pressure is 100/70 your mean arterial blood pressure is ~80 mm Hg

Bloom's: Level 1. Remember

Learning Outcome: 12.09

Learning Outcome: 12.10

Learning Outcome: 12.11

Section: 12.09

Section: 12.10

Section: 12.11

Topic: Cardiovascular System

39. Which of the following statements concerning regulation of blood flow is TRUE?

- A.** Increased levels of metabolic waste products and decreased oxygen concentration in tissues promote hyperemia through the tissues.
- B. If blood flow to a tissue is blocked for a period of time and then the block is removed, the result is a reactive hyperemia in which blood flow through the affected tissue remains low.
- C. According to flow autoregulation, if blood pressure to an arteriole is decreased, blood flow will not return toward its original level until the original blood pressure is restored.
- D. High levels of CO₂ and metabolites tend to cause contraction in the smooth muscle of arteriole walls.
- E. The resistance to blood flow in brain and heart vascular beds does not vary in response to changes in local gas or metabolite concentrations.

Bloom's: Level 2. Understand

Learning Outcome: 12.09

Section: 12.09

Topic: Cardiovascular System

40. Which of these best describes active hyperemia?

- A. increased metabolic activity that results in vasoconstriction
- B.** increased metabolic activity that results in vasodilation
- C. decreased blood flow to tissues that results in vasoconstriction
- D. decreased blood flow to tissues that results in vasodilation
- E. increased blood pressure that drives blood more rapidly through tissues

Bloom's: Level 1. Remember

Learning Outcome: 12.09

Section: 12.09

Topic: Cardiovascular System

41. Which of the following statements concerning control of blood flow through arterioles is TRUE?
- A. Beta-adrenergic receptors are more abundant on most arteriolar smooth muscle than are alpha-adrenergic receptors.
 - B. Binding of epinephrine to alpha-adrenergic receptors causes vasodilation.
 - C. Increased stimulation of vascular smooth muscle by the parasympathetic nervous system causes increased vasoconstriction.
 - D.** If the arterial blood pressure to an organ suddenly decreases, arterioles in the organ will dilate in response.
 - E. Body-wide constriction of arterioles results in a decrease in the total peripheral resistance (TPR).

Bloom's: Level 2. Understand

Learning Outcome: 12.09

Section: 12.09

Topic: Cardiovascular System

42. Blood flow through most organs is regulated primarily by increasing or decreasing the _____ activity to arteriolar smooth muscles in the organ. Another form of regulation, called _____, depends upon the metabolic activity of the organ. Increased activity leads to increased interstitial-fluid metabolites, which cause _____ of the arterioles. The former is a type of _____ regulation of blood flow; the latter is an example of _____ regulation.
- A.** sympathetic; active hyperemia; dilation; extrinsic; intrinsic
 - B. sympathetic; reactive hyperemia; dilation; intrinsic; extrinsic
 - C. parasympathetic; active hyperemia; constriction; extrinsic; intrinsic
 - D. sympathetic; flow autoregulation; constriction; intrinsic; extrinsic
 - E. parasympathetic; reactive hyperemia; dilation; extrinsic; intrinsic

Bloom's: Level 1. Remember

Learning Outcome: 12.09

Section: 12.09

Topic: Cardiovascular System

43. If the arterial blood pressure in the brain is suddenly decreased, the flow through arterioles in the brain will immediately fall and then which of these will occur next?
- A. Brain arterioles will constrict to accelerate blood flow through the brain capillaries.
 - B. Brain arterioles will dilate due to a decrease in levels of CO₂.
 - C. Blood flow will remain at the new, lower level due to reactive hyperemia.
 - D. Blood flow will rise to levels above normal due to excess O₂ levels.
 - E.** Blood flow will return toward its original level due to flow autoregulation.

Bloom's: Level 2. Understand

Learning Outcome: 12.09

Section: 12.09

Topic: Cardiovascular System

44. Normally, the hydrostatic pressure difference between capillary fluid and interstitial fluid favors movement of fluid _____ a tissue capillary. The protein osmotic pressure difference between capillary fluid and interstitial fluid normally favors movement of fluid _____ a tissue capillary.
- A. into; into
 - B. into; out of
 - C. out of; out of

D. out of; into

Bloom's: Level 1. Remember
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

45. Which of the following statements concerning the capillaries is FALSE?

- A.** Increasing capillary hydrostatic pressure decreases the likelihood that filtration will occur.
- B. Velocity of blood flow is slower in the capillaries than in the arteries.
- C. It is possible for a capillary to filter fluid at its arterial end and absorb fluid at its venous end.
- D. Large capillary pores are more likely to be found in liver capillaries than in brain capillaries.
- E. Large proteins that escape capillaries and enter the interstitial fluid are returned to the circulation via the lymphatic system.

Bloom's: Level 2. Understand
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

46.

Which of the following correctly compares the factors involved in bulk flow of fluid in systemic and pulmonary capillaries?

- A. The protein oncotic pressure inside pulmonary capillaries is significantly greater.
- B. There are no lymphatic vessels to remove fluid from lung interstitial fluid.
- C.** The hydrostatic pressure inside pulmonary capillaries is significantly lower.
- D. The protein oncotic pressure is lower in pulmonary interstitial fluid than in typical systemic interstitial fluid.
- E. The Starling's forces overwhelmingly favor reabsorption all along the length of pulmonary capillaries.

Bloom's: Level 1. Remember
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

47. Distinguishing characteristics of veins include which of the following?

- A. All veins carry deoxygenated blood.
- B.** All veins carry blood toward the heart.
- C. All veins have thick, elastic walls.
- D. Veins have walls consisting only of endothelial cells.
- E. All veins have valves to ensure one-way movement of blood.

Bloom's: Level 1. Remember
Learning Outcome: 12.01
Learning Outcome: 12.11
Section: 12.01
Section: 12.11
Topic: Cardiovascular System

48. What determines the movement of blood in systemic veins?
- A. The blood pressure difference between systemic capillaries and the right atrium.
 - B. The contraction and relaxation of skeletal muscles.
 - C. The decrease of thoracic pressure and increase of abdominal pressure due to diaphragm movement.
 - D. Valves in the veins.
 - E.** All of the above.

Bloom's: Level 1. Remember
Learning Outcome: 12.11
Section: 12.11
Topic: Cardiovascular System

49. Which of the following is a result of increased sympathetic stimulation of vascular smooth muscle?
- A. Filtration of fluid from capillaries to interstitial fluid increases.
 - B. Total peripheral resistance (TPR) decreases.
 - C. The percentage of blood volume in the veins increases.
 - D. Blood flow to the brain decreases.
 - E.** Venous return of blood to the heart increases.

Bloom's: Level 2. Understand
Learning Outcome: 12.08
Learning Outcome: 12.09
Learning Outcome: 12.10
Learning Outcome: 12.11
Section: 12.08
Section: 12.09
Section: 12.10
Section: 12.11
Topic: Cardiovascular System

50. Which of the following factors would NOT tend to increase systemic arterial blood pressure?
- A. increased sympathetic stimulation of the blood vessels
 - B. increased blood volume
 - C. increased venous return
 - D.** increased parasympathetic stimulation of the heart
 - E. increased activity of the skeletal muscle pump

Bloom's: Level 2. Understand
Learning Outcome: 12.08
Learning Outcome: 12.09
Learning Outcome: 12.11
Learning Outcome: 12.13
Section: 12.08
Section: 12.09
Section: 12.11
Section: 12.13
Topic: Cardiovascular System

51. Which of the following is most likely to be a cause of hypotension?
- A. an increase in blood volume
 - B.** sweating, vomiting, or emotional responses
 - C. decreased firing of the arterial baroreceptors
 - D. increased release of epinephrine by the adrenal medulla

E. a sudden decrease in firing of the parasympathetic nervous system

Bloom's: Level 1. Remember
Learning Outcome: 12.16
Section: 12.16
Topic: Cardiovascular System

52. Jane donates a pint of blood to a blood bank. A few minutes later, which of the following would be increased compared to pre-donation values?

- A. her stroke volume and total peripheral resistance
- B.** her heart rate and total peripheral resistance
- C. her heart rate and mean arterial pressure
- D. the percentage of her cardiac output flowing to her kidneys
- E. the blood flow to her brain

Bloom's: Level 3. Apply
Learning Outcome: 12.16
Section: 12.16
Topic: Cardiovascular System

53. Jane donates a pint of blood to a blood bank. A few minutes later, which of the following would be decreased compared to pre-donation values?

- A. her stroke volume and total peripheral resistance
- B. her heart rate and total peripheral resistance
- C. her heart rate and mean arterial pressure
- D.** the percentage of her cardiac output flowing to her kidneys
- E. blood flow to her brain

Bloom's: Level 2. Understand
Learning Outcome: 12.16
Section: 12.16
Topic: Cardiovascular System

54. Which is a typical response of the body to hemorrhage?

- A. decreasing the heart rate below normal
- B. decreasing total peripheral resistance to below normal levels
- C. raising mean arterial pressure to above normal
- D. increasing cardiac output to above normal levels
- E.** increasing bulk flow reabsorption of fluid into capillaries

Bloom's: Level 2. Understand
Learning Outcome: 12.10
Learning Outcome: 12.16
Section: 12.10
Section: 12.16
Topic: Cardiovascular System

55. Following hemorrhage, reflexes are triggered that attempt to compensate for the blood loss. As a result of the blood loss and the reflex mechanisms, which of the following will be true, compared to prehemorrhage values?

- A. Both cardiac output and total peripheral resistance will be increased.
- B. Both cardiac output and total peripheral resistance will be decreased.
- C. Cardiac output will be increased and total peripheral resistance will be decreased.
- D.** Cardiac output will be decreased and total peripheral resistance will be increased.
- E. Hematocrit will be increased.

Bloom's: Level 1. Remember
Learning Outcome: 12.16
Section: 12.16
Topic: Cardiovascular System

56. How would a hemorrhage immediately affect the activity of the baroreceptors?
- A. The baroreceptors would increase their rate of firing to all medullary cardiovascular center cell types.
 - B. The baroreceptors would increase their rate of firing to cells in the medulla oblongata that activate sympathetic pathways and decrease their rate of firing to cells in the medulla oblongata that activate parasympathetic pathways.
 - C.** The baroreceptors would decrease their rate of firing to all medullary cardiovascular center cell types.
 - D. The baroreceptors would decrease their rate of firing to cells in the medulla oblongata that activate sympathetic pathways and increase their rate of firing to cells in the medulla oblongata that activate parasympathetic pathways.
 - E. A hemorrhage would not affect the activity of the baroreceptors.

Bloom's: Level 1. Remember
Learning Outcome: 12.13
Learning Outcome: 12.16
Section: 12.13
Section: 12.16
Topic: Cardiovascular System

57. Which of the following is most likely to occur when a soldier stands at attention--very still, with legs and spine straight?
- A. decreased pressure in the capillaries of the feet
 - B. increased absorption of interstitial fluid by the capillaries of the feet
 - C.** increased storage of blood in the veins of the feet and legs
 - D. increased venous return
 - E. increased blood flow to the brain

Bloom's: Level 3. Apply
Learning Outcome: 12.10
Learning Outcome: 12.11
Section: 12.10
Section: 12.11
Topic: Cardiovascular System

58. During exercise, there is a decreased flow of blood to:
- A. the brain.
 - B. the skin.
 - C.** the abdominal organs.
 - D. the skeletal muscles
 - E. the heart.

Bloom's: Level 1. Remember
Learning Outcome: 12.18
Section: 12.18
Topic: Cardiovascular System

59. Which of the following does NOT contribute to increased stroke volume during exercise?
- A. increased contractility of cardiac muscle
 - B. increased venous return
 - C. increased length of filling time during diastole**
 - D. increased sympathetic stimulation of ventricular muscle
 - E. increased end-diastolic volume

Bloom's: Level 2. Understand
Learning Outcome: 12.18
Section: 12.18
Topic: Cardiovascular System

60. Which is the most likely effect of physical endurance training on a person's cardiac performance?
- A. a decrease in cardiac output
 - B. an increase in maximal stroke volume**
 - C. an increase in maximal heart rate
 - D. an increase in resting heart rate
 - E. an increase in cardiac output when the person is at rest

Bloom's: Level 1. Remember
Learning Outcome: 12.18
Section: 12.18
Topic: Cardiovascular System

61. Which of these correctly states differences between a trained athlete and a sedentary individual at rest?
- A.**

The athlete would have a lower heart rate and larger stroke volume.

B.

The athlete would have a higher heart rate and larger stroke volume.

C.

The athlete would have a lower heart rate and smaller stroke volume.

D.

The athlete would have a higher heart rate and smaller stroke volume.

E.

There would be no differences when the individuals were at rest.

Bloom's: Level 2. Understand
Learning Outcome: 12.18
Section: 12.18
Topic: Cardiovascular System

62. Which of the following does not describe hypertension? Hypertension

A.

refers to a chronic state of elevated blood pressure.

B.

is usually defined as a systolic pressure greater than 140 mm Hg and a diastolic pressure greater than 90 mm Hg.

C.

is usually a result of chronically elevated cardiac output.

D.

may be caused by kidney disease.

E.

can sometimes be treated with drugs that increase excretion of water in the urine.

Bloom's: Level 1. Remember
Learning outcome: 12.19
Section: 12.19
Topic: Cardiovascular System

63. Arterial systolic pressure occurs _____ while arterial diastolic pressure occurs _____.

A. at the same time as closure of the semilunar valves; at the same time as closure of the atrioventricular valves

B. during the isovolumetric contraction phase of the cardiac cycle; during the isovolumetric relaxation phase of the cardiac cycle

C. at the same time as the P-wave of the electrocardiogram; at the same time as the T-wave of the electrocardiogram

D. when the the ventricle reaches end-systolic volume; when the ventricle reaches end-diastolic volume

E. during the middle of the phase of ventricular ejection; just before the semilunar valve opens

Bloom's: Level 2. Understand
Learning Outcome: 12.05
Learning Outcome: 12.08
Learning Outcome: 12.13
Section: 12.05
Section: 12.08
Section: 12.13
Topic: Cardiovascular System

64. Which of the following drugs might be prescribed to alleviate hypertension?

- A. an alpha-adrenergic receptor agonist
- B.** a beta-adrenergic receptor antagonist
- C. a cholinergic antagonist
- D. a drug that increases L-type Ca^{2+} channel currents
- E. a drug that increases T-type Ca^{2+} channel currents

Bloom's: Level 1. Remember
Learning outcome: 12.19
Section: 12.19
Topic: Cardiovascular System

65. Which of the drug treatments listed below is INCORRECTLY matched to a mode of action in treating hypertension?

- A. alpha-adrenergic receptor blockers - reduce TPR by decreased stimulation of arteriolar smooth muscle
- B. beta-adrenergic receptor antagonists - reduce cardiac output by slowing heart rate and reducing contractility
- C.** antagonists of parasympathetic receptors - reduce TPR by decreased stimulation of arteriolar smooth muscle
- D.

angiotensin-converting enzyme (ACE) inhibitors - reduce TPR by reducing angiotensin 2 concentrations

E.

diuretics - reduce blood volume by increasing excretion of sodium and water in urine

F.

calcium channel blockers - reduce speed and force of contraction in vascular smooth muscle

G. ACE inhibitors - lowers peripheral resistance by promoting vasodilation

Bloom's: Level 2. Understand
Learning outcome: 12.19
Section: 12.19
Topic: Cardiovascular System

66. Which of the following is NOT likely to result in edema?

- A. blockage of lymph vessels
- B. prolonged standing
- C. liver disease
- D. heart failure
- E.** elevated plasma protein concentrations

Bloom's: Level 2. Understand
Learning Outcome: 12.10
Learning Outcome: 12.20
Section: 12.10
Section: 12.20

67. Atherosclerosis is:

- A.** the major cause of heart attacks.
- B. a thinning in the walls of arteries.
- C. associated with low blood levels of cholesterol and heavy exercise.
- D. a disease in which the walls of arteries become more compliant.
- E. more common in younger people than in older people.

Bloom's: Level 1. Remember

Learning Outcome: 12.22

Section: 12.22

Topic: Cardiovascular System

68. What is hemostasis?

- A. the maintenance of relatively stable conditions in the internal environment
- B.** the prevention or stoppage of blood loss
- C. a disease in which blood clot formation is impaired
- D. a protein inside red blood cells that binds oxygen with high affinity
- E. the set point for normal arterial blood pressure

Bloom's: Level 1. Remember

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

69. Which of the following occurs first in hemostasis?

- A. activation of the fibrinolytic system
- B.** platelet aggregation
- C. a clotting cascade that leads to the conversion of fibrinogen to stable fibrin
- D. conversion of prothrombin to thrombin
- E. conversion of plasminogen to plasmin

Bloom's: Level 1. Remember

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

70. Platelets participate in hemostasis by:

- A. aggregating to form a plug and manufacturing fibrinogen.
- B. secreting nitric oxide and releasing chemicals that promote vasoconstriction.
- C. secreting prostacyclin, which prevents platelet aggregation on blood vessel endothelium.
- D.** aggregating to form a plug and releasing chemicals that promote vasoconstriction.
- E. secreting tissue plasminogen activator (t-PA) whenever they come into contact with collagen.

Bloom's: Level 2. Understand

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

71. Which is an intermediary protein that enables platelets to adhere to collagen?

- A. tissue plasminogen activator (t-PA)
- B. ATP
- C. von Willebrand factor (vWF)**
- D. arachidonic acid
- E. activated protein C

Bloom's: Level 1. Remember

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

72. Which of the following statements regarding blood clotting is TRUE?

- A. Blood clotting requires activation of thrombin.**
- B. Blood clotting is enhanced by prostaglandin I₂ (PGI₂) and nitric oxide.
- C. A blood clot is a network of interlacing strands of fibrinogen.
- D. Blood clotting occurs too rapidly in individuals with the disease hemophilia.
- E. Injecting tissue plasminogen activator (t-PA) into a patient who is bleeding will aid blood clotting.

Bloom's: Level 2. Understand

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

73. Which of the following statements about blood clotting is NOT true?

- A. It is the formation of a thrombus.
- B. It occurs after formation of a platelet plug in a damaged vessel.
- C. It requires the presence of erythrocytes.**
- D. It is a result of a cascade of enzyme activation.
- E. It involves positive feedback by thrombin.

Bloom's: Level 1. Remember

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

74. Which of the following statements regarding the dissolving of blood clots is FALSE?

- A. Activation of the reactions that lead to blood clotting ultimately lead to blood clot dissolution.
- B. Tissue plasminogen activator (t-PA) is secreted by endothelial cells.
- C. Blood clots are digested by plasmin.
- D. Plasminogen is an inactive precursor of the enzyme plasmin.
- E. It involves aggregation of soluble fibrin fragments into fibrin.**

Bloom's: Level 1. Remember

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

75. Which of the following is NOT an anticoagulant or stimulator of blood clot dissolution?

- A.** vitamin K
- B. aspirin
- C. thrombin
- D. heparin
- E. tissue plasminogen activator (t-PA)

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

76. Which correctly describes functions of Protein C?

- A. It activates platelets and converts prothrombin to thrombin.
- B. It activates clotting factor XII and platelets.
- C.

It binds to tissue factor and activates clotting factor VII.

- D. It inactivates thrombin and converts fibrinogen to fibrin.
- E.** It inhibits clot formation and inactivates factors Va and VIIIa.

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

77. Blood loss is likely to stimulate the secretion of higher than normal plasma levels of erythropoietin.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

78. The primary stimulus for erythropoietin secretion is decreased iron concentrations in the liver.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.24
Section: 12.24
Topic: Cardiovascular System

79. All blood vessels that carry well-oxygenated blood are called arteries.

FALSE

Bloom's: Level 1. Remember

Learning Outcome: 12.01
Learning Outcome: 12.08
Section: 12.01
Section: 12.08
Topic: Cardiovascular System

80. At rest, more blood flows per minute to the kidneys and abdominal organs than to the muscles and skin.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.01
Section: 12.01
Topic: Cardiovascular System

81. At rest, more blood flows to the skin and abdominal organs than to the lungs.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.01
Section: 12.01
Topic: Cardiovascular System

82. The myocardial cells receive their blood supply from the coronary arteries that branch off from the aorta.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.03
Section: 12.03
Topic: Cardiovascular System

83. A major difference between cardiac muscle cells and the cells in the cardiac conducting system is that the contractile cells do not undergo spontaneous depolarization.

TRUE

Bloom's: Level 2. Understand
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

84. The sinoatrial node is normally the heart's pacemaker because it has the fastest spontaneous rate of diastolic depolarization.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

85. The wave of ventricle free wall contraction starts at the apex of the heart and travels toward the base.

TRUE

*Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System*

86. An ectopic pacemaker is an area of the myocardial conducting system, other than the atrioventricular node, that initiates cardiac depolarization.

FALSE

*Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System*

87. The QRS wave of the ECG corresponds to depolarization of the atria.

FALSE

*Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System*

88. An electrocardiogram would be definitive for diagnosing diseases involving the valves of the heart.

FALSE

*Bloom's: Level 2. Understand
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System*

89. Cardiac muscle cannot undergo tetanus because its absolute refractory period lasts almost as long as the muscle twitch.

TRUE

*Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System*

90. Sympathetic stimulation of cardiac muscle cells produces stronger and faster contractions because the concentrations of Ca^{2+} in the sarcoplasm are reduced by inhibition of proteins that pump it out of the cell.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

91. Parasympathetic neurons release acetylcholine onto cells in the atria of the heart, but not onto cells of the ventricles.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

92. The determinant of whether heart valves are open or closed is the pressure difference across them.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

93. The left ventricle has to pump more blood than the right ventricle because the left ventricle has to pump blood through the systemic circulation, which is much larger than the pulmonary circulation.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Learning Outcome: 12.05
Section: 12.04
Section: 12.05
Topic: Cardiovascular System

94. The left ventricle has a thicker wall than the right ventricle because the left ventricle has to pump blood against a higher pressure.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

95. The only time during the cardiac cycle that the AV valves are open is systole.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

96. During most of systole, left ventricular pressure exceeds aortic pressure, causing blood ejection.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

97. Long-term studies show that the risk for heart attack and stroke doubles for every 20 mm increase in diastolic pressure and 10 mm Hg in systolic pressure.

TRUE

Bloom's: Level 1. Remember
Learning outcome: 12.19
Section: 12.19
Topic: Cardiovascular System

98. Normal heart sounds are produced by vibrations caused by the closing of the AV valves at the end of diastole and the closing of the aortic and pulmonary valves at the end of systole.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.05
Section: 12.05
Topic: Cardiovascular System

99. The inherent pacemaker discharge rate of the sinoatrial node is 72 beats per minute.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.04
Section: 12.04
Topic: Cardiovascular System

100. Stimulation of parasympathetic nerves releases epinephrine into the blood plasma.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.03
Section: 12.03
Topic: Cardiovascular System

101. Sympathetic stimulation of the heart increases action potential conduction velocity through the AV node.

TRUE

Bloom's: Level 2. Understand
Learning Outcome: 12.04
Learning Outcome: 12.06
Section: 12.04
Section: 12.06
Topic: Cardiovascular System

102. The Frank-Starling mechanism of the heart states that an increased venous return will normally result in a higher heart rate.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

103. The stroke volume of the heart can be increased by recruiting more cardiac muscle fibers into activity.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

104. The Frank-Starling curve for heart muscle is analogous to a length-tension curve in skeletal muscle.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

105. Ventricular contractility is the strength of ventricular contraction at any given end-diastolic volume.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.06
Section: 12.06
Topic: Cardiovascular System

106. Systolic pressure is the peak pressure in systemic arteries and occurs at the beginning of systole.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.08
Section: 12.08
Topic: Cardiovascular System

107. Mean arterial pressure is most accurately calculated by determining the average of the systolic and

diastolic pressures.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.08
Section: 12.08
Topic: Cardiovascular System

108. The flow rate of blood through an organ is in part determined by the relative dilation or constriction of arterioles in that organ.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.09
Section: 12.09
Topic: Cardiovascular System

109. The smooth muscle in arteriole walls can be stimulated either to contract or to relax, thereby either decreasing or increasing the amount of blood flowing through arteriolar beds.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.09
Section: 12.09
Topic: Cardiovascular System

110. The hydrostatic pressure difference between the plasma inside the capillary beds and the interstitial fluid surrounding the cells favors filtration of fluid.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

111. The protein osmotic pressure difference between the plasma inside the capillary beds and the interstitial fluid surrounding the cells favors filtration of fluid.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

112. The amount of nutrients and waste products moved across the capillary wall by bulk flow is greater than the amount that diffuses across under normal conditions.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

113. Strong vasoconstriction of arterioles will probably result in greater filtration of fluid from the plasma of capillary beds downstream.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.09
Learning Outcome: 12.10
Section: 12.09
Section: 12.10
Topic: Cardiovascular System

114. Valves are important for promoting one-way flow of blood through the heart and some large veins.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.03
Learning Outcome: 12.11
Section: 12.03
Section: 12.11
Topic: Cardiovascular System

115. The main homeostatically-regulated variable of the cardiovascular system is the mean systemic arterial blood pressure.

TRUE

Bloom's: Level 2. Understand
Learning Outcome: 12.08
Section: 12.08
Topic: Cardiovascular System

116. Total peripheral resistance in the circulatory system is primarily determined by the degree of vasoconstriction in the veins.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.13
Section: 12.13
Topic: Cardiovascular System

117. Increasing the mean arterial pressure or the pulse pressure in the carotid artery will cause decreased firing of action potentials in the afferent neurons associated with the baroreceptors.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.13
Section: 12.13
Topic: Cardiovascular System

118. The medullary cardiovascular center is the only part of the brain involved with the regulation of blood pressure.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.13
Learning Outcome: 12.15
Section: 12.13
Section: 12.15
Topic: Cardiovascular System

119. The condition of shock is an example of failure of homeostatic mechanisms to compensate when one or more parts of the reflex control system are damaged.

TRUE

Bloom's: Level 3. Apply
Learning Outcome: 12.16
Section: 12.16
Topic: Cardiovascular System

120. An athlete who is nearing the end of a 2 kilometer run would be expected to have both an increased mean arterial blood pressure and an increased total peripheral resistance.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.18
Section: 12.18
Topic: Cardiovascular System

121. During exercise, sympathetic stimulation of the heart and arteriolar smooth muscle is enhanced because of reflexes triggered by elevated mean arterial pressure and elevated pulse pressure.

FALSE

Bloom's: Level 3. Apply
Learning Outcome: 12.18
Section: 12.18
Topic: Cardiovascular System

122. Hypertension is often treated with drugs that increase total peripheral resistance.

FALSE

Bloom's: Level 1. Remember
Learning outcome: 12.19
Section: 12.19
Topic: Cardiovascular System

123. In a failing heart, stroke volume does not increase as steeply when end-diastolic volume increases.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 12.20

Section: 12.20

Topic: Cardiovascular System

124. Left ventricular failure often results in increased net pulmonary capillary filtration into the interstitial fluid of the lungs and a resulting decrease in the diffusional exchange of O₂ and CO₂ between lung and blood.

TRUE

Bloom's: Level 2. Understand

Learning Outcome: 12.20

Section: 12.20

Topic: Cardiovascular System

125. Increased concentrations of plasma proteins, increased venous pressure, and lymphatic obstruction all tend to cause tissue edema.

FALSE

Bloom's: Level 2. Understand

Learning Outcome: 12.10

Learning Outcome: 12.12

Section: 12.10

Section: 12.12

Topic: Cardiovascular System

126. Hemostatic mechanisms can generally stop blood loss from a small vein that is cut.

TRUE

Bloom's: Level 1. Remember

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

127. The function of the platelet plug is to block the blood vessel so that blood cannot flow through it.

FALSE

Bloom's: Level 2. Understand

Learning Outcome: 12.25

Section: 12.25

Topic: Cardiovascular System

128. Chemical mediators released from platelet granules and plasma membranes stimulate contraction of vascular smooth muscle.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

129. A blood clot is essentially an intricate network of interlacing strands of thrombin.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

130. In the clotting cascade, thrombin feeds back and further stimulates its own activation, which is a positive feedback mechanism.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

131. In the clotting cascade, factor Xa helps convert prothrombin to thrombin.

TRUE

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

132. The Starling forces which influence bulk flow of fluid between capillary plasma and interstitial fluid are identical everywhere in the body.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.10
Section: 12.10
Topic: Cardiovascular System

133. When arterioles constrict it raises arterial blood pressure and increases the volume of forward flow into the veins, while constriction in veins reduces forward flow by decreasing pressure in the atria.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.09
Learning Outcome: 12.11

Learning Outcome: 12.13
Section: 12.09
Section: 12.11
Section: 12.13
Topic: Cardiovascular System

134. The term AED (Automatic Electronic Defibrillator) refers to a recently developed device used to regulate blood pressure with the surprise benefit of being useful in contraception with some individuals within a narrowly defined age group.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.22
Section: 12.22
Topic: Cardiovascular System

135. Thrombin is inactivated when it binds to heparin.

FALSE

Bloom's: Level 1. Remember
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

136. The adaptive value of having a complex cascade system for blood clotting is that a defect of one participant in the cascade can be corrected by another enzyme later in the cascade.

FALSE

Bloom's: Level 2. Understand
Learning Outcome: 12.25
Section: 12.25
Topic: Cardiovascular System

Chapter 12 Test Bank Summary

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