

Answers



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Sample Questions Each upward movement of the _____ causes the stereocilia of the inner hair cells to bend, opening ___ gates. a. basilar membrane; K⁺ b. tectorial membrane; K⁺ c. vestibular membrane; K⁺ d. basilar membrane; Na⁺ e. tectorial membrane; Na⁺ 2. The viscosity of blood is due more to _____ than to any other factor. a. fibrin b. albumin c. sodium d. erythrocytes e. nitrogenous wastes 3. Three distinct types of muscle fibers are identified on the basis of their size, speed, and endurance. Which of the following athletic endeavors best represents the use of slow, oxidative fibers? a. a sprint by an Olympic runner b. a long, relaxing swim c. throwing a baseball d. weight training 4. The velocity of blood flow decreases when a. Viscosity increases. b. Blood pressure increases. c. Vessel radius increases. d. Afterload increases. e. vasomotion decreases 5. The ability to see color is due to a. rods b. cones c. rhodopsin d. Both A and C e. Both B and C 6. Stimuli produced by sound waves reach the brain following the pathway: a. cochlear duct ? spiral organ ? ossicles ? oval window ? auditory canal ? tympanic membrane ? fibers of cochlear nerve b. auditory canal ? tympanic membrane ? oval window ? cochlear duct ? ossicles ? spiral organ ? fibers of cochlear nerve c. cochlear duct ? oval window ? auditory canal ? tympanic membrane ? ossicles ? spiral organ ? fibers of cochlear nerve d. tympanic membrane ? auditory canal ? ossicles ? oval window ? cochlear duct ? spiral organ ? fibers of cochlear nerve e. auditory canal ? tympanic membrane ? ossicles ? oval window ? cochlear duct ? spiral organ ? fibers of cochlear nerve 7. Opening and closing of the heart valves is caused by a. Breathing. b. Gravity. c. Valves contracting and relaxing. d. Osmotic gradients. e. Pressure gradients. 8. Rank the following steps in order (2 pts). ___4_ Myosin heads bind to actin forming a cross-bridge. ___5_ Myosin heads pivot, pulling

the actin filament towards the M line. ADP and Pi are released. ___3_ ATP binds to sites on myosin heads, energizing it. __ 1_ Calcium ions bind to troponin. _ 2_ Actin binding sites open. Briefly describe the relationship between the following terms. 9. Sarcolemma, action potentials, and T tubules Sarcolemma is the outer layer of any muscle fiber whether cardiac, striated or non-striated. It is through sarcolemma by which action potential starts by influx of contractile ions. In addition, T tubules are the invagination of sarcolemma into the muscle fiber or muscle cell. 10. Na⁺, K⁺, and Ca²⁺ during an action potential in a cardiocyte. ' Na⁺ ions causes depolarization in Phase 0 known as rapid depolarization' (Bell, pp. 23-25) and Na⁺ is present in high concentration in extracellular fluid while K⁺ ions are high intracellularly. ' K⁺ causes repolarization in phase 3 while Calcium ions, which are released by calcium channels by the influx of sodium ions, causes formation of plateau in Phase 2' (Bell, pp. 30-51). Sodium ions start action potential in a cardiac myocyte and by the reflux of Potassium ions arresting membrane potential is achieved. 11. Stroke volume and heart rate ' Stroke volume is the volume of blood pumped by left ventricle of the heart in each heart beat' (Bell, pp. 29-42). Cardiac output depends upon both, stroke volume and heart rate. With increase in any one of these factor, increases cardiac output thus blood pressure. Stroke volume can be calculated by subtracting end systolic volume from end diastolic volume. Heart rate is the beats per minute which is 72 as per normal. Answer the following short answer questions to the best of your ability. 12. Explain at the tissue level why picking up a book off the floor is as controlled a contraction as picking up a small box of books. Because, while picking up a single book off the floor stretches the same muscles of the back and to same length as picking up

small box of books. All the muscle fibers of the back, stretches at the same time because all the muscle are innervated by nerves, which causes synchronized and controlled contraction each time the body bends. 13. Compare and contrast action potentials in skeletal muscle, cardiocytes, and SA nodal cells. Discuss also how the differences contribute to the function of each. In contrast with SA node of the human heart, cardiac action potential, the resting membrane potential is -60 mV (Bell, pp. 70-88), cardiocyte membrane potential is -80 mV and skeletal muscle resting membrane potential is -95 mV. SA nodal cells generate the action potential spontaneously while cardiac myocyte cannot generate action potential; therefore, these cardiocytes wait for nodal cells to give them a signal to contract. ' Sodium and Calcium ions are transferred through gap junction between cardiocytes and depolarization occurs' (Bell, pp. 101-115). The refractory period of cardiocyte is more the skeletal muscle. ' The duration of action potential is also different in skeletal muscle and cardiac cell. ' In skeletal muscle it is approximately 2-5 ms and in cardiac cell it is 200 - 400 ms' (Bell, pp. 23-25). In muscle, sodium channel are involved in depolarization and in cardiac cells calcium is mainly involved in depolarization. 14. Describe the processes that contribute to capillary exchange. Why does fluid leave the arteriole side of the capillary blood and enter at the venule side? There are different processes by which capillary exchange occurs such as diffusion, active transport, convection and vesicular transport. Diffusion occurs in lungs as oxygen, carbon dioxide, anesthetics and other lipid soluble compounds are exchange through diffusion forces. Most importantly, active transport is the major process by which capillary exchange occurs by which amino acid, glucose, other important ions, and

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compounds are absorbed. ' The reason behind the fluid transport from arterial side to venule side is the capillary blood pressure, the interstitial fluid pressure and the colloid osmotic pressure of the plasma' (Bell, pp. 89-95).

Low blood pressure contributes the transfer of fluid from interstitial space to blood circulation, which results in increase blood volume and pressure.

Works Cited Bell, David R. Medical Physiology. Lippincott Williams & Wilkins, 2009.