

Question 1: (2 points)

A major difference between skeletal and cardiac muscle is:

- a. **neurogenic contraction in cardiac myocytes**
- b. contractile cells with tapered ends
- c. **greater number of mitochondria in skeletal myocytes**
- d. different amounts of lipids used in aerobic respiration

Question 2: (2 points)

Which of the following is NOT a great vessel attached directly to the heart?

- a. ascending aorta
- b. descending aorta
- c. superior vena cava
- d. left pulmonary vein

Question 3: (2 points)

The right atrioventricular valve is also known as the:

- a. bicuspid valve
- b. the mitral valve
- c. the aortic valve
- d. the tricuspid valve

Question 4: (2 points)

Heart valves allow blood to flow in both directions

- a. True
- b. False

Question 5: (2 points)

Blood from the superior vena cava enters the:

- a. left ventricle
- b. right ventricle
- c. right atrium

- d left atrium

Question 6: (2 points)

Which groups of autorhythmic cells branch out through the ventricular myocardium?

- a. the sinoatrial nodes
- b the bundle of His
- c. Purkinje fibers
- d the atrioventricular nodes

Question 7: (2 points)

The _____ serves as the cardiac pacemaker.

- a. AV node
- b SA node
- c. Diaphragm
- d AV bundle

Question 8: (2 points)

Which of the following contributes directly to the plateau phase of the cardiac action potential?

- a. increased membrane permeability to sodium
- b decreased membrane permeability to potassium
- c. increased membrane permeability to potassium
- d decreased membrane permeability to calcium

Question 9: (2 points)

Which of the following statements regarding the behavior of cardiac muscle cells at rest is FALSE?

- a. The permeability of the membrane to sodium is high relative to skeletal muscle cells
- b The permeability of the membrane to potassium is greatest
- c. The cardiac cell is especially dependent on the Na,K-ATPase due to the high resting permeability to Na⁺.

- d Chloride permeability is significantly greater than potassium permeability.

Question 10: (2 points)

During what phase of the cardiac muscle action potential is there a rapid efflux of K^+ ?

- a. the plateau phase
- b. the falling phase
- c. the rising phase
- d. none

Question 11: (2 points)

Tetanus in the heart is not possible because:

- a. there are no distinct motor units in the heart
- b. there is inadequate O_2 supply to support a sustained contraction
- c. vagal stimulation prevents a forceful contraction
- d. there is a specialized conduction system in the heart
- e. the refractory period in cardiac muscle lasts almost as long as the duration of the contraction

Question 12: (2 points)

During the relative refractory period in heart.

- a. no action potential can be elicited regardless of stimulus strength
- b. a small action potential is elicited by a small stimulus.
- c. a small action potential is elicited by a larger than normal stimulus.
- d. a normal action potential is elicited by a small stimulus.

Question 13: (2 points)

Which of the following source of calcium and mechanism for calcium transport is NOT important in excitation-contraction coupling on a beat-to-beat basis in cardiac myocytes?

- a. sarcolemmal calcium channel
- b. Na-Ca exchanger
- c. extracellular space

- d sarcoplasmic reticulum
- e. mitochondria

Question 14: (2 points)

The layer of the heart wall responsible for its pumping action is the

- a. fibrous pericardium.
- b serous pericardium.
- c. epicardium.
- d myocardium.
- e. endocardium.

Question 15: (2 points)

Blood flows from the superior vena cava into the

- a. right atrium.
- b inferior vena cava.
- c. left atrium.
- d aorta.
- e. pulmonary trunk.

Question 16: (2 points)

The myocardium is made of

- a. smooth muscle.
- b cardiac muscle.
- c. skeletal muscle.
- d endothelium.
- e. dense connective tissue.

Question 17: (2 points)

Blood flows from the pulmonary veins into the

- a. pulmonary arteries.

- b right atrium.
- c. lungs.
- d left atrium.
- e. left ventricle.

Question 18: (2 points)

The bicuspid valve is located between the

- a. right ventricle and the aorta.
- b right ventricle and the pulmonary trunk.
- c. left atrium and the left ventricle.
- d right and left atria.
- e. right and left ventricles.

Question 19: (2 points)

There is a semilunar valve between the

- a. right ventricle and the aorta.
- b right ventricle and the pulmonary trunk.
- c. left atrium and the left ventricle.
- d right atrium and the right ventricle.
- e. left ventricle and the pulmonary trunk.

Question 20: (2 points)

The function of the chordae tendineae is to

- a. pull the walls of the ventricles inward during contraction.
- b **open the semilunar valves.**
- c. **open the AV valves.**
- d **prevent eversion of the AV valves during ventricular systole.**
- e. hold the heart in place within the mediastinum.

Question 21: (2 points)

The atrioventricular valves close when the

- a. SA node fires.
- b. atria contract.
- c. vagus nerve stimulates them.
- d. ventricles relax.
- e. ventricles contract.

Question 22: (2 points)

The cusps of the atrioventricular (AV) valves are anchored to the papillary muscles by the

- a. epicardium.
- b. fossa ovalis.
- c. chordae tendineae.
- d. intercalated discs.
- e. pericardium.

Question 23: (2 points)

The left ventricle wall of the heart is thicker than the right wall in order to

- a. accommodate a greater volume of blood.
- b. expand the thoracic cage during diastole.
- c. pump blood with greater pressure.
- d. pump blood through a smaller valve.
- e. pump more blood since the left side feeds the entire body except the lungs.

Question 24: (2 points)

The function of intercalated discs is to

- a. initiate the heart beat.
- b. anchor the heart in place within the mediastinum.
- c. prevent eversion of valves.
- d. provide a mechanism for rapid conduction of action potentials among myofibers.

- e. provide an anchoring point for chordae tendineae.

Question 25: (2 points)

Cardiac muscle cells have less sarcoplasmic reticulum than skeletal muscle cells. The effect of this is that cardiac muscle cells

- a. do not depolarize as quickly.
- b. can function as a single unit.
- c. generate less ATP.
- d. have a smaller intracellular reserve of calcium ions.
- e. are autorhythmic cells.

Question 26: (2 points)

The initiation of the heart beat is the responsibility of the

- a. cardiovascular center.
 - b. baroreceptors.
 - c. vagus nerve.
 - d. SA node.
 - e. fossa ovalis.
-

Question 27: (2 points)

A heart beat is normally initiated when

- a. a nerve impulse arrives from the cardiovascular center in the brain.
- b. a critical volume of blood fills the ventricles.
- c. enough sodium and calcium ions leak into the cells of the SA node to reverse their resting potentials.
- d. enough potassium ions leak out of the cells of the SA node to reverse their resting potentials.
- e. the chordae tendineae recoil after being stretched.

Question 28: (2 points)

Cardiac muscle fibers remain depolarized longer than skeletal muscle fibers because

- a. voltage-gated Na⁺ channels close more quickly to trap Na⁺ inside longer.
- b. Ca²⁺ enters the cytosol from the extracellular fluid to contribute more positive charges slightly after Na⁺ have entered.
- c. voltage-gated K⁺ channels open at the same time as Na⁺ channels, allowing more positively charged K⁺ to enter
- d. it takes longer to reach threshold, and the duration of depolarization is directly proportional to the time it takes to reach threshold.
- e. the intercalated discs are very thick relative to the rest of the sarcolemma, it takes longer for K⁺ to exit the cell to cause repolarization.

Question 29: (2 points)

The force of cardiac muscle contraction is influenced primarily by the

- a. number of calcium ions entering the cells through slow channels.
- b. rate at which sodium ions diffuse into the cells.
- c. number of calcium ions that can be stored in the sarcoplasmic reticulum.
- d. duration of the absolute refractory period.
- e. up-and down-regulation of beta adrenergic receptors on the cells.

Question 30: (2 points)

Opening of voltage-gated K⁺ channels in cardiac myofibers allows for

- a. rapid depolarization.
- b. a long refractory period.
- c. repolarization.
- d. rapid conduction between myofibers.
- e. the maintenance of a plateau phase.

Question 31: (2 points)

The sound associated with the closure of the aortic semilunar valves is best heard near the

- a. superior right point.
- b. superior left point.
- c. inferior right point.
- d. inferior left point.

- e. midpoint of all the above points.

Question 32: (2 points)

The Frank-Starling Law of the Heart states that

- a. the heart is dependent upon the autonomic nervous system for a stimulus to contract.
- b. the heart contracts to the fullest extent possible for the conditions, or not at all.
- c. cardiac output equals heart rate times stroke volume.
- d. the absolute refractory period for the heart must be longer than the duration of contraction for efficient heart functioning.
- e. a greater force of contraction can occur if the heart muscle is stretched first.

Question 33: (16 points)

Choose the item(s) below that best matches the term.

Matching pairs:

- Receives blood from the right ventricle —
- Receives blood from the left ventricle —
- Carries deoxygenated blood —
- Exits from behind the aortic valve —
- Located in interatrial septum —
- Located in right atrium —
- Located in interventricular septum —
- Located in the left ventricle —

Question 34: (16 points)

Choose the item(s) below that best matches the term.

Matching pairs:

- Valve between aorta and left ventricle —
- Valve between pulmonary artery and right ventricle —
- Valve between left ventricle and left atrium —
- Valve between right ventricle and right atrium —
- Primary pacemaker —

Attaches to the AV node

—

Secondary pacemaker

—

Carries the impulse directly to ventricular muscle fibers

—

Question 35: (2 points)

Cardiac tamponade results from compression created by the buildup of fluid in the _____ pericardium (pericardial space?) _____.

Question 36: (2 points)

Thickenings of the sarcolemmas called __intercalated discs (desmosomes?) _____ hold cardiac muscle fibers together.
