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Certified Cardiographic Technician (CCT) exam

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Question: 1

Which heart chamber functions to pump deoxygenated blood to the lungs?

- A. Right atrium
- B. Right ventricle
- C. Left atrium
- D. Left ventricle

Answer: B

Explanation:

The right ventricle pumps the deoxygenated blood it has received from the right atrium to the lungs. The right atrium pumps deoxygenated blood from the body to the right ventricle. The left atrium pumps oxygenated blood from the lungs to the left ventricle. The left ventricle pumps oxygenated blood to the body.

Question: 2

Which lead is the most affected by respiration?

- A. V2
- B. V4
- C. Lead III
- D. Lead I

Answer: C

Explanation:

Lead III is the most affected by respiration, and therefore the waveforms may look different depending on the respiratory cycle. Because of this, a Q wave that only appears in lead III and is not associated with other corresponding changes in other leads is not significant.

Question: 3

Which of the following is the correct sequence by which action potentials are conducted through the heart?

- A. SA node → AV node → bundle branches → Purkinje fibers
- B. Bundle branches → Purkinje fibers → SA node → AV node
- C. Purkinje fibers → SA node bundle branches → AV node

D. AV node → SA node → bundle branches → Purkinje fibers

Answer: A

Explanation:

The sequence by which an action potential is conducted through the heart is from the sinoatrial (SA) node to the atrioventricular (AV) node to the bundle branches and then to the Purkinje fibers.

Question: 4

When calibrating an ECG machine, what is the standard size of the calibration mark representing the sensitivity of the ECG machine?

- A. 5 mm in height
- B. 10 mm in height
- C. 15 mm in height
- D. 20 mm in height

Answer: B

Explanation:

The calibration mark representing the sensitivity of the ECG should be 10 mm in height (two large squares). This mark is usually found on the left side of the page at the beginning of each line of the ECG. When this is set correctly it means that for every millivolt measured from the patient, a deflection of 10 mm will be recorded on the trace.

Question: 5

Which of the following is the mechanism of action of nitrates?

- A. Decrease the responsiveness of heart to the sympathetic nervous system
- B. Lower the heart rate
- C. Decrease cardiac contractility
- D. Dilation of coronary arteries

Answer: D

Explanation:

Nitrates are useful for the prevention and treatment of angina. They work by dilating the coronary arteries and thus increasing the blood flow to the heart. They dilate peripheral veins, and, in higher doses, other peripheral arteries, which decreases preload and afterload. Beta-blockers decrease the responsiveness of the heart to the sympathetic nervous system. Calcium channel blockers, beta-blockers, and other medications decrease cardiac contractility and decrease heart rate.

Question: 6

Which phase of the action potential in fast response myocardial tissues consists of rapid depolarization, with the resting cell being brought to threshold?

- A. Phase 0
- B. Phase 1
- C. Phase 2
- D. Phase 3

Answer: A

Explanation:

Phase 0 consists of rapid depolarization of the cell to threshold, which leads to activation of voltage-dependent sodium channels. Phase 1 consists of a slight "notch" of repolarization caused mainly by the activation of transient potassium currents (potassium leaving the cell) and a corresponding rapid decrease in the sodium current. Phase 2 is a plateau phase during which "late" calcium, and to a lesser extent sodium, currents offset the effect of potassium currents and temporarily stabilize the membrane potential. Phase 3 refers to repolarization and return to resting potential due to increased potassium currents. Phase 4 is the resting membrane potential.

Question: 7

The depolarizing current in pacemaker cells is created primarily by which of the following ions?

- A. Sodium
- B. Calcium
- C. Potassium
- D. Chloride

Answer: B

Explanation:

The depolarizing current in cardiac pacemaker cells is carried primarily by relatively slow, inward calcium currents. In most other depolarizing cells, such as muscle cells, the depolarization is created by fast sodium currents. Potassium plays a role in repolarization of the cells.

Question: 8

Which of the following commonly limits the diagnostic value of Holter monitoring?

- A. Patient noncompliance with keeping track of events
- B. Lack of continuous monitoring
- C. Small capacity of recording devices
- D. Transmission of data depends on patient participation

Answer: A

Explanation:

Patient noncompliance with keeping a diary of their symptoms and using event markers significantly limits the diagnostic value of Holter monitoring. It is important for patients to record and mark their symptoms in order to correlate events with the data collected. Holter monitoring is a type of continuous monitoring and benefits include the large capacity of the recording devices as well as the ability to transmit data without patient participation.

Question: 9

Which of the following effects is caused by the actions of the parasympathetic nervous system on the heart?

- A. Increased rate of conduction
- B. Greater force of contraction
- C. Decreased diastolic filling time
- D. Decreased rate of SA node pacing

Answer: D

Explanation:

The parasympathetic nervous system results in cardiac inhibitory effects, including decreased rate of SA node pacing, decreased rate of conduction, and decreased force of contraction. The sympathetic nervous system increases the rate of conduction and causes increased force of contraction. An increased contraction rate, caused by sympathetic nervous system stimulation, would result in decreased diastolic filling time.

Question: 10

What does the T wave represent on an ECG?

- A. Atrial depolarization
- B. Ventricular depolarization
- C. Atrial repolarization
- D. Ventricular repolarization

Answer: D

Explanation:

Repolarization of the ventricles begins immediately after the QRS. The T wave represents the final and more rapid phase of that repolarization. Atrial depolarization is represented by the P wave. Ventricular depolarization is represented by the QRS complex. Atrial repolarization is not seen on the ECG.



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