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# **Medical Technology CCI-CCT**

**Certified Cardiographic Technician (CCT) Exam**



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# Latest Version: 6.1

## Question: 1

Which of the following is the correct placement of chest leads for a 12-lead ECG?

- A. VI in the third intercostal space, immediately right of the sternum. V 2 in the fourth intercostal space, immediately left of the sternum. V3 midway between V 2 and VA. V4 in the fifth intercostal space, at the midclavicular line. VS in the fourth intercostal space, at the anterior axillary line. V6 in the third intercostal space, at the midaxillary line.
- B. VI in the fourth intercostal space, immediately right of the sternum. V2 in the fifth intercostal space, immediately right of the sternum. V3 in the fifth intercostal space, immediately left of the sternum. V4 in the fifth intercostals space, at the midclavicular line. V5 in the fifth intercostal space, at the anterior axillary line. V6 in the fifth intercostal space, at the midaxillary line.
- C. VI in the fourth intercostal space, immediately right of the sternum. V 2 in the fourth intercostal space, immediately left of the sternum. V 3 midway between V2 and VA. V4 in the sixth intercostal space, directly below V2. V5 in the fifth intercostal space, at the midclavicular line. V6 in the fourth intercostal space, at the midaxillary line.
- D. VI in the fourth intercostal space, immediately right of the sternum. V2 in the fourth intercostal space, immediately left of the sternum. V3 midway between V2 and V4. V4 in the fifth intercostal space, at the midclavicular line. VS in the fifth intercostal space, at the anterior axillary line. V6 in the fifth intercostal space, at the midaxillary line.

**Answer: D**

Explanation:

The appropriate placement of the chest leads is very important for obtaining an accurate ECG. In order to determine whether the electrical activity of the heart is normal or abnormal, and to determine more precisely what type abnormality is present, it is necessary for these leads to be placed precisely and consistently. VI and V2 are oriented over the right side of the heart, V3 and V4 are oriented over the interventricular septum, and V5 and V6 are oriented over the left side of the heart.

## Question: 2

How many leaflets does the mitral valve have?

- A. One
- B. Two
- C. Three
- D. Four

**Answer: B**

Explanation:

The mitral valve is a bicuspid valve, meaning that it has leaflets (also known as cusps). It is located between the left atrium and left ventricle. The tricuspid valve, located between the right atrium and right ventricle, has three leaflets. The pulmonic valve leads from the right ventricle to the pulmonary artery and has three leaflets. The aortic valve leads from the left ventricle to the aorta and normally has three leaflets.

### Question: 3

What is being measured when determining the height or depth of a wave from the baseline on an ECG?

- A. Power
- B. Current
- C. Voltage
- D. Resistance

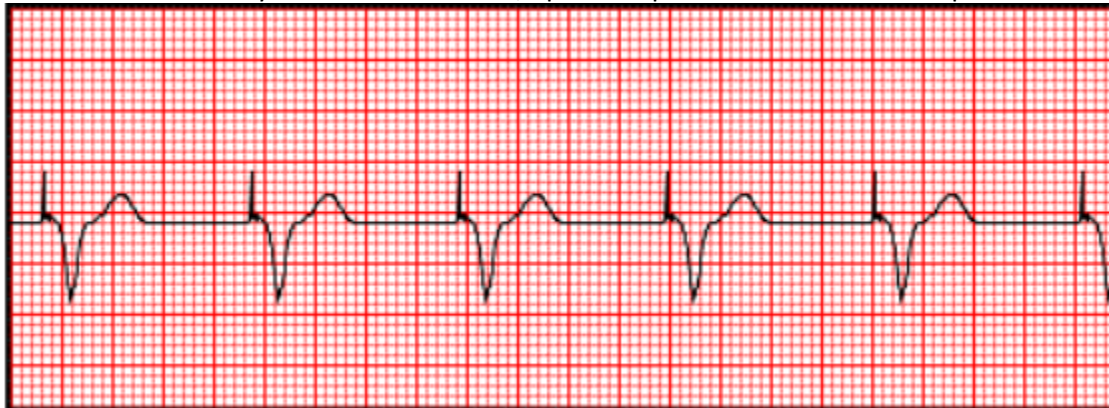
**Answer: C**

Explanation:

The amplitude of waves as measured from the baseline is a measure of voltage. Voltage is also known as electrical potential difference, and therefore gives us a picture of the depolarization and repolarization of the heart. These measurements are made in millimeters.

### Question: 4

What is the most likely cause of the vertical, upwards spikes seen in the ECG strip below?



- A. Pacemaker firing
- B. Spontaneous AV node firing
- C. ECG leads placed too closely together
- D. Heart block

**Answer: A**

Explanation:

These spikes are an artifact due to the firing of an implanted pacemaker. In the above ECG the pacemaker is firing at regular intervals and each spike is followed by a QRS complex and a T wave. This is a normal ECG for a patient with a firing implanted pacemaker.

### Question: 5

Which of the following is NOT an indication for Holter monitoring?

- A. Assessing pacemaker function
- B. Evaluating syncopal episodes
- C. Assessing for ischemia
- D. Evaluating for a new infarction

**Answer: D**

Explanation:

Holter (ambulatory) ECG monitoring can be useful in evaluating cardiac rhythm abnormalities, assessing pacemaker and implantable defibrillator function, assessing for ischemia, and evaluating heart rate variability. Ambulatory ECGs can be used to rule out conditions that may be missed on routine ECGs. Evaluation for an infarction should be done as an inpatient care since this requires immediate treatment if a new infarction is present.

### Question: 6

What is the difference between the first stage of the "Bruce protocol" stress test and the first stage of the "Modified Bruce protocol" stress test?

- A. The Modified Bruce protocol starts at the same gradient, but at a slower speed for the first stage of the test.
- B. The Modified Bruce protocol starts at the same speed, but at a lower gradient for the first stage of the test.
- C. The Modified Bruce protocol starts at a lower gradient and a slower speed for the first stage of the test.
- D. There is no difference between the first stage of the two protocols.

**Answer: B**

Explanation:

Stage I of the Bruce protocol is a speed of 1.7 mph and gradient of 10%; stage 2 is a speed of 2.5 mph and a gradient of 12%. Stage I of the Modified Bruce protocol is a speed of 1.7 mph and a gradient of 0%; stage 2 is a speed of 1.7 mph and a 5% grade. The third stage of the Modified Bruce protocol corresponds to the first stage of the standard Bruce protocol and continues on from there. The Modified Bruce protocol is typically used for elderly or sedentary patients.

### Question: 7

A patient is found to have a normal heart rate and rhythm. It is determined from an ECG that the axis of the heart is  $-35^{\circ}$ . What does this indicate?

- A. The heart is in its normal axis range
- B. The patient has vertical axis deviation
- C. The patient has right axis deviation
- D. The patient has left axis deviation

**Answer: D**

Explanation:

The normal axis of the heart is between 00 and  $+90^{\circ}$ , which is downwards and to the left. If the axis is upwards and to the left (between 00 and  $-90^{\circ}$ ), that is considered left axis deviation. If the axis is to the right (between  $+90^{\circ}$  and  $-90^{\circ}$ ), it is considered right axis deviation.

### Question: 8

Which of the following skin preparations should be done before Holter monitor electrode placement?

- A. Abrasion of the skin
- B. Removal of all chest hair
- C. Disinfection of the skin
- D. Moisturization of the skin

**Answer: A**

Explanation:

Abrading the thin outer layer of skin helps the electrodes adhere better to the skin, making them less likely to lose contact. The electrodes are also taped to the skin. If a patient has an especially hairy chest, the chest hair may need to be clipped in order to allow for proper adherence, but removal of all chest hair is not necessary. Disinfection and moisturization are not typical steps in skin preparation.

### Question: 9

Where is the sinoatrial node located?

- A. Medial part of left atrium
- B. Posterior part of right atrium
- C. Superior part of left atrium
- D. Inferior part of right atrium

**Answer: B**

Explanation:

The SA node is located in the posterior wall of the right atrium, near the entrance of the superior vena cava. The AV node is located in the inferior region of the right atrium.

### Question: 10

When the ECG below was performed, what was done incorrectly by the ECG technician?



- A. The machine was not calibrated correctly
- B. The paper in the machine was placed upside down
- C. The placement of the leads was reversed
- D. The precordial leads and limb leads were intermixed

**Answer: C**

Explanation:

This patient has a normal rate and rhythm, but the appearance of the ECG is abnormal because the leads have been reversed. Reversal of lead placement has led to an ECG strip with negative (inverted) P waves, QRS complexes, and T waves. This is a common mistake when placing ECG leads and can lead to confusion when reading the ECG.

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