SI A&P - Full Discipline Demo - Digital

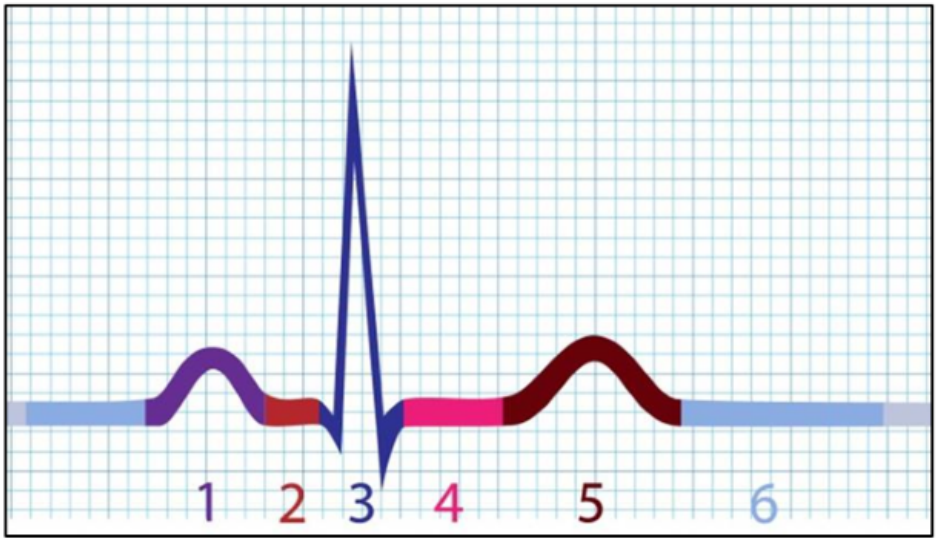
Cardiovascular Physiology - No Materials

Final Report - Answer Guide

Institution	Science Interactive University
Session	SI A&P - Full Discipline Demo - Digital
Course	SI A&P - Full Discipline Demo - Digital
Instructor	Sales SI Demo

Test Your Knowledge

Match each numbered event on the image below with the correct description.

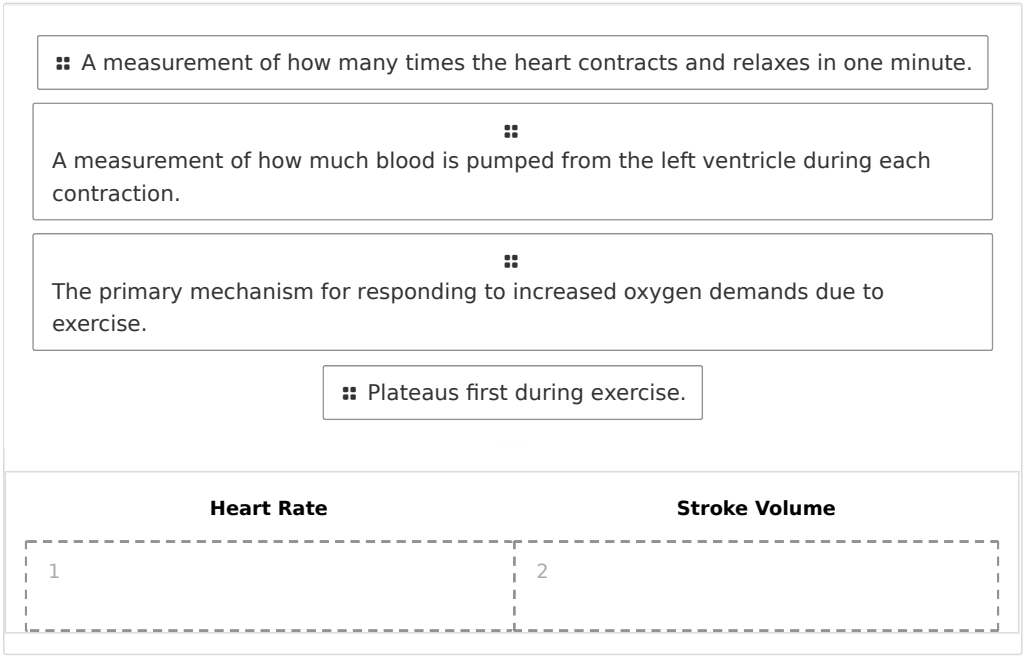


1	Ventricular depolarization begins; atria repolarize
2	Ventricular repolarization complete
3	Atrial depolarization begins
4	Ventricular repolarization begins
5	Atrial depolarization complete
6	Ventricular depolarization complete

Correct answers:

1 3 2 6 3 1 4 5 5 2 6 4

Classify each statement as related to heart rate or stroke volume.



Correct answers:

1

The primary mechanism for responding to increased oxygen demands due to exercise.

A measurement of how many times the heart contracts and relaxes in one minute.

2

A measurement of how much blood is pumped from the left ventricle during each contraction.

Plateaus first during exercise.

Exploration

Cardiac output decreases as a result of exercise.

- True
- False ✔

The primary autorhythmic cells of the heart are located in the _____.

- AV bundle
- AV node
- Purkinje fibers
- SA node ✔

The P wave shows atrial depolarization.

- True ✔
- False

Exercise 1

How did heart rate change between resting and exercising conditions? Reference Data Table 2 in your explanation.

Heart increased after exercise, rising from an average of 77 bpm at rest to 125 bpm after exercise as recorded in Data Table 2.

How do changes in heart rate correlate to changes in cardiac output?

Cardiac output varies with oxygen demands of the body's tissues and organs. Heart rate changes are the primary mechanism for responding to increased oxygen demands due to exercise. As the heart rate increases, blood flow increases throughout the body delivering oxygen to tissues.

How is heart rate normally controlled within the heart?

The sinoatrial node (SA) normally controls the heart rate. Specialized sets of autorhythmic (auto = own, rhythmic = rhythm or pattern) cells within the heart control the rhythm of the heart. The primary autorhythmic cells of the heart are located in the sinoatrial node (SA) at the right superior and posterior portion of the right atrium.

Data Table 1: Heart Rate Measurements
(SAMPLE ANSWER BELOW)

Activity	Palpation Location	Number of Heartbeats in 20 seconds	Heart Rate (Beats per Minute)
Seated	Radial	25	75
	Carotid	26	78
Exercising	Radial	43	129
	Carotid	40	120

Exercise 2

What abnormalities do you observe in the Nodal Rhythm graph? What are the most likely causes of these abnormalities?

What abnormalities do you observe in the Heart Block graph? What are the most likely causes of these abnormalities?

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What abnormalities do you observe in the Atrial Flutter graph? What are the most likely causes of these abnormalities?

What abnormalities do you observe in the Atrial Fibrillation graph? What are the most likely causes of these abnormalities?

What abnormalities do you observe in the Ventricular Fibrillation graph? What are the most likely causes of these abnormalities?

Panel 1: Normal Sinus Rhythm Description

(SAMPLE ANSWER BELOW)

The P wave is the first feature of an ECG diagram and marks the depolarization of the right and left atria. The line immediately to the right of the P wave marks the completion of atrial depolarization. The QRS complex marks the repolarization of the atria and the beginning of ventricular depolarization. The line immediately to the right of the QRS complex marks the completion of ventricular depolarization. The T wave marks the repolarization of the right and left ventricles. The line immediately to the right of the T wave marks the completion of ventricular repolarization.

Competency Review

The amount of blood the heart pumps through the cardiovascular system in one minute is called the _____.

- cardiac output ✔
- heart rate
- stroke volume
- diastolic pressure

Cardiac output varies with oxygen demands of the body's tissues and organs.

- True ✔
- False

The primary autorhythmic cells of the heart create rhythmic muscle contractions of the heart at about 60-100 beats per minute.

- True ✔
- False

Periods of no electrical activity on an ECG are called _____.

- bundles
- intervals
- segments ✔
- waves

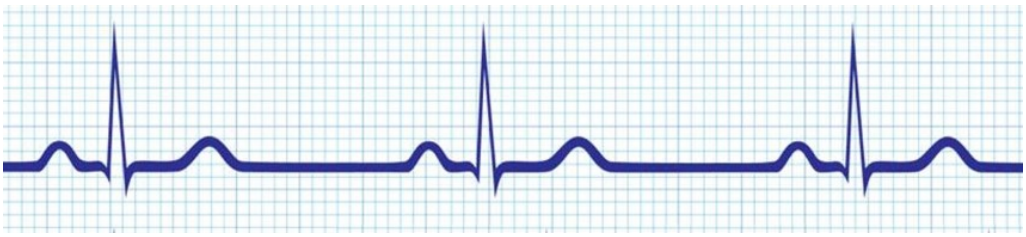
An electrocardiogram can indicate if the heart muscle is damaged.

- True ✔
- False

Heart rate measured at both the radial and carotid arteries decreases after performing 25 jumping jacks compared to when at rest.

- True
- False ✔

The ECG recording below indicates a(n) _____.



- normal sinus rhythm ✔
- atrial flutter
- atrial fibrillation
- ventricular fibrillation

Extension Questions

Medically, ECGs are used during exercise to detect heart abnormalities that are often masked at rest. Apply your knowledge of cardiac output response to exercise and ECGs to predict how the ECG of a healthy individual would appear during exercise compared to when the individual is at rest. (SAMPLE ANSWER BELOW)

For a healthy individual, the segments between the T wave of one completed heartbeat and the P wave of the next heartbeat would decrease in length during exercise compared to when at rest. However, the pattern of the normal sinus rhythm (P wave, segment, QRS complex, segment, T wave) would not change in a healthy individual between exercise and rest.