Chapter 5 – Study Guide Answers

On the following diagram of the heart, what do A through K refer to?

A. Atria (Left/Right)
B. Ventricle (Left/Right)
C. Aorta
D. Pulmonary artery
E. Pulmonary veins
F. Inferior vena cava
G. Superior vena cava
H. Right (AV) valve
I. Left (AV) valve
J. Aortic valve
K. Pulmonary valve

Describe the action of two pumps in the heart.

- The right heart pumps blood to the lungs, where the blood is oxygenated.
- The left heart pumps the oxygenated blood to the systemic circulation.

Describe the different kinds of blood vessels.

Arteries
Veins
Pulmonary veins
Arterioles
Capillaries
Venules

- Arteries carry blood away from the heart and toward the tissues
- Veins carry blood from the tissues back to the heart
- Pulmonary veins carry oxygenated blood from the lungs to the left heart to be pumped out into the systemic circulation
- Arterioles are muscular vessels that keep the pressure low in the capillaries
- Capillaries are thin-walled vessels through which gases, nutrients, and waste products are exchanged
- Venules are very small vessels that connect capillaries to veins

In the following diagram of the conducting system of the heart, what are A through G?

![Heart Diagram]

A. Sinoatrial (SA) node
B. Atrioventricular (AV) node
C. Bundle of His
D. Bundle branches (Left/Right)
E. Purkinje system
F. Superior vena cava
G. Internodal pathways

What occurs during diastole?
The ventricles fill with blood.

What occurs during systole?
The ventricular muscle contracts to force blood out of the chambers of the ventricles.

What is the purpose of heart valves?
Valves create unidirectional blood flow. After blood passes through them, they close, preventing the backflow of blood.

What is the formula for determining cardiac output? __________ = __________ x __________, where ________________

CO = HR x SV, where HR is heart rate and SV is stroke volume.

What is the Fick method of estimating CO?
Determining the rate at which oxygen is added to the blood as it flows through the lungs. This results in an estimation of pulmonary blood flow, which is equal to CO.

What is the indicator dilution method of determining the CO?

Involves injecting dye into a large vein or the right atrium. The concentration of the dye as it passes through an artery is recorded and the CO is estimated from this information.

What is the role of vagus fibers on the heart rate?

They have an inhibitory influence on the SA node, so they decrease the heart rate.

What is the role of sympathetic fibers on the heart rate?

They have a stimulatory influence on the SA node, so they increase the heart rate.

What are some factors that affect heart rate?

- Age
- Gender
- Size
- Posture
- Ingestion of food
- Smoking
- Emotion
- Body temperature
- Heat and humidity

Name four factors that affect stroke volume.

1. Gravity
2. Muscular activity
3. Size of the heart
4. Nervous influences

Name three reasons why heart rate is more important than stroke volume in aerobic exercise.

1. Stroke volume levels out at approximately eight times the resting level
2. Heart rate is proportional to the work load imposed
3. Heart rate is proportional to the oxygen consumed

What are the stages of typical heart rate response to exercise?

- At the beginning of exercise, the heart rate rises rapidly.
- For light or moderate exercise, a plateau is reached within the first minute.
- For vigorous exercise, the heart rate increases until exhaustion.
- At the end of exercise, the heart rate rapidly declines within the first two or three minutes.
- After the initial rapid decline, the rate decreases more slowly.

How does heart rate respond to static and dynamic exercise?

Only a slight increase in heart rate occurs during static exercise, whereas large increases in heart rate can occur during dynamic exercise.
Name three ways training affects the heart.

1. Decreases resting heart rate and heart rate during exercise
2. Increases stroke volume
3. Increases cardiac reserve capacity

How does aerobic exercise affect blood pressure?

Aerobic exercise elevates systolic pressure but has little effect on diastolic pressure.

How does isometric exercise affect blood pressure?

The intrathoracic pressure dramatically increases, decreasing venous return to the right atrium and putting a greater load on the heart.