Previous exam questions in heart and circulation.

This list is not comprehensive, some questions about the relation of ECG to the heart cycle will be covered after the ECG lecture, and some are follow up questions on on cardiac output, related to the relation between oxygen uptake and cardiac output, but these will be covered when we have covered oxygen uptake.

A patient has a resting cardiac output of 4.5 l/min. The heart rate is 60 beats per minute. What is the
stroke volume?
A 75 ml
B 60 ml
C 50 ml
D 45 ml

A patient has a resting cardiac output of 5 l/min. The heart rate is 65 beats per minute. What is the stroke volume?
A 77 ml
B 65 ml
C 52 ml
D 47 ml

Another patient has a left ventricular end diastolic volume of 150 ml, and a stroke volume of 60 ml.
What is the ejection fraction?
A 90%
B 60%
C 50%
D 40%

Another patient has a left ventricular end diastolic volume of 150 ml, a cardiac output of 4.8 l/min and a heart rate of 80 beats per minute. What is the ejection fraction?
A 90%
B 60%
C 50%
D 40%

A patient with heart failure has an end diastolic left ventricular volume of 350 ml, an ejection fraction of 15%. What would the resting heart rate have to be, to maintain a normal
cardiac output of 4.5 l/min?
a) 155
b) 85
c) 70
d) 62

A patient with heart failure has an end diastolic left ventricular volume of 300 ml, an ejection fraction of 21%. What would the resting heart rate have to be, to maintain a normal cardiac output of 4.5 l/min?
A) 142
B) 85
C) 71
D) 62

The ejection fraction is used a measure of ventricular function. A patient with heart failure has an end diastolic left ventricular volume of 250 ml. During rest, she has a normal cardiac output of 4.5 litres /min with a heart rate of 92 beats / min. What is the resting ejection fraction?
A 49%
B 36%
C 24%
D 20%

The ejection fraction is used a measure of ventricular function. However, this has some limitations. Endurance training increases left ventricular volume and reduces heart rate. A certain (male) cross country skier has an end diastolic left ventricular volume of 250 ml. During rest, he has a normal cardiac output of 4.8 litres /min with a heart rate of 42 beats / min. What is the resting ejection fraction?
A 78%
B 58%
C 46%
D 32%

During exercise, he has the ability to increase the ejection fraction to 85%. End diastolic volume does not increase during exercise in the healthy. His maximal heart rate is 185 beats / min. What is his maximal cardiac output?
A 7 l/min
B 16 l/min
C 32 l/min
D 39 l/min

Another (male) endurance runner has an end diastolic left ventricular volume of 220 ml. During rest, he has a normal cardiac output of 4.7 litres /min with a heart rate of 45 beats / min. What is the resting ejection fraction?
A 89%
B 53%
C 47%
D 35%

During exercise, this runner has the ability to increase the ejection fraction to 82%. End diastolic volume does not increase during exercise in the healthy. His maximal heart rate is 185 beats / min. What is his maximal cardiac output?
A 7 l/min
B 16 l/min
C 33 l/min
D 39 l/min

The ejection fraction is used a measure of ventricular function. An endurance athlete has an end diastolic left ventricular volume of 250 ml. During rest, he has a normal cardiac output of 5.5 litres /min with a heart rate of 42 beats / min. What is the resting ejection fraction?
A 66%
B 59%
C 52%
D 48%

Hypertension is a risk factor for stroke and heart infarction. What's the limit between high normal blood pressure (prehypertension) and manifest hypertension (stage 1)?
a) 120/80
b) 140/90
c) 160/100
d) 180/110

The blood pressure is usually measured by inflating a cuff around the upper arm, and then reducing the pressure gradually. Which of the statements below are correct in relation to this procedure?
a) When the systolic pressure equals the pressure in the cuff, the artery will just start to open.
b) When the systolic pressure equals the cuff pressure, the artery is open during the whole heart cycle
c) When the diastolic pressure equals the pressure in the cuff, the artery will just start to open.
d) When the cuff pressure is zero, the blood flow in the artery starts.

The blood pressure is among other things regulated by peripheral resistance. Which vessels are responsible for most of this resistance?
A Arteries
B Arterioles
C Capillaries
D Venules

Arterial blood pressure is regulated by the relation between cardiac output and peripheral resistance. What is the main site for regulating the peripheral resistance?
A) The aorta
B) The arterioles
C) The venules
D) The veins

A blood vessel has a narrowing in a short segment. What will always happen to the blood dynamics in this narrow segment? (Velocity: meters/sec, Flow: litres/min)
A The blood velocity increases
B The blood velocity decreases
C The blood flow increases

D The blood flow decreases

The aortic valve may be calcified and narrow due to disease. What happens to the blood dynamics through that valve during systole? (Remember: Velocity: meters/sec, Flow: litres/min)
A The blood velocity increases
B The blood velocity decreases
C The blood flow increases
D The blood flow decreases

A blood vessel has a narrowing (stenosis) in a short segment. In the normal part of the vessel, the cross sectional area is 1 cm_2, a blood velocity of 1 m/s and a systolic pressure of 120 mmHg. Through the stenosis, the blood velocity increases to 4 m/s. What is the cross sectional area of the stenosis?
A) 4 cm^2
B) 0.5 cm^2
C) 0.25 cm^2
D) 0.0625 cm^2

What is correct about exitation contraction coupling?
A The action potential causes inflow of Na+ intracellularly, which binds to contractile proteins
B The action potential causes outflow of K+ extracellularly, which binds to membrane surface proteins
C The action potential causes intracellular release of Ca++, which binds to contractile proteins
D The action potential causes outflow of Mg++ extracellularly, which bindsto membrane surface proteins

As muscle relaxes, the relaxation itself is an energy demanding process, meaning that a contracted muscle will not relax if the cell is depleted of energy. What is the energy demanding process in the cell responsible for relaxation?
A The active elongation of the cell, as the actin – myosin cross bridges turns the other way, pushing action and myosin from each other.
B The uncoupling of actin-myosin cross bridges
C The restoration of the normal resting membrane potential.
D The active removal of calcium from the cytoplasm