MCQs Cardiac Cycle

I & II

1- Pulse pressure is:

A. The highest pressure measured in the arteries
B. The lowest pressure measured in the arteries
C. measured only during diastole
D. determined by stroke volume
E. decreased when the capacitance of the arteries decreases
F. the difference between mean arterial pressure and central venous pressure
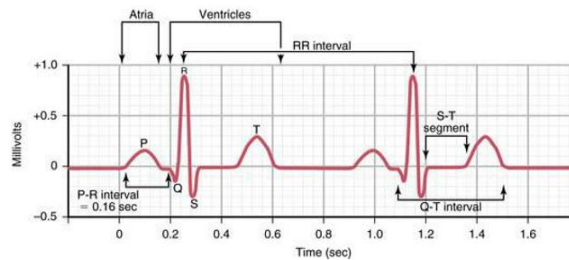
Q' 2,3,4 and 5

2- What is the normal QT interval:

A. 0.03 seconds
B. 0.13 seconds
C. 0.16 seconds
D. 0.20 seconds
E. 0.35 seconds

## 3- The ventricles are completely depolarized during which isoelectric portion of the electrocardiogram (ECG):

A. PR interval
B. QRS complex
C. QT interval
D. ST segment
E. T wave

4- P wave due to:

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

5- QRS complex due to:

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

Intraventricular pressure (mm Hg) vs Left ventricular volume (ml), with points A, B, C, D marked.
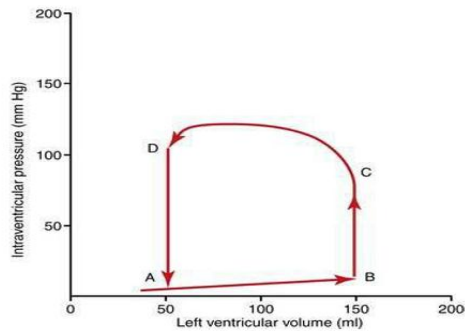
A 60-year-old woman has a resting heart rate of 70 beats/min, arterial pressure is 130/85 mm Hg, and body temperature is normal. Her pressure-volume diagram of the left ventricle is shown above.

6- What is her cardiac output in milliliters per minute?

A. *2000*
B. *3000*
C. *4000*
D. *6000*
E. *7000*

7- When does the second heart sound occur in the ventricular pressure–volume relationship?

A. *At point D*
B. *Between point A and point B*
C. *Between point B and point C*
D. *Between point C and point D*
E. *Between point D and point A*

8- When does the third heart sound occur in the ventricular pressure–volume relationship?

A. *At point D*
B. *Between point A and point B*
C. *Between point B and point C*
D. *Between point C and point D*
E. *Between point D and point A*

9- What is her ventricular ejection fraction?

A. *33%*
B. *50%*
C. *60%*
D. *67%*
E. *80%*

10- During isometric contraction phase the ventricular volume:

A. Increases
B. Rapidly increases
C. Slowly decreases
D. Doesn't change
E. Decreases

11- During the rapid ejection phase the ventricular pressure:

A. 80-120 mmHg
B. 0 mmHg
C. 15-30 mmHg
D. Doesn't change

12- Which pairing is INCORRECT?

A. 3rd heart sound - Elderly
B. 1st heart sound - closure of AV valves
C. left atrium - pulmonary veins
D. EDV - isometric contraction phase

13- QRS-complex occurs during which phase?

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

14- Atrial systole accounts for most of the ventricular filling.

A. True
B. False

15-Which one of the following is an early phase of systole?

A. Atrial systole
B. Isovolumetric systole
C. Reduced ejection
D. Rapid filling

16- Ventricular systole causes...

A. *Blood to flow into the ventricles.*
B. *Blood to flow out of the atria.*
C. *The atrioventricular valves to close, and then the semilunar valves to open.*
D. *The semilunar valves to close, and then the atrioventricular valves to open.*
E. *Pressure to become greater in the aorta and pulmonary trunk than in the ventricles.*

17- When the pressure in the ventricles becomes lower than the pressure in the atria...

A. *The ventricles contract.*
B. *Blood flows into the pulmonary trunk.*
C. *Blood flows into the aorta.*
D. *The atrioventricular valves open.*
E. *The semilunar valves open.*

18-The steps of the cardiac cycle in sequence are...

A. *isovolumic contraction, isovolumic relaxation, ejection, passive ventricular filling, active ventricular filling.*
B. *isovolumic relaxation, isovolumic contraction, ejection, passive ventricular filling, active ventricular filling.*
C. *isovolumic contraction, ejection, isovolumic relaxation, passive ventricular filling, active ventricular filling.*
D. *isovolumic contraction, ejection, isovolumic relaxation, active ventricular filling, passive ventricular filling.*
E. *Ejection, isovolumic relaxation, passive ventricular filling, isovolumic contraction, active ventricular filling.*

19-The beginning of ventricular systole is when blood flowing back toward the relaxed ventricles causes the semilunar valves to close.

A. *True*
B. *False*

20- The atria never need to contract due to passive ventricular filling.

A. *True*
B. *False*

21- What do you expect at the beginning of ventricular contraction?

A. AV valves open
B. AV valves close

22- If 200ml of blood return to the heart…

A. 100ml passive filling, 100ml atrial contraction
B. 140ml atrial contraction, 60ml passive filling
C. 140ml passive filling, 60ml atrial contraction

23- Why did the AV valves closed during the beginning of ventricular contraction?

A. The pressure in left ventricle is higher than the pressure in left atrium
B. The pressure in left atrium is higher than the pressure in left ventricle
C. The pressure in the left ventricle is the same as the pressure in the left atrium

24- The highest rate of increased pressure happens in …
A. Right ventricle
B. Right atrium
C. Left atrium
D. Left ventricle

Answers:

Q1: D (Pulse pressure is the difference between the highest (systolic) and lowest (diastolic) arterial pressures. It reflects the volume ejected by the left ventricle (stroke volume). Pulse pressure increases when the capacitance of the arteries decreases, such as with aging.)

Q2: E (The contraction of the ventricles lasts almost from the beginning of the Q wave and continues to the end of the T wave. This interval is called the Q-T interval and ordinarily lasts about 0.35 sec.)

Q3: D (The PR segment (part of the PR interval) and the ST segment are the only portions of the electrocardiogram (ECG) that are isoelectric. The PR interval includes the P wave (atrial depolarization) and the PR segment, which represents conduction through the atrioventricular (AV) node; during this phase, the ventricles are not yet depolarized. The ST segment is the only isoelectric period when the entire ventricle is depolarized.)

Q4: C

Q5: A

Q6: E (This patient has a heart rate of 70 beats/, and you can determine the cardiac output by using the following formula: cardiac output = heart rate × stroke volume. The stroke volume can be determined from the figure, which is 100 ml, the volume change during the C-D segment. Using this you can determine that the cardiac output is 7000 ml/min)

Q7: A (During the ejection phase, the aortic and pulmonary valves open and blood flows into the aorta and pulmonary artery. The ejection phase is between C and D, so the aortic and pulmonary valves open at C and then close at D. The closing of these valves causes the second heart sound.)

Q8: B (Between points A and B is the period of ventricular filling. The vibration of the ventricular walls makes this sound after sufficient blood has entered the ventricular chambers.)

Q9: D (The ejection fraction is the stroke volume/end diastolic volume. Stroke volume is 100 ml, and the end systolic volume at point D is 150 ml. This gives you an ejection fraction of 0.667 or in terms of percentage 66.7%.)

Q10: D

Q11: A

Q12: A

Q13: B

Q14: B

Q15: B

Q16: C

Q17: D

Q18: C

Q19: B

Q20: B

Q21: B

Q22: C

Q23: A

Q24: D