

33 REVIEW SHEET

EXERCISE

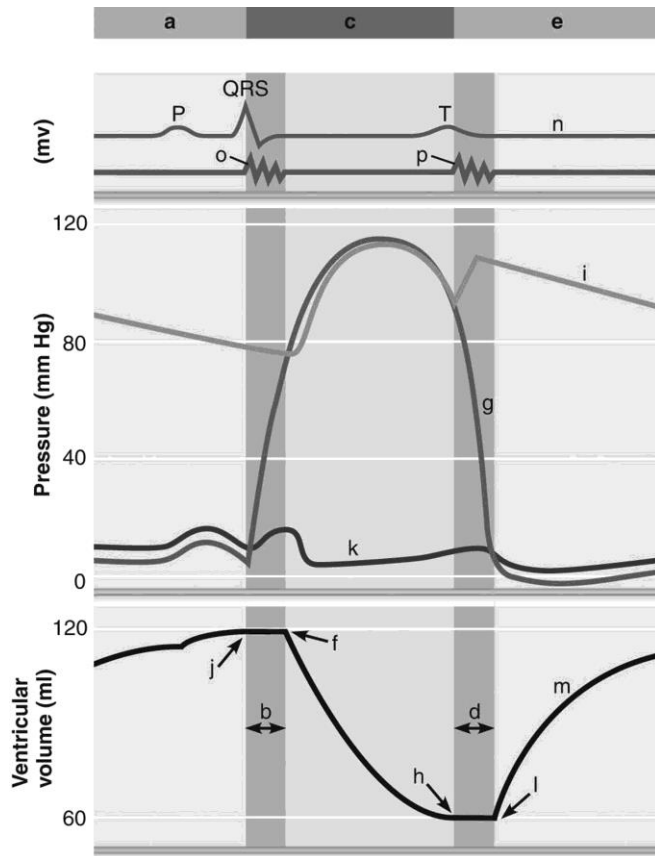
NAME _____

LAB TIME/DATE _____

Human Cardiovascular Physiology: Blood Pressure and Pulse Determinations

Cardiac Cycle

1. Using the grouped sets of terms to the right of the diagram, correctly identify each trace, valve closings and openings, and each time period of the cardiac cycle.



- i 1. aortic pressure
- k 2. atrial pressure (left)
- n 3. ECG
- o 4. first heart sound
- p 5. second heart sound
- g 6. ventricular pressure (left)
- m 7. ventricular volume
- h 8. aortic (semilunar) valve closes
- f 9. aortic (semilunar) valve opens
- b, d 10. AV and semilunar valves are closed (2 letters)
- j 11. AV valve closes
- l 12. AV valve opens
- a, e 13. ventricular diastole (2 letters)
- c 14. ventricular systole

2. Define the following terms.

systole: Contraction of ventricles (general usage)

diastole: Ventricular relaxation (general usage)

cardiac cycle: One complete heartbeat including atrial and ventricular contraction.

3. Answer the following questions concerning events of the cardiac cycle.

During which phase of the cardiac cycle are the AV valves opened? Ventricular filling phase

Describe the pressure difference that causes the AV valves to open. Atrial pressure greater than ventricular pressure

During which phase of the cardiac cycle are the semilunar valves opened? Ventricular ejection phase

What event causes the semilunar valves to open? Ventricular pressure greater than pressure in great arteries

Are both sets of valves closed during any part of the cycle? Yes

If so, when? Momentarily after atrial contraction and ventricular systole

Are both sets of valves open during any part of the cycle? No

During which phase in the cardiac cycle is the pressure in the left ventricle highest? Ventricular ejection phase

What event results in the pressure deflection called the dicrotic notch? Rebound of the aorta after being stretched during the ventricular ejection phase and then the subsequent closure of the aortic semilunar valves.

4. Using the key below, indicate the time interval occupied by the following events of the cardiac cycle.

Key: a. 0.8 sec b. 0.4 sec c. 0.3 sec d. 0.1 sec

a 1. the length of the normal cardiac cycle b 3. the quiescent period

d 2. the time interval of atrial contraction c 4. the time interval of ventricular contraction

5. If an individual's heart rate is 80 beats/min, what is the length of the cardiac cycle? 0.75 sec. What portion of the cardiac cycle decreases with a more rapid heart rate? Quiescent period (ventricular relaxation period)

6. What two factors promote the movement of blood through the heart? Alternate contraction and relaxation of the myocardium

and opening and closing of the heart valves.

Heart Sounds

7. Complete the following statements.

The two monosyllables describing the heart sounds are 1. The first heart sound is a result of closure of the 2 valves, whereas the second is a result of closure of the 3 valves. The heart chambers that have just been filled when you hear the first heart sound are the 4, and the chambers that have just emptied are the 5.

1. lub-dup

2. atrioventricular

3. aortic and pulmonary (semilunar)

4. ventricles

5. atria

6. atria

Immediately after the second heart sound, both the 6 and 7 are filling with blood. 7. ventricles

9. To auscultate most accurately, indicate where you would place your stethoscope for the following sounds:
closure of the tricuspid valve: Left or right sternal border of the fifth intercostal space
closure of the aortic valve: Right sternal border of the second intercostal space
apical heartbeat: Fifth intercostal space in line with the middle of the left clavicle
Which valve is heard most clearly when the apical heartbeat is auscultated? Mitral
10. No one expects you to be a full-fledged physician on such short notice, but on the basis of what you have learned about heart sounds, give an example of how abnormal sounds might be used to diagnose a heart problem.
Abnormal sounds such as swishing sounds after valvular closure or high-pitched sounds arising when blood is forced through constricted (valve) openings might indicate valvular problems.

The Pulse

11. Define *pulse*. Pressure surges in an artery occurring during each contraction and relaxation of the left ventricle.
12. Describe the procedure used to take the pulse. Place the first 2-3 fingertips of one hand over an arterial pressure point. Compress firmly and then release the pressure slightly to palpate the pulse.
13. Identify the artery palpated at each of the pressure points listed.
at the wrist: Radial on the dorsum of the foot: Dorsalis pedis
in front of the ear: Temporal at the side of the neck: Carotid
14. When you were palpating the various pulse or pressure points, which appeared to have the greatest amplitude or tension? Carotid artery Why do you think this was so? The carotid arteries are the major arteries that deliver blood to the brain and they are closest to the heart.
15. Assume someone has been injured in an auto accident and is hemorrhaging badly. What pressure point would you compress to help stop bleeding from each of the following areas?
the thigh: Femoral artery the calf: Popliteal artery
the forearm: Brachial artery the thumb: Radial artery
16. How could you tell by simple observation whether bleeding is arterial or venous? If it spurts, it is arterial. It will flow evenly if it is venous blood.
17. You may sometimes observe a slight difference between the value obtained from an apical pulse (beats/min) and the value from an arterial pulse taken elsewhere on the body. What is this difference called?

Blood Pressure Determinations

18. Define *blood pressure*. Pressure exerted by blood against the walls of the blood vessels.

19. Identify the phase of the cardiac cycle to which each of the following apply.

systolic pressure: Systole (ventricular contraction) diastolic pressure: Diastole (relaxation)

20. What is the name of the instrument used to compress the artery and record pressures in the auscultatory method of determining blood pressure? Sphygmomanometer

21. What are the sounds of Korotkoff? Sounds that can be auscultated over a partially occluded artery.

What causes the systolic sound? Sound of turbulent blood flow as it first begins to move through the constricted artery.

What causes the disappearance of the sound? Blood is flowing freely; the artery is no longer constricted.

22. Describe how blood pressure is measured using a sphygmomanometer. The sphygmomanometer cuff is inflated above the

expected systolic pressure as the pressure on the cuff is released and the flow of blood returns through the appendage.
an

audible sound will be heard and this is the systolic pressure. The sound of turbulence will continue until the pressure
from the

cuff drops below the diastolic pressure.

23. Define *pulse pressure*. Systolic pressure minus diastolic pressure

Why is this measurement important? It indicates the actual working pressure (the time during which blood can be
forced

out of the heart during systole).

24. Explain why *pulse pressure* is different from *pulse rate*. Pulse pressure is what generates the pulse felt calculated as
the systolic pressure minus the diastolic pressure; pulse rate is the number of pulsations per minute.

25. How do venous pressures compare to arterial pressures? Venous pressures are lower.

Why? Veins are far removed from the pumping action of the heart. and most of the pressure is used or "lost" as the
blood passes through the capillaries.

26. What maneuver to increase the thoracic pressure illustrates the effect of external factors on venous pressure? *Valsalva maneuver* How is it performed? *A person takes a deep breath, and mimics the motions of exhaling forcibly, but without actually exhaling. The glottis will close and the intrathoracic pressure will increase.*
27. What might an abnormal increase in venous pressure indicate? (Think!) *Heart failure. With the heart unable to adequately pump blood, it pools in the lower extremities and increases venous pressure.*

Observing the Effect of Various Factors on Blood Pressure and Heart Rate

28. What effect do the following have on blood pressure? (Indicate increase by ↑ and decrease by ↓.)
- | | | | |
|---|---|---|-------------------------|
| ↓ | 1. increased diameter of the arterioles | ↓ | 4. hemorrhage |
| ↑ | 2. increased blood viscosity | ↑ | 5. arteriosclerosis |
| ↑ | 3. increased cardiac output | ↑ | 6. increased pulse rate |
35. What is the importance of collateral blood supplies? *Can maintain the blood supply to an organ or body part in case the major nutrient artery is occluded.*