

## **Review Questions for Heart Sounds topic**

Review questions will not be collected and are not worth any points. Doing them will, however, help you prepare for the midterms and quizzes in this course. Furthermore, some of these review questions will appear on the final exam (although the numbers within the questions may be changed).

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1) The two main loops of the cardiovascular system are \_\_\_\_\_ loop and the \_\_\_\_\_ loop.  
(Choose two correct answers)

- A) Pulmonary
- B) Respiratory
- C) Aorta
- D) Systemic

2) Within the pulmonary loop, the

- A) pulmonary arteries carry oxygen-poor blood.
- B) pulmonary veins carry blood toward the lungs
- C) blood returning to the left atrium of the heart is oxygen-poor.
- D) oxygen from the blood diffuses into the lungs.

3) Which is **not** a blood vessel that **directly** connects to the heart?

- A) Carotid artery
- B) Superior vena cava
- C) Aorta
- D) Inferior vena cava
- E) Pulmonary artery
- F) Pulmonary vein

4) The atrioventricular (AV) valves

- A) are located between the atria and the vena cava
- B) are located between the ventricles and the aorta
- C) are located between the ventricles and the atria
- D) are located within coronary arteries

5) The semilunar valves

- A) prevent the backward flow of blood from the ventricles into the atria.
- B) are open during the relaxation phase of the ventricles.
- C) are closed throughout the cardiac cycle
- D) prevent backflow of blood from the pulmonary artery and the aorta into the ventricles

- 6) The “Lub-dup” sounds of the heart come from what part of the heart?
- A) Ventricles
  - B) Atria
  - C) Valves
  - D) Arteries
- 7) The second heart sound (“dup”) results from vibrations generated by the
- A) opening of the AV valves at the start of diastole.
  - B) closing of the AV valves at the start of systole.
  - C) opening of the semilunar valves at the start of systole.
  - D) closing of the semilunar valves at the start of diastole.
- 8) When listening to heart sounds with a stethoscope, abnormal heart sounds (such as gurgles or muffled beats) are known as
- A) Cardiac errors
  - B) Murmurs
  - C) Incomplete rhythm cycles
  - D) Infarctions
- 9) The average heart rate for an adult at rest is
- A) 12 beats per minute
  - B) 72 beats per minute
  - C) 80 beats per minute
  - D) 120 beats per minute
- 10) Which term means the volume of blood pumped by the heart per beat?
- A) Heart volume
  - B) Stroke volume
  - C) Venous return
  - D) Cardiac output
- 11) During normal ventricular contraction what volume of blood is a typical stroke volume?
- A) 5 liters
  - B) 5 ml
  - C) 70 ml
  - D) 1.25 liters

- 12) Which term means the volume of blood pumped by the heart per minute?
- A) Heart rate
  - B) Stroke volume
  - C) Systemic current
  - D) Cardiac output
- 13) Which factor was described in class as the cause of an increase in stroke volume?
- A) Increased blood pressure
  - B) Increased skeletal muscle pumping
  - C) Increased force of contraction
  - D) Increased peripheral resistance
- 14) The stroke volume multiplied by the heart rate is equal to the...
- A) stroke rate.
  - B) venous return.
  - C) ejection fraction.
  - D) cardiac output.
- 15) At rest the cardiac output of the heart of an average person is \_\_\_\_\_ liters of blood per minute.
- A) three
  - B) five
  - C) seven
  - D) nine
- 16) If someone's heart has a stroke volume of 70 ml per beat and a heart rate of 90 beats/minute, the cardiac output would be
- A) 6300 mL/min.
  - B) 7700 mL/min.
  - C) 70 mL/min.
  - D) 128 mL/min.
- 17) The path of blood from the heart, through the lungs, and back to the heart is known as the \_\_\_\_\_ loop. The path of blood from the heart, to all the organs of the body (except the lungs), and back to the heart is known as the \_\_\_\_\_ loop.

18) After each description below, write P if it matches the pulmonary loop and write S if it matches the systemic loop. Some blanks may require both answers.

- a) It goes to the lungs and back: \_\_\_\_\_
- b) The blood in its arteries is blue: \_\_\_\_\_
- c) Oxygen enters the blood in this loop: \_\_\_\_\_
- d) It begins at the heart: \_\_\_\_\_
- e) The blood in its veins is blue: \_\_\_\_\_
- f) CO<sub>2</sub> is present in some or all of this loop: \_\_\_\_\_

19) \_\_\_\_\_ is the term for any blood vessel in the body that carries blood away from the heart.

20) \_\_\_\_\_ is the term for any blood vessel in the body that carries blood toward the heart.

21) The word \_\_\_\_\_ refers to lungs, and so the veins returning blood to the heart from the lungs are called the \_\_\_\_\_ veins.

22) The right atrium receives blood from two major veins: the superior and inferior \_\_\_\_\_.

23) The \_\_\_\_\_ returns blood from all upper body regions (above the diaphragm) to the right atrium.

24) The \_\_\_\_\_ returns blood from all lower body regions (below the diaphragm) to the right atrium.

25) Write T(ue) or F(alse) in each blank space:

- a) The ventricles are refilled with blood during ventricular diastole \_\_\_\_\_
- b) The semilunar valves are between the atria and the ventricles \_\_\_\_\_
- c) Blood in the pulmonary loop arteries is blue \_\_\_\_\_
- d) The left and right atria contract at the same time \_\_\_\_\_
- e) The right atria and the right ventricle contract at the same time \_\_\_\_\_

26) After each description, write LV if it applies to the left ventricle, write RV if it applies to the right ventricle, write LA if it applies to the left atrium, and write RA if it applies to the right atrium. Some descriptions may match more than one answer. Write all matching answers.

- a) Contracts at the same time as the right ventricle \_\_\_\_\_
- b) Pumps blood out of the heart \_\_\_\_\_
- c) Pumps blood within the heart \_\_\_\_\_
- d) Has semilunar valves at its exit \_\_\_\_\_
- e) Has cardiac muscle walls \_\_\_\_\_
- f) Carries oxygenated blood \_\_\_\_\_
- g) Carries deoxygenated blood \_\_\_\_\_

27) You are a red blood cell that is about to return to the heart after passing through the systemic loop. Starting with the right atrium as "1", number the following components of the cardiovascular system in the correct order that you would encounter them.

- Right atrium 1
- Left atrium \_\_\_\_\_
- Right ventricle \_\_\_\_\_
- Left ventricle \_\_\_\_\_
- Pulmonary artery \_\_\_\_\_
- Pulmonary vein \_\_\_\_\_
- Aorta \_\_\_\_\_
- Right AV valve \_\_\_\_\_
- Left AV valve \_\_\_\_\_
- Lungs \_\_\_\_\_
- Aortic semi-lunar valve \_\_\_\_\_
- Pulmonary semi-lunar valve \_\_\_\_\_

28) Using the list of cardiovascular system parts listed in the problem 19 above as possible answers, list the parts of the cardiovascular system that carry oxygenated blood.

29) The two large arteries leaving the heart (one from the right ventricle and one from the left ventricle) are the \_\_\_\_\_ and the \_\_\_\_\_.

30) Most of the work of the heart is performed by the \_\_\_\_\_ ventricle as it forces blood into the aorta.

31) The \_\_\_\_\_ (which chamber of the heart?) pumps blood to the lungs; the \_\_\_\_\_ (which chamber of the heart?) pumps blood to the body via a huge artery called the aorta.

32) The amount of force required to pump blood through the entire body is greater than the force needed to pump blood through the lungs, so the \_\_\_\_\_ ventricle is larger and more muscular than the \_\_\_\_\_ ventricle.

33) Blood has to travel further in the \_\_\_\_\_ loop than in the \_\_\_\_\_ loop: Because of the difference in loop length, more strength and blood pressure are required to keep it moving in the longer loop.

34) Blood in the pulmonary veins is higher/lower (circle one) in oxygen compared to blood in the pulmonary arteries.

35) The \_\_\_\_\_ valves separate the atria from the ventricles.

36) The \_\_\_\_\_ valves are located at the start of the pulmonary artery and the aorta and prevent the back flow of blood into the ventricles.

37) The AV valves and the semilunar valves open and then slam shut with each beat of the heart. This constant opening and closing would damage most tissues, but the heart valves are not harmed because they are made of a very strong and tough leather-like tissue. What tissue are they made out of? (hint: It may help to review the tissue types chapter).

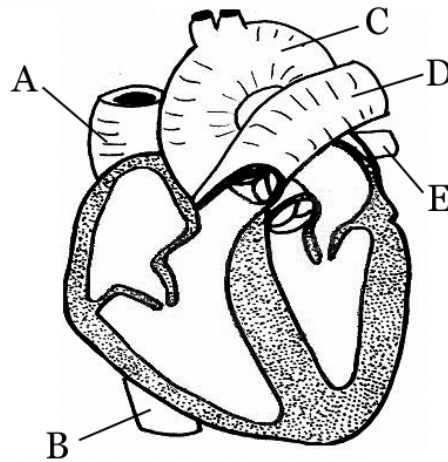
38) There are/aren't (circle one) valves preventing backflow of blood from the atria into the veins that return blood to the heart.

39) If a valve in the heart malfunctions, and allows blood to flow in both directions, an abnormal heart sound called a \_\_\_\_\_ occurs.

40) The \_\_\_\_\_ valves prevent backflow from the ventricles into the atria. These valves shut when the ventricles contract/relax (circle one).

41) The \_\_\_\_\_ valves prevent backflow of blood from the aorta and pulmonary artery into the ventricles. These valves shut when the ventricles contract/relax (circle one).

42) Name the blood vessels shown in the heart diagram the right. Hints: All these vessel connect directly to chambers in the heart. A, B, and E are veins. C and D are arteries.



43) The pulmonary semilunar valve separates the \_\_\_\_\_ ventricle from the \_\_\_\_\_ artery.

44) The aortic semilunar valve separates the \_\_\_\_\_ ventricle from the \_\_\_\_\_.

45) The right AV valve is also called the \_\_\_\_\_ valve.

46) The left AV valve is also called the \_\_\_\_\_ valve or the \_\_\_\_\_ valve.

47) The \_\_\_\_\_ valves (which make the “dup” noise of the “lub-dup” heartbeat sound) can best be heard by placing a stethoscope at the second intercostal space (which is slightly above the breast).

48) The \_\_\_\_\_ valves (which make the “lub” noise of the “lub-dup” heartbeat sound) can best be heard by placing a stethoscope at the fifth intercostal space (which is slightly below the breast).

49) The \_\_\_\_\_ (which chamber of the heart?) is the first chamber of the heart to receive blood from the lungs.

50) The first heart sound is caused by closure of the \_\_\_\_\_ valves and the second heart sound is caused by closure of the \_\_\_\_\_ valves.

51) Write the letters of all descriptions below that occur when the atria are contracting.

- a) Semilunar valves are open
- b) Ventricles begin systole
- c) Ventricles are in diastole
- d) AV valves are open
- e) The “lub” sound occurs
- f) The “dup” sound occurs
- g) The atria are in systole

52) Using the same letters listed in problem 43, write the letters of all descriptions below that occur when the atria begin relaxing.

53) Using the same letters listed in problem 43, write the letters of all descriptions below that occur when the ventricles begin contracting.

54) Using the same letters listed in problem 43, write the letters of all descriptions below that occur when the ventricles begin relaxing.

55) The heart beat sounds are often described as lub-dup, pause, lub-dup, pause, etc. Write the letters of all events listed below that occur when the lub sound occurs.

- a) The atria are relaxing
- b) The atria are contracting
- c) The ventricles are relaxing
- d) The ventricles are contracting

56) Using the letters from problem 55, write the letters of all events listed below that occur when the dup sound occurs.

57) Using the letters from problem 55, write the letters of all events listed below that occur during the first part of the pause.

58) Using the letters from problem 47, write the letters of all events listed below that occur during the second part of the pause.



- 59) The semilunar valves are open/closed (circle one) during contraction of the ventricles.
- 60) The first of the two heart sounds (“lub”) is due to the \_\_\_\_\_ valves closing.
- 61) The second of the two heart sounds occurs when the \_\_\_\_\_ valves shut.
- 62) On the ECG, the P/QRS/T (circle one of the three) is closest to the “lub” noise.
- 63) On the ECG, the P/QRS/T (circle one of the three) is closest to the “dup” noise.
- 64) The heart sounds occur before/during/after (circle one of the three) the ECG waves that cause them.
- 65) Explain why the ECG waves and the heart sounds do not occur at the exact same instant.

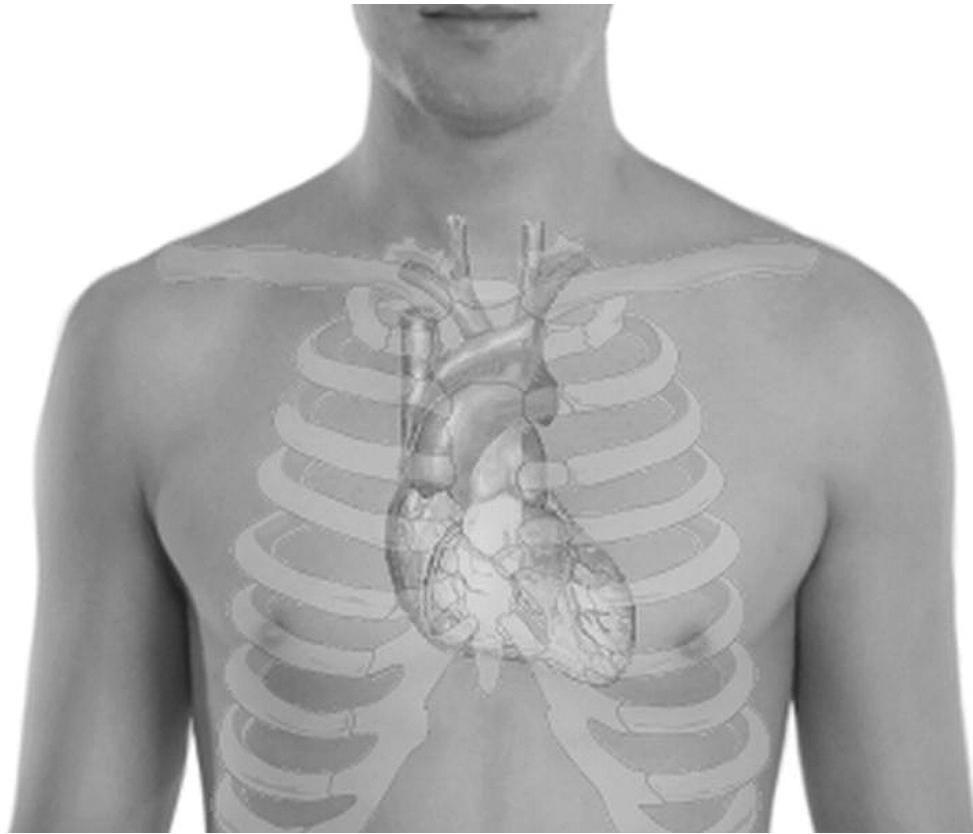
66) On the figure below...

a) Mark a T where you listen for the best Lub noise from the tricuspid valve.

b) Mark a B where you listen for the best Lub noise from the bicuspid valve.

c) Mark a P where you listen for the best Dup noise from the pulmonary semilunar valve.

d) Mark a A where you listen for the best Dup noise from the aortic semilunar valve.



67) What is the average adult resting heart rate? \_\_\_\_\_ What is considered the normal range of adult resting heart rates? \_\_\_\_\_

68) Define the following terms, as they were defined in class:

a) Bradycardia

b) Tachycardia

c) Stroke volume

d) Cardiac output

69) During exercise, the heart rate increases/decreases (circle one).

70) Stroke volume is the \_\_\_\_\_ pumped per \_\_\_\_\_.

71) An average adult's stroke volume is \_\_\_\_\_.

72) The stroke volume can be changed by the \_\_\_\_\_ of ventricular contraction.

73) A person has a stroke volume of 78 ml per beat and a heart rate of 75 beats per minute. What is their cardiac output? \_\_\_\_\_. (For full credit, include the proper units of cardiac output, not just the number).

74) A person has a stroke volume of 112 ml per beat and a resting heart rate of 50 beats per minute. What is their cardiac output? \_\_\_\_\_

**Answers for Review Questions for Heart Sounds topic:**

1) A and D

2) A

3) A

4) C

5) D

6) C

7) D

8) B

9) B

10) B

11) C

12) D

13) C

14) D

15) B

16) A

17) Pulmonary  
Systemic

18) a) P  
b) P  
c) P  
d) P and S  
e) S  
g) P and S

19) Artery

20) Vein

21) Pulmonary  
Pulmonary

22) Vena cavae

23) Superior vena cava

24) Inferior vena cava

25) a) T

b) F

c) T

d) T

e) F

26) a) LV

b) RV and LV

c) RA and LA

d) RV and LV

e) RA, LA, RV, and LV

f) LA and LV

g) RA and RV

27) Right atrium 1  
Left atrium 8  
Right ventricle 3  
Left ventricle 10  
Pulmonary artery 5  
Pulmonary vein 7  
Aorta 12  
Right AV valve 2  
Left AV valve 9  
Lungs 6  
Aortic semi-lunar valve 11  
Pulmonary semi-lunar valve 4

28) Left atrium  
Left ventricle  
Pulmonary vein  
Aorta  
Left AV valve  
Lungs  
Aortic semilunar valve

29) Pulmonary artery  
Aorta

30) Left ventricle

31) Right ventricle  
Left ventricle

32) Left ventricle  
Right ventricles

33) Systemic loop  
Pulmonary loop

34) Higher

35) Atrioventricular (AV) valves

36) Semilunar valves

37) Irregular dense connective tissue

38) Aren't

39) Murmurs

40) AV valves  
Contract

41) Semilunar valves  
Relax

42) A = Superior vena cava

B = Inferior vena cava

C = Aorta

D = Pulmonary artery

E = Pulmonary vein

43) Right ventricle  
Pulmonary

44) Left ventricle  
Aorta

45) Tricuspid valve

46) Bicuspid valve  
Mitral valve

47) Semilunar valves

48) AV valves

49) Left atrium

50) AV valves  
Semilunar valves

51) c, d, and g

52) a, b, and e

53) a, b, and e

54) c, d, and f

55) a and d

56) a and c

57) a and c

58) b and c

59) Open

60) AV valves

61) Semilunar valves

62) QRS

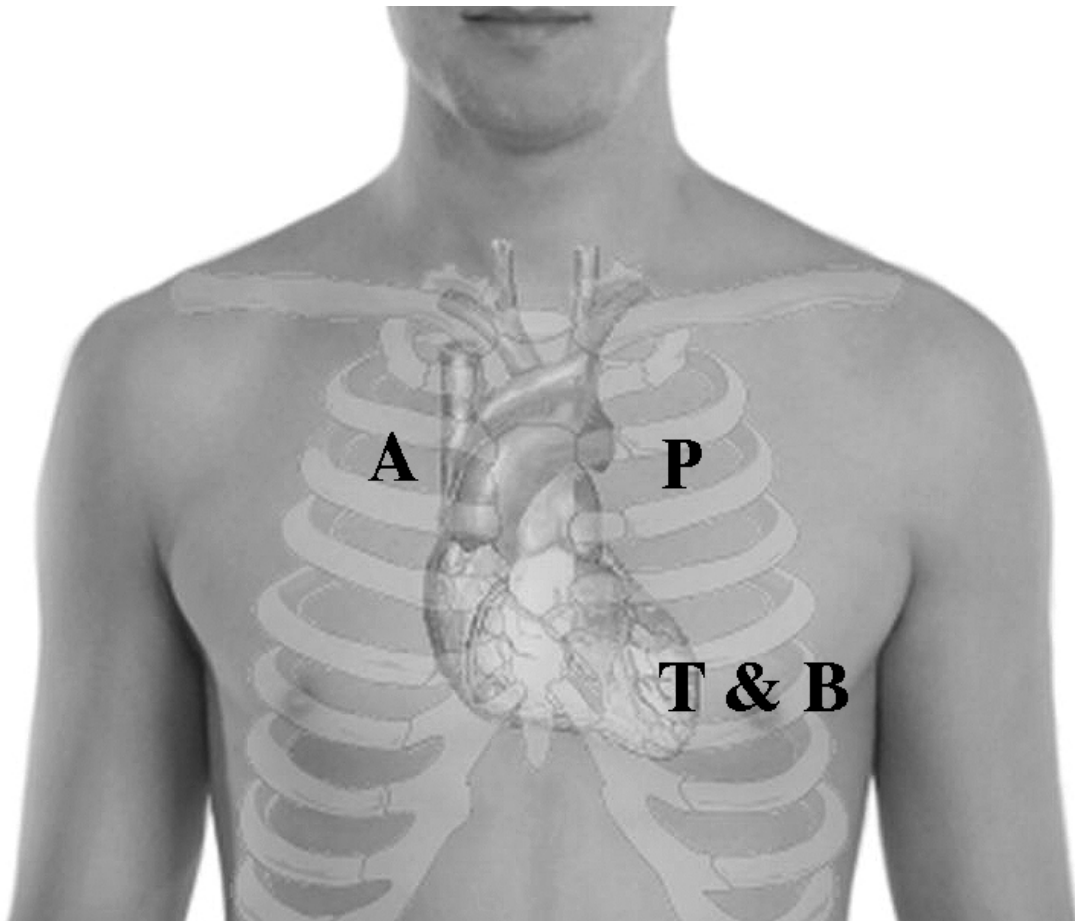


63) T

64) After

65) The ECG waves are electrical signals that instruct the heart muscles to contract or relax. Once the heart muscle receives an ECG signal, it takes a fraction of a second for the heart muscle cells to respond to that signal. This short delay occurs because it takes time for the cardiac muscle cells to depolarize by letting calcium ions into the cytoplasm, and to allow the troponin and tropomyosin proteins to disengage from the myosin proteins, and for the actin proteins to slide inward over the myosin proteins. Only when all these events have been completed are the cardiac muscle cells contracted, and only then is a pressure change generated in the ventricle which can open or close the heart valves.

66)



67) 72 beats per minute  
60 - 100 beats per minute

- 68) (a) Slow heart rate (below the normal heart rate range)  
(b) Fast heart rate (above the normal heart rate range)  
(c) The volume of blood pumped by the heart per beat  
(d) The volume of blood pumped by the heart per minute

69) Increases

70) Volume of blood pumped  
Beat

71) 70 mL per beat

72) Strength

73) 5850 mL per minute

74) 5600 mL per minute