Name: _____ **Class:** _____ **Date:** _____ **ID: A**

Bio12-Q4W3-Circ.+Resp.+EXcretion systems-Qs. Bank

True/False
Indicate whether the statement is true or false.

____ 1. The respiratory system uses oxygen in the breakdown of glucose in cells in order to provide energy in the form of ATP.

____ 2. If you have type A blood and anti-A is added during a transfusion, no clumps will form.

____ 3. Your pulse represents the pressure that blood exerts as it pushes the walls of a vein.

____ 4. Breathing is controlled by changes in the chemistry of the blood, which cause the medulla oblongata to react.

____ 5. When your diaphragm contracts, the space in the chest cavity becomes larger.

____ 6. Carbon dioxide and oxygen are the waste products of cellular respiration.

____ 7. The major waste products of the cells are ammonia and the wastes from the breakdown of proteins.

____ 8. As the liquid passes through the U-shaped tubule in the nephron, most of the ions and water and all of the glucose and amino acids are reabsorbed into the bloodstream.

____ 9. Blood enters the heart through the atria.

____ 10. The only veins that carry oxygen-rich blood are the venae cavae.

____ 11. The blood in the veins is prevented from flowing backward because of valves in these blood vessels.

____ 12. Red blood cells are produced in the spleen.

____ 13. Human red blood cells are produced by the liver.

Multiple Choice
Identify the choice that best completes the statement or answers the question.

____ 14. Which organ filters blood that has collected wastes from cells throughout the body and maintains the homeostasis of body fluids?
a. kidneys
b. heart
c. lungs
d. pacemaker

____ 15. Which of the following stores urine before being expelled from the body?
a. urinary bladder
b. urethra
c. kidneys
d. ureters

____ 16. The process that uses oxygen to break down glucose, producing energy, takes place _____.
a. only in the lungs
b. when the diaphragm contracts
c. in alveoli
d. within cells

____ 17. Which of the following is associated with cellular respiration?
a. metabolic processes
b. ATP formation
c. gas exchange in cells
d. all of these

____ 18. Which of the following is true of breathing?
a. homeostatic process
b. involuntary process
c. coordinated process
d. all of these

____ 19. Which of the following is the shape of the diaphragm when it is in the exhaling position?
a. circular
b. dome shape
c. flat
d. triangular

____ 20. The filtering unit of the kidney is the ____.
a. bladder
b. ureter
c. nephron
d. urethra

____ 21. Which of the following is a function of the kidney?
a. remove wastes from the blood
b. adjust the fluid level of the blood
c. adjust the salt level of the blood
d. all of the above

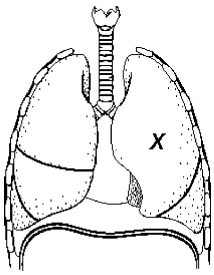

Figure 37-3

____ 22. How would the diaphragm change in Figure 37-3 in order to inhale?
a. flatten and lower
b. expand and go higher
c. flatten and go higher
d. expand and lower

____ 23. What would happen to the diaphragm in Figure 37-3 during a cough?
a. it would flutter
b. it would remain still
c. it would move up rapidly
d. it would relax

____ 24. Approximately what is the gas concentration at the point marked X in Figure 37-3 if it is at a high pressure?
a. more oxygen, less carbon dioxide
b. less oxygen, more carbon dioxide
c. more oxygen, more carbon dioxide
d. less oxygen, less carbon dioxide

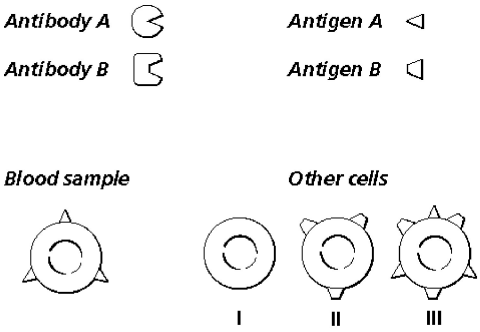

Figure 37-4

____ 25. What antibodies does the sample shown in Figure 37-4 have?
a. A
b. B
c. both
d. neither

____ 26. Which blood cell can the specimen shown in Figure 37-4 be given with no harm?
a. I
b. II
c. III
d. I and II

____ 27. Which type of blood cell can the specimen shown in Figure 37-4 donate to with no harm?
a. I
b. II
c. III
d. all of them

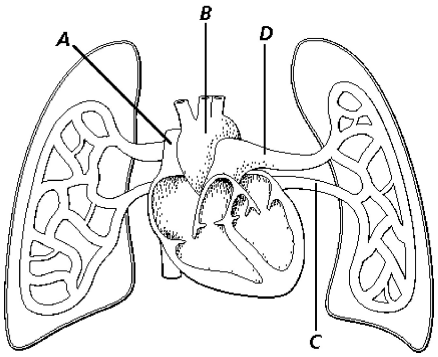

Figure 37-5

____ 28. What is the destination of blood a B in Figure 37-5?
a. the heart
b. both lungs
c. the body
d. the left lung

____ 29. How is the blood located in the vein at C in Figure 37-5 different than the blood in all other veins of the body?
a. it is rich with oxygen
b. it is rich with carbon dioxide
c. it doesn't reach the lung
d. it doesn't reach the heart

____ 30. Why is blood pumped through D before B in Figure 37-5?
a. to enrich it with oxygen
b. to enrich it with carbon dioxide
c. to enrich it with water
d. to enrich it with blood cells

Matching

Match each item with the correct statement below.

a. hemoglobin
b. antigen
c. trachea
d. nephron
e. artery
f. atrium
g. alveoli
h. urine
i. aorta
j. platelets
k. pulse
l. antibody
m. plasma
n. capillary
o. ventricle
p. vein

____ 31. A filtering unit in the kidney
____ 32. Solution of body wastes consisting of excess water, waste molecules, and excess ions
____ 33. Regular surge of blood through an artery
____ 34. Largest blood vessel in the body
____ 35. A lower chamber of the heart
____ 36. An upper chamber of the heart
____ 37. A large blood vessel that carries blood from the tissues to the heart
____ 38. A kind of large, muscular, thick-walled elastic vessel that carries blood away from the heart

____ 39. Protein that reacts with an antigen
____ 40. Microscopic blood vessel
____ 41. Foreign substance that stimulates an immune response
____ 42. Cell fragments that help blood to clot after an injury
____ 43. Iron-containing protein that picks up oxygen after it enters the blood vessels in the lungs
____ 44. Fluid portion of blood in which blood cells move
____ 45. Sacs of the lungs where exchange of oxygen and carbon dioxide takes place
____ 46. Passageway leading from the larynx to the lungs

Short Answer

47. The amount of salt in your diet varies considerably, and yet many processes of your body require that salt levels not vary too much. Which system helps your body maintain homeostasis of salt levels? How?
48. Identify the major functions of the excretory system.
49. A human blood sample at a blood bank has A antigens in the red blood cells and anti-B antibodies in the plasma. What type is the blood? Who can receive it?
50. How would you describe the differences between external and internal respiration to a person who has little understanding of biology?
51. How is the volume of the chest cavity increased during inhalation?
52. Trace a molecule of oxygen from the atmosphere through the external respiratory system.
53. How does a pacemaker set the heart rate?
54. What problem may arise when a woman with Rh^- blood is pregnant with an Rh^+ fetus?
55. Distinguish between systolic pressure and diastolic pressure.
56. How does the respiratory system prevent most of the foreign matter in urban air from reaching your lungs?
57. Arteriosclerosis slowly reduces blood flow through the arteries to the brain. Explain how this may affect a patient who has this condition.
58. When a person has pneumonia, the alveoli become inflamed and the air spaces become clogged. What effect will these symptoms have on a pneumonia patient?

As the graph in Figure 37-1 shows, a marathon runner is able to increase the amount of blood pumped by the heart (cardiac output) from 5 L/min while resting to 30 L/min while competing. The runner's stroke volume (pumping capacity per heartbeat) measured in mL/beat, and heart rate, measured in beats/min, are also increased.

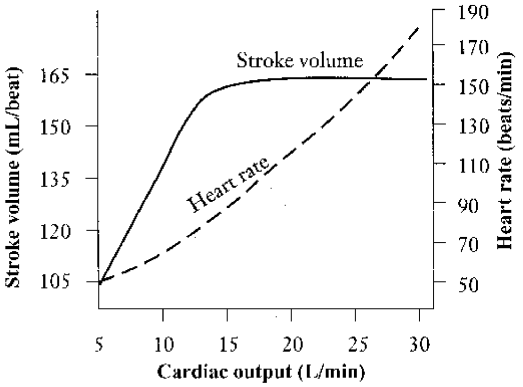

Figure 37-1

59. Based on Figure 37-1, which has the greater effect on cardiac output, stroke volume or heart rate?
60. What is the stroke volume when the cardiac output is 20 mL/min? Refer to Figure 37-1.
61. When the runner's cardiac output is 20 L/min, what is the heart rate? Use Figure 37-1.
62. Describe the pathway a waste molecule takes out of the body through the kidney.
63. Why is an Rh incompatibility (mother Rh-, baby Rh+) not a problem during the first pregnancy?

Problem

The vertebrate heart can beat spontaneously. If the heart of a vertebrate is removed and placed in a balanced salt solution with nutrients, it will continue to beat for hours. In fact, the muscle from each part of the heart beats at its own rate if it is not under the control of the pacemaker.

In a physiology laboratory experiment, a frog is anesthetized and the heart is exposed. Recall that the frog has a three-chambered heart, with right and left atria and a single ventricle. It also has a sinus venosus, which receives oxygen-depleted blood from all parts of the body except the lungs. The sinus venosus is where contraction begins. (This role is assumed by the pacemaker in the mammalian heart.) For this experiment, the nerve connections to the heart are blocked. The sinus venosus, the right atrium, and the ventricle are each attached to a stylus for marking on a kymograph (an instrument that records changes in pressure). In the graphs of Figure 37-2, rises represent contractions.

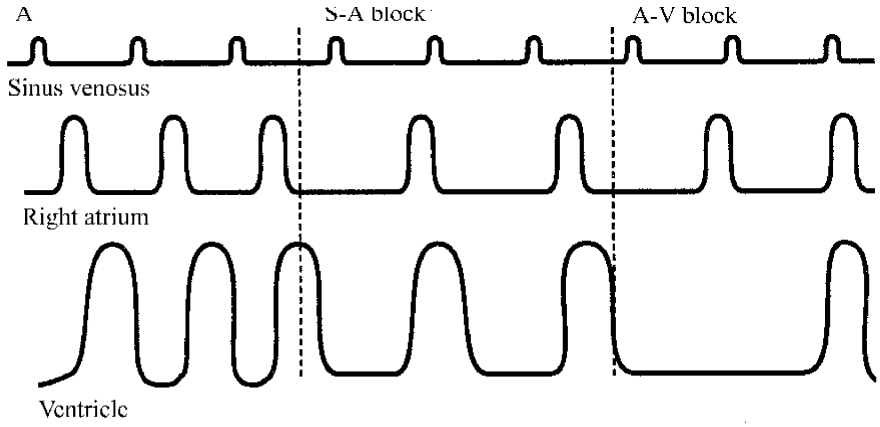

Figure 37-2

64. What can you conclude about the rate of beat of the different parts of the heart from this experiment? Refer to Figure 37-2.

65. How does blocking the action between the atrium and the ventricle, which is called an A-V block, affect the beat of the sinus venosus, the atrium, and the ventricle? Refer to Figure 37-2.

66. What could you do to find out the effect of blocking the atrium? See Figure 37-2.

67. Based on Figure 37-2, how does blocking the sinus venosus affect the rate at which the atrium and ventricle beat?

68. To understand how the heart beats when the impulse from the sinus venosus is blocked, a string is tied tightly around the heart between the sinus venosus and the atrium. In Figure 37-2, this is called an S-A block. How does the S-A block affect the rate of the beat of the sinus venosus?

69. Interpret the data in A in Figure 37-2.

Bio12-Q4W3-Circ.+Resp.+EXcretion systems-Qs. Bank
Answer Section

TRUE/FALSE

1. ANS: F PTS: 1 DIF: B OBJ: 37-2
   NAT: C1 | C5 | F4
2. ANS: F PTS: 1 DIF: B OBJ: 37-4
   NAT: C1 | C5
3. ANS: F PTS: 1 DIF: B OBJ: 37-5
   NAT: A1 | C1 | F1
4. ANS: T PTS: 1 DIF: B OBJ: 37-3
   NAT: C1 | C5 | F1
5. ANS: T PTS: 1 DIF: B OBJ: 37-3
   NAT: C1 | C5 | F1
6. ANS: F PTS: 1 DIF: B OBJ: 37-3
   NAT: C1 | C5 | F1
7. ANS: T PTS: 1 DIF: B OBJ: 37-7
   NAT: C5 | F1 | G1
8. ANS: T PTS: 1 DIF: B OBJ: 37-7
   NAT: C5 | F1 | G1
9. ANS: T PTS: 1 DIF: B OBJ: 37-5
   NAT: A1 | C1 | F1
10. ANS: F PTS: 1 DIF: B OBJ: 37-5
    NAT: A1 | C1 | F1
11. ANS: T PTS: 1 DIF: B OBJ: 37-5
    NAT: A1 | C1 | F1
12. ANS: F PTS: 1 DIF: B OBJ: 37-4
    NAT: C1 | C5
13. ANS: F PTS: 1 DIF: B OBJ: 37-4
    NAT: C1 | C5

MULTIPLE CHOICE

14. ANS: A PTS: 1 DIF: B OBJ: 37-7
    NAT: C5 | F1 | G1
15. ANS: A PTS: 1 DIF: B OBJ: 37-7
    NAT: C5 | F1 | G1
16. ANS: D PTS: 1 DIF: B OBJ: 37-2
    NAT: C1 | C5 | F4
17. ANS: D PTS: 1 DIF: B OBJ: 37-2
    NAT: C1 | C5 | F4
18. ANS: D PTS: 1 DIF: B OBJ: 37-3
    NAT: C1 | C5 | F1
19. ANS: B PTS: 1 DIF: B OBJ: 37-3
    NAT: C1 | C5 | F1

20. ANS: C PTS: 1 DIF: B OBJ: 37-7
NAT: C5 | F1 | G1
21. ANS: D PTS: 1 DIF: B OBJ: 37-7
NAT: C5 | F1 | G1
22. ANS: A PTS: 1 DIF: A OBJ: 37-3
NAT: C1 | C5 | F1
23. ANS: C PTS: 1 DIF: A OBJ: 37-3
NAT: C1 | C5 | F1
24. ANS: B PTS: 1 DIF: A OBJ: 37-3
NAT: C1 | C5 | F1
25. ANS: C PTS: 1 DIF: A OBJ: 37-4
NAT: C1 | C5
26. ANS: A PTS: 1 DIF: A OBJ: 37-4
NAT: C1 | C5
27. ANS: C PTS: 1 DIF: A OBJ: 37-4
NAT: C1 | C5
28. ANS: C PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
29. ANS: A PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
30. ANS: A PTS: 1 DIF: A OBJ: 37-5
NAT: A1 | C1 | F1

MATCHING

31. ANS: D PTS: 1 DIF: B OBJ: 37-7
NAT: C5 | F1 | G1
32. ANS: H PTS: 1 DIF: B OBJ: 37-7
NAT: C5 | F1 | G1
33. ANS: K PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
34. ANS: I PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
35. ANS: O PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
36. ANS: F PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
37. ANS: P PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
38. ANS: E PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
39. ANS: L PTS: 1 DIF: B OBJ: 37-4
NAT: C1 | C5
40. ANS: N PTS: 1 DIF: B OBJ: 37-5
NAT: A1 | C1 | F1
41. ANS: B PTS: 1 DIF: B OBJ: 37-4
NAT: C1 | C5

42. ANS: J PTS: 1 DIF: B OBJ: 37-4
NAT: C1 | C5
43. ANS: A PTS: 1 DIF: B OBJ: 37-4
NAT: C1 | C5
44. ANS: M PTS: 1 DIF: B OBJ: 37-4
NAT: C1 | C5
45. ANS: G PTS: 1 DIF: B OBJ: 37-1
NAT: B3 | C1 | C5
46. ANS: C PTS: 1 DIF: B OBJ: 37-1
NAT: B3 | C1 | C5

SHORT ANSWER

47. ANS:
The urinary system, with help from the hormone aldosterone, stimulates reabsorption of sodium and chloride ions. If a person takes in too much salt, aldosterone production decreases and more sodium is eliminated.

PTS: 1 DIF: A OBJ: 37-8 NAT: A1 | A2 | C5

48. ANS:
The excretory system functions in maintaining homeostasis. Many chemicals are balanced in the blood by passing through the filtration system of the kidneys. In addition, nitrogenous wastes are removed from the body through this system.

PTS: 1 DIF: A OBJ: 37-7 NAT: C5 | F1 | G1

49. ANS:
It is type A blood. A person with type A blood can receive it.

PTS: 1 DIF: A OBJ: 37-4 NAT: C1 | C5

50. ANS:
Answers may include: External respiration is better termed *breathing*. It deals with getting oxygen from the atmosphere to the cells through lungs and alveoli. Once oxygen enters the cell, internal respiration begins. Internal respiration is all of the activities of metabolism that use oxygen in chemical reactions to release ATP.

PTS: 1 DIF: A OBJ: 37-2 NAT: C1 | C5 | F4

51. ANS:
When you inhale, the muscles between your ribs contract, and your rib cage rises. At the same time, your diaphragm contracts and moves lower in the chest cavity.

PTS: 1 DIF: A OBJ: 37-3 NAT: C1 | C5 | F1

52. ANS:
The oxygen is inhaled through the nose. It passes through the pharynx and the larynx, and it enters the bronchi. The bronchi branch into the lungs where oxygen passes into the alveoli, enters the bloodstream, and is carried to the cells.

PTS: 1 DIF: A OBJ: 37-1 NAT: B3 | C1 | C5

53. ANS:
The pacemaker generates an electrical impulse that spreads over both atria, signaling the two atria to contract at almost the same time. It also triggers cells at the base of the right atrium to send an electrical impulse over the ventricles.

PTS: 1 DIF: B OBJ: 37-6 NAT: A1 | B3 | C5

54. ANS:
Toward the end of pregnancy or at delivery, the fetal blood may leak through the placenta and mix with the mother's blood. If the mother is Rh^-, she will produce antibodies against the Rh antigen. If she becomes pregnant again, the antibodies will cross the placenta and attack the red blood cells of an Rh^+ fetus. If the fetus is Rh^-, there is no problem.

PTS: 1 DIF: B OBJ: 37-4 NAT: C1 | C5

55. ANS:
When the ventricles contract, blood pressure rises sharply. This high pressure is called systolic pressure. As the ventricles relax, blood pressure drops; the lowest pressure occurs just before the ventricles contract again and is called diastolic pressure.

PTS: 1 DIF: B OBJ: 37-5 NAT: A1 | C1 | F1

56. ANS:
The trachea and bronchi are lined with cilia that constantly beat upward toward your throat so that foreign particles can be expelled or swallowed. Also cells in the trachea and the bronchi secrete mucus that can trap the particles.

PTS: 1 DIF: B OBJ: 37-1 NAT: B3 | C1 | C5

57. ANS:
If the patient's blood flow is cut down, the amount of oxygen and nutrients that reach the brain is reduced. The patient may become confused and unable to perform normally.

PTS: 1 DIF: A OBJ: 37-5 NAT: A1 | C1 | F1

58. ANS:
Gas exchange between air and blood cannot take place. Unless this is remedied, the patient will die.

PTS: 1 DIF: A OBJ: 37-1 NAT: B3 | C1 | C5

59. ANS:
The heart rate has the greater effect because as the graph shows, cardiac output is at its maximum only when the heart rate reaches its maximum. Cardiac output is well below its maximum when stroke volume reaches its maximum.

PTS: 1 DIF: A OBJ: 37-5 NAT: A1 | C1 | F1

60. ANS:
160 mL/beat

PTS: 1 DIF: B OBJ: 37-5 NAT: A1 | C1 | F1

61. ANS:
120 beats/min

PTS: 1 DIF: B OBJ: 37-5 NAT: A1 | C1 | F1

62. ANS:
From the blood, the waste molecule is filtered out by the nephron, passed to the ureter, to the bladder, and to the outside through the urethra.

PTS: 1 DIF: B OBJ: 37-7 NAT: C5 | F1 | G1

63. ANS:
During the first pregnancy, the mother is not exposed to the antigen until very late in the pregnancy, usually during birth. It is at that time the mother begins to manufacture antibodies. These antibodies could only affect future pregnancies with Rh+ babies.

PTS: 1 DIF: B OBJ: 37-7 NAT: C5 | F1 | G1

PROBLEM

64. ANS:
Answers will vary but may include that each area of the heart beats at its own rate unless influenced by the sinus venosus or by the lower part of the atrium. Also, students may conclude that although the sinus venosus controls the rhythm of the heart, other heart tissue can initiate contraction if the sinus venosus is blocked.

PTS: 1 DIF: A OBJ: 37-6 NAT: A1 | B3 | C5

65. ANS:
The sinus venosus and atrium continue to beat, but each at its own rate. The ventricle slows down considerably.

PTS: 1 DIF: A OBJ: 37-6 NAT: A1 | B3 | C5

66. ANS:
You could tie another string around the heart, between the atrium and the ventricle.

PTS: 1 DIF: A OBJ: 37-3 NAT: C1 | C5 | F1

67. ANS:
The atrium and the ventricle beat more slowly after the block.

PTS: 1 DIF: A OBJ: 37-6 NAT: A1 | B3 | C5

68. ANS:
It doesn't change the rate.

PTS: 1 DIF: A OBJ: 37-6 NAT: A1 | B3 | C5

69. ANS:
The sinus venosus of the frog heart contracts slightly before the atrium. The atrium contracts slightly before the ventricle. The atrium and the ventricle contract at the same rate as the sinus venosus.

PTS: 1 DIF: A OBJ: 37-6 NAT: A1 | B3 | C5