Mr. Epithelium’s Anatomy and Physiology Test SSSS Key

You have 50 minutes to complete this test packet. One 8.5 x 11 cheat sheet is allowed, along with 1 non-programmable calculator dedicated to computation. Good luck!

All questions are worth 1 point unless otherwise specified

Part I The Cardiovascular and Lymphatic System

1. (2pts) List the 2 main parts of the cardiovascular system
   Blood vessels and the Heart

2. (7pts) The heart pumps blood through the blood vessels which carries many components all over the body. Which of the following choices make up those components? (You may choose more than one answer)
   A. Blood
   B. Digestive wastes
   C. White blood cells
   D. Red blood cells
   E. Neural impulses
   F. Hormones
   G. Oxygen

3. (2pts) Blood flows out of the right ventricle into the pulmonary circuit and back into the systemic circuit.

4. About how many times does the heart beat per day?
   A. 80,000
   B. 100,000
   C. 120,000
   D. 140,000

5. Which chamber of the heart collects deoxygenated blood returning from the body?
   A. Right Atrium
   B. Left Atrium
   C. Right Ventricle
   D. Left Ventricle
6. Which chamber of the heart pushes blood into the body?
   A. Right Atrium
   B. Left Atrium
   C. Right Ventricle
   D. Left Ventricle

7. Which chamber of the heart forces blood into the lungs via the pulmonary valve?
   A. Right Atrium
   B. Left Atrium
   C. Right Ventricle
   D. Left Ventricle

8. Which chamber of the heart collects oxygenated blood returning from the lungs?
   A. Right Atrium
   B. Left Atrium
   C. Right Ventricle
   D. Left Ventricle

9. What is the largest artery in the human body?
   A. Great Subclavian Artery
   B. Saphenous Artery
   C. Vena Cava
   D. Aorta

10. The Mitral and Tricuspid Valves make up the atrioventricular (AV) valves
11-24 Label the following diagram of the heart (Figure 1.1).

(Starting from top right clockwise) 1, 13, 14, 5, 9, 7, 10, 3, 6, 8, 4, 11, 2, 12

25. In Figure 1.1, label the interventricular septum with an arrow.

26. (2pts) In Figure 1.1, label the pulmonary and aortic valve with 2 arrows.
27-30 2pts, all or nothing (is description is close, still give 2 pts)

27. (2pts) Give a short description of the Superior Vena Cava:
Deoxygenated blood from the upper parts of the body returns to the heart through this vessel.

28. (2pts) Give a short description of the Inferior Vena Cava:
Deoxygenated blood from the lower parts of the body returns to the heart via this vessel.

29. (2pts) Give a short description of the Ascending Aorta:
Portion of the aorta that rises up, before surpassing the aortic arch into the descending aorta.

30. (2pts) Give a short description of the Descending Aorta:
Portion of the aorta right after the aortic arch, and travels downward.

31-38 Label the parts of the electrical system of the heart in the picture below (Figure 1.2)

1. Sinoatrial Node
2. Intra-atrial Pathway
3. Internodal Pathway
4. Atriaventricular Node
5. Bundle of His
6. Right Bundle Branch
7. Purkinje Fibers
8. Left Bundle Branch

39. Which number (1-8) in Figure 1.2 is the pacemaker of the heart?

1

40. Which numbers (1-8) in Figure 1.2 carries electricity through the atria?

2, 3

41. Which number (1-8) in Figure 1.2 is the last part of the conduction through the atria?

5

42. Which number (1-8) in Figure 1.2 distributes electrical energy to the myocardium?

7

43. (4pts) Draw a simple ECG below with the P wave, QRS complex, and the T wave.

I point for correct P wave
1 point for correct T wave
1 point for point Q being underneath the line
1 point for point S being underneath the line
44. What does EKG stand for?

**Electrocardiogram**

45. (2pts) What does the EKG do?

An EKG can diagnose abnormal heart rates, arrhythmias, and damage to the heart muscle among other medical conditions.

46. (2pts) (Circle or underline each correct choice) Ventricular contraction occurs during (systole, diastole), and ventricular relaxation occurs during (systole, diastole)

47. (2pts) Describe cardiac output:

Cardiac output is the volume of blood pumped by each ventricle and it equals the product of the heart rate and stroke volume.

48. How would you calculate stroke volume?

\[ SV = EDV - ESV \]

39. How would you calculate Heart rate?

**Take the number of beats per minute**

40. How would you calculate Cardiac output?

\[ HR \times SV \]

41. How would you calculate Pulse pressure?

\[ SP - DP \]

42. Give the 2 equations for Mean arterial pressure.

\[ DP + \frac{1}{3} PP \text{ and } \frac{2}{3} DP + \frac{1}{3} SP \]

43. (5pts) Name some factors that affect total peripheral resistance.

Venous pressure, inspiration, stroke volume, nervous activity (5 pts is all are included, 3 if one missing, 1 if more than 1 is missing)

44-48. Match each vessel to its description:

<p>| | | | |</p>
<table>
<thead>
<tr>
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</thead>
<tbody>
<tr>
<td>A</td>
<td>B Arteries</td>
<td>A. Small versions of veins, carry blood from capillaries to veins</td>
<td></td>
</tr>
<tr>
<td>B</td>
<td>E Arterioles</td>
<td>B. Largest vessels, carry blood from the heart and into the systemic circuit</td>
<td></td>
</tr>
<tr>
<td>C</td>
<td>C Capillaries</td>
<td>C. Smallest vessels, transfer materials to and from blood.</td>
<td></td>
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<tr>
<td>D</td>
<td>A Venules</td>
<td>D. Carry blood back to heart, have valves in them to stop and prevent back flow towards capillaries</td>
<td></td>
</tr>
<tr>
<td>E</td>
<td>D Veins</td>
<td>E. Smaller than arteries, carry blood to the capillaries for nutrient exchange</td>
<td></td>
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49. (3pts) Name the 3 main plasma proteins:

**Globulins, Albumins, Fibrinogen**

50. Plasma makes up **55%** of total blood.
No 51. Is lymph circulation actively pumped by the heart?

52. Lymph flow is driven by: (You may choose more than one)
   A. Smooth muscle in lymph vessels
   B. Heart pump
   C. Skeletal-muscle pump
   D. Pressure gradients
   E. Respiratory pump

53. Lymph vessels collect excess fluid from the Capillary Beds and return them back into circulation

54. (12pts, one for each) List the 12 sites where lymph travels in lymph circulation.
   Interstitial fluid, lymph capillary, afferent lymph vessel, lymph node, efferent lymph vessel, lymph trunk, lymph duct, tight lymphatic duct, thoracic duct, subclavian vein, interstitial fluid
   (Some may be repeated, but the circulation of lymph is a cycle!)

55. (5pts max) Name at most 5 patterns that can affect the cardiovascular system.
   Any 5 will work: Hemorrhage (or hypotension), Upright posture, Exercise, Hypertension, Heart Failure, Coronary Heart Disease

Part II Excretory System

56. (4pts) Name the 4 basic functions of the excretory system:
   Excrete toxins and nitrogenous waste
   Helps regulate blood pressure
   Maintain water balance
   Regulate levels of numerous chemicals in blood

57. The kidney receives _____-% of cardiac output
   A. 15-20
   B. 20-25
   C. 25-30
   D. 30-35

58. The ureter carries urine from the kidneys to the bladder
59. The bladder holds up to _____ of urine
   A. 10 oz
   B. 12 oz
   C. 14 oz
   D. 16 oz

60. The _____ surrounds the nephron loop
   A. Vasa Recta
   B. Capillary bed
   C. Henle Network
   D. Renal system

61. Urine collects in the (accept 2 answers)- Renal pelvis, (urinary) bladder

62. What is the normal GFR?
   A. 100 mL/min
   B. 110 mL/min
   C. 125 mL/min
   D. 150 mL/min

63-69. Give a brief description of each disease:
63. (2pts) Obstructive disorders:
   Flow of urine is blocked causing it to back up and injure one or both kidneys
64. (2pts) UTI’s:
   Infections of the urinary tract – can be in the kidneys, ureters, bladder or urethra
65. (2pts) Glomerular Disorders:
   Collection of disorders that affect kidney function by attacking the glomeruli
66. (2pts) Renal Failure:
   Partial or total failure of kidneys to function
67. (2pts) Incontinence:
   Loss of bladder control
68. (2pts) Prostatitis:
Swelling and inflammation of the prostate gland

69. (2pts) BPH:
Enlarged prostate gland

70. The entire plasma volume is filters about 60 times a day.

71-76. Label the parts of the nephron:
71. Bowman’s capsule
72. Distal convoluted tubule
73. Glomerulus
74. Proximal convoluted tubule
75. Loop of Henle
76. Collecting duct

87. Where does 76 eventually drain into? (use a number in the kidney)

78. (5pts) Name the substances that can pass into 73.
metabolic wastes, excess ions, useful substances like glucose, free fatty acids, amino acids, vitamins, and other solutes also enter the capsular space

79-91. Label the parts of the kidney:
79. Capsule
80. Cortex
81. Medulla
82. Renal papilla
83. Fat deposits (or just fat)
84. Renal sinus
85. Minor calyx
86. Major calyx
87. Renal artery
88. Renal pelvis
89. Renal vein
90. Renal pyramid
91. Ureter
92. 91 eventually leads to the bladder
which then leads to the urethra

93. Which kidney is this? Right

Part III Challenge Problems

Specific scoring (Also tiebreaker): If score in this section (out of 28) is greater than 10, add 5 bonus points. Greater than 20, add 10. Greater than 25, add 15.

94. Unscramble the 3 layers of the heart wall starting from the outer to inner: (use the letter in the space)

C
A
B

94. A. Myocardium
   B. Endocardium
   C. Epicardium

95. (2pts) Backflow of blood, also known as regurgitation, can be prevented with the help of valves.

96. The right coronary artery supplies blood to the: (choose all that apply)

A. The right atrium
B. Parts of the right ventricle
C. The SA node
D. The AV node
E. The Purkinje Fibers
F. The superficial surface of the left atrium
G. Parts of the left ventricle
H. The left atrium

97. The characteristic of cardiac muscle tissue is that it can contract on its own without neural or stimulation, also called autorhythmicity

98. As atrial systole ends, atrial diastole begins. Which ventricular phase (systole, diastole) occurs fully during atrial diastole?

99. Which two centers make up collectively that cardiac center of the medulla oblongata?
   Cardioacceleratory, Cardioinhibitory

100. Filling time is the duration of ventricular diastole
101. Vessel walls have 3 distinct layers, name all 3 from innermost to outermost.

Tunica intima, tunica media, tunica externa

102. arterioles are also referred to as resistance vessels.

103. (2pts) The heart has 2 distinct sounds when beating, a ‘lubb’ and a ‘dupp’. Which is the S1 sound and which is the S2 sound?

‘lubb’ is the S1 sound and ‘dupp’ is the S2 sound.

104. A metarteriole is commonly known as a precapillary arteriole

105. As filtrate traverses the renal tubule, it’s called tubular fluid

106. (6pts, 2 each) Our bodies form 3 important organic wastes, shown below. List beside each how that organic waste was created.

1. Urea

Breakdown of amino acids

2. Uric Acid

Recycling of nitrogenous bases from RNA

3. Creatine

Breakdown of creatine phosphate

107. (3pts) Urine formation occurs in 3 basic steps. List all 3 below:

Filtration, reabsorption, secretion

108. The conversion of the plasma protein fibrinogen to fibrin removes the clotting proteins, leaving a fluid known as serum

109. (4pts) Platelet production by megakaryocytes can be sped up by: Thrombopoietin, thrombocyte-stimulating factor, interleukin-6, muti-CSF