

# 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?

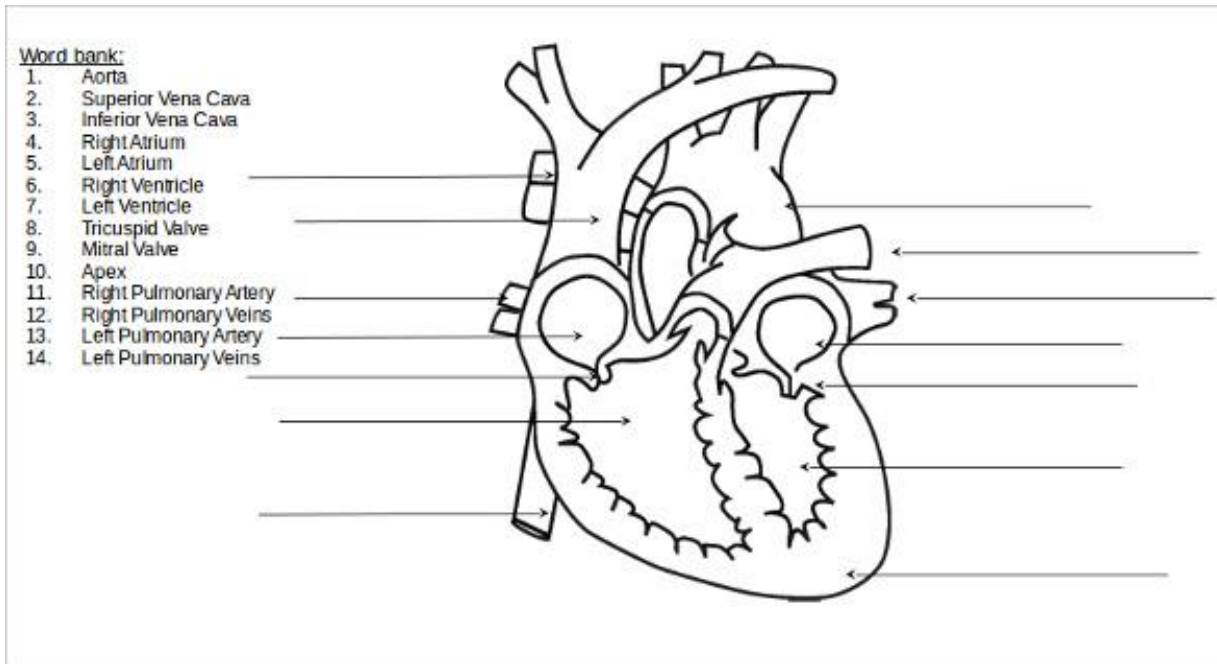
- A. Right Atrium
- B. Left Atrium
- C. Right Ventricle
- D. Left Ventricle

9. What is the largest artery in the human body?

- A. Great Subclavian Artery
- B. Saphenous Artery
- C. Vena Cava
- D. Aorta

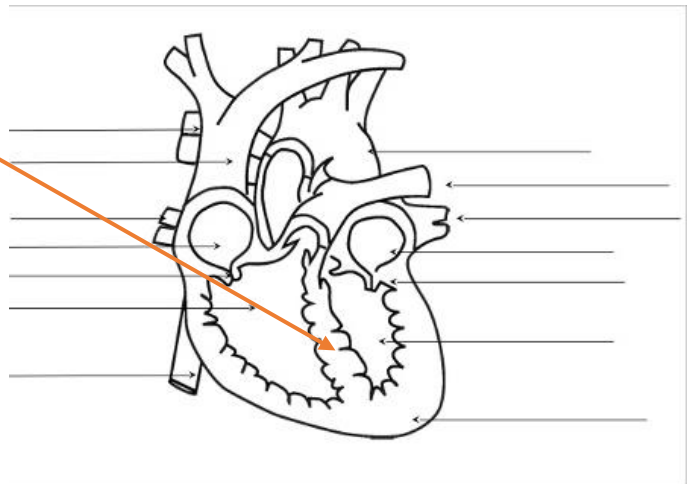
10. The Mitral and Tricuspid Valves make up the **atrioventricular (AV)** valves

11-24 Label the following diagram of the heart (Figure 1.1).

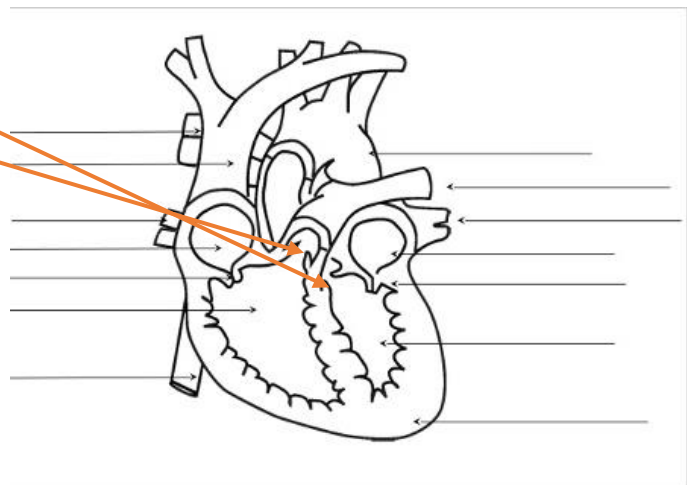


(starting from top right clockwise) 1, 13, 14, 5, 9, 7, 10, 3, 6, 8, 4, 11, 2, 12

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

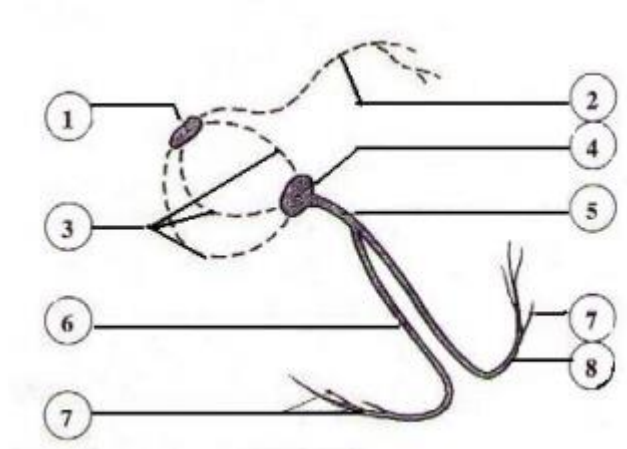
4. Atriaventricular Node

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

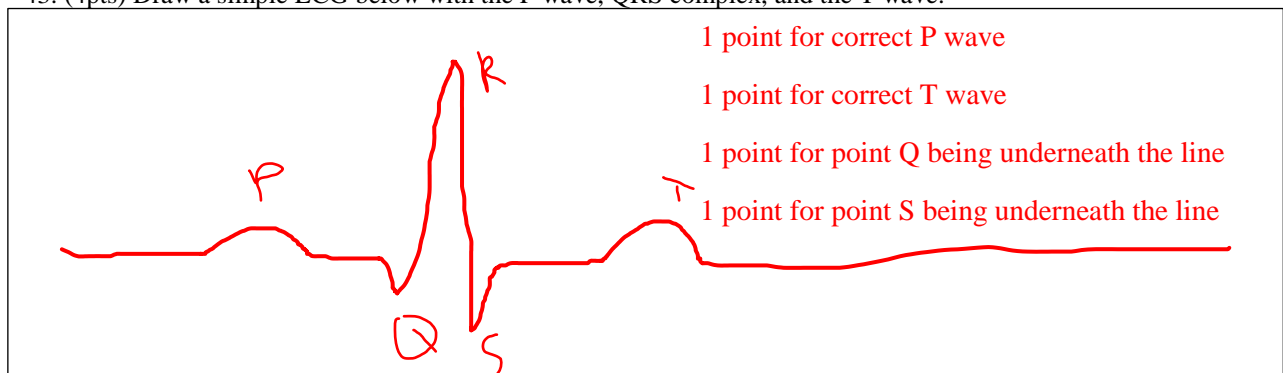
41. Which number (1-8) in Figure 1.2 is the last part of the conduction through the atria?

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.



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 x SV

41. How would you calculate Pulse pressure?

SP-DP

42. Give the 2 equations for Mean arterial pressure.

DP+ 1/3 PP and 2/3 DP+ 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:

_____ B Arteries	A. Small versions of veins, carry blood from capillaries to veins
_____ E Arterioles	B. Largest vessels, carry blood from the heart and into the systemic circuit
_____ C Capillaries	C. Smallest vessels, transfer materials to and from blood.
_____ A Venules	D. Carry blood back to heart, have valves in them to stop and prevent back flow towards capillaries
_____ D Veins	E. Smaller than arteries, carry blood to the capillaries for nutrient exchange

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

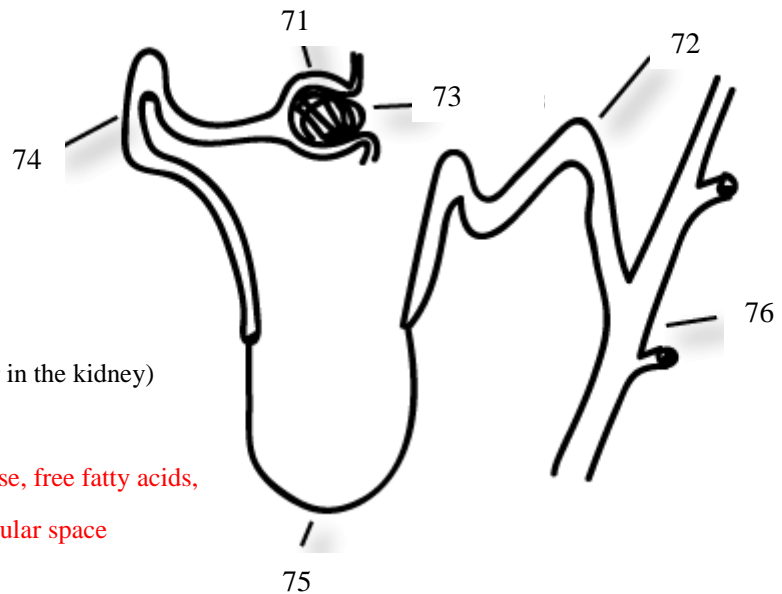
75. Loop of Henle

76. Collecting duct

88 77. 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

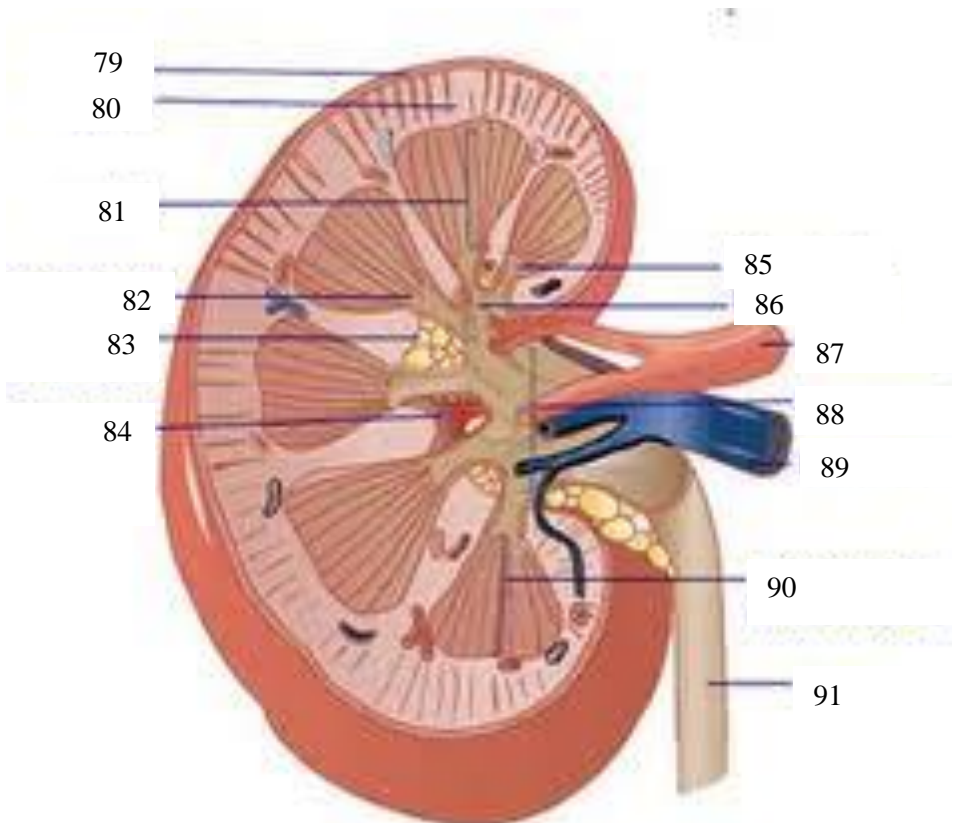
88. Renal pelvis

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. Myocardium
- A**                      B. Endocardium
- B**                      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**