1. All of the following are characteristics of the pacemaker potential EXCEPT:
   a. The pacemaker potential occurs in the SA node before it occurs in the AV nodes
   b. During the repolarization phase, K+ leaves the pacemaker cells
   c. Ca2+ channels are only open during the plateau phase
   d. A & C
   e. B & C

For Question 2, refer to the following table.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Ventricular volume is constant</td>
<td>5</td>
<td>SL valve is closed</td>
</tr>
<tr>
<td>2</td>
<td>Ventricular volume is increasing</td>
<td>6</td>
<td>SL valve is open</td>
</tr>
<tr>
<td>3</td>
<td>AV valve is closed</td>
<td>7</td>
<td>Ventricular pressure is increasing</td>
</tr>
<tr>
<td>4</td>
<td>AV valve is open</td>
<td>8</td>
<td>Ventricular pressure is decreasing</td>
</tr>
</tbody>
</table>

2. Immediately following the second heart sound, which of the following MUST BE TRUE?
   a. 1, 4, 5 & 7
   b. 1, 3, 5 & 8
   c. 2, 4, & 5
   d. 2, 4, 5 & 8
   e. 1, 3, 5 & 7

3. Of the following, which of the following occurs latest during an inflammatory response?
   a. Injured tissue release cytokines
   b. Injured cells release histamine
   c. Phagocytic cells undergo diapedesis at the injury site
   d. Capillary beds dilate at the injury site
   e. Interstitial fluid at the injury site fills with macrophages

4. All of the following are characteristics of circulation EXCEPT:
   a. Oxygen levels at the end of the pulmonary circuit are equal to those at the beginning of the systemic circuit
   b. The systemic circuit begins in the left atrium
   c. The systemic requires a greater pressure gradient than the pulmonary circuit
   d. A & B
   e. B & C

5. In regards to the valves and chambers of the heart, which of the following is TRUE?
   a. The papillary muscles for the AV valves are located in the wall of the atria
   b. The same amount of blood is entering the right and left atrium
   c. The left ventricle holds a greater blood volume than the right ventricle
   d. The left SL valve prevents blood from flowing from the pulmonary veins into the right atrium
   e. B & D

6. All of the following may occur during a humoral response EXCEPT:
   a. B cells are induced
   b. Antibodies can induce the formation of APC’s
c. Antibodies formed against a specific pathogen bind to multiple sites on the pathogen
d. Antibodies formed against the pathogen may activate macrophages
e. B & C

7. Which of the following effector mechanisms generally occur when a pathogen is associated with a mucous membrane?

a. **Neutralization**
b. Precipitation
c. Agglutination
d. Opsonization
e. Activate the complement system

8. In regards to the coronary vessels, which of the following is TRUE?

a. The circumflex artery is the first branch off the anterior interventricular artery
b. Blood must pass through the marginal branches to enter the posterior interventricular artery
c. **The left and right coronary arteries are branches off the aorta**
d. The anterior and posterior interventricular arteries supply blood to the anterior surface of the heart
e. C & D

9. All of the following MUST BE TRUE of the heart when atrial pressure exceeds ventricular pressure EXCEPT:

a. The ventricle is in diastole
b. **The P wave has occurred**
c. The second heart sound has not occurred
d. Ventricular volume is increasing
e. C & D

10. In regards to the intrinsic conductance system, which of the following is TRUE?

a. The SA and AV nodes are connected by intercalated discs
b. Cells in the AV node give rise to the bundle branches
c. The pacemaker potential in the atria is spread via intercalated discs
d. **Without the AV node the ventricles would not contract**
e. A & C

11. An individual must form antibodies for which of the following types of acquired immunity?

a. Active naturally acquired immunity
b. Passive naturally acquired immunity
c. Active artificially acquired immunity
d. Passive artificially acquired immunity
e. **None of the above**

12. In regards to the cardiac action potential, which of the following is NOT TRUE?

a. The 0 Phase results from the influx of Na+
b. Myocardial cells re-polarize during Phase 1
c. **Ca²⁺ and K⁺ both leave the myocardial cells during the plateau phase**
d. Myocardial cells re-polarize during Phase 3

e. C & D

13. In regards to antigens, which of the following is TRUE?

a. Antigens are only found on nucleated cells
b. **Pathogens may have more than one type of antigen**
c. Antigens are only required during specific immune responses
d. A & B
e. A, B & C

14. Which of the following could result from a tumor that destroys the SON?

a. **Less OT would be released into circulation**
b. Prolactin secretion would decrease
c. Ventromedial nuclei activity of the hypothalamus would increase
d. Anterior pituitary hormones could not be released into circulation
e. None of the above

15. Increases to which of the following DO NOT increase blood pressure?

a. Heart rate
b. Blood viscosity
c. SV
d. **Urine output**
e. B & D

16. Which of the following is the most likely effect of decreasing Na+ conductance in pacemaker cells?

a. EDV will increase
b. Heart rate will increase
c. **Threshold will be reached more slowly**
d. Peripheral resistance will increase
e. A & C

For Question 17, refer to the following table.

<p>| | | | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Peripheral resistance increases</td>
<td>6</td>
<td>Venous return increases</td>
</tr>
<tr>
<td>2</td>
<td>Peripheral resistance decreases</td>
<td>7</td>
<td>Venous return decreases</td>
</tr>
<tr>
<td>3</td>
<td>Vasomotor activity increases</td>
<td>8</td>
<td>Heart rate increases</td>
</tr>
<tr>
<td>4</td>
<td>Vasomotor activity decreases</td>
<td>9</td>
<td>Heart rate decreases</td>
</tr>
</tbody>
</table>

17. Which of the above result when the parasympathetic nervous system is activated?

a. 1, 3, 6 & 8
b. 1, 3 & 6
c. 2, 3, 8
d. **2, 4, 7 & 9**
e. 2, 4, 6 & 9
18. Of the following, which would result if the number of basophils in the anterior pituitary decreased?
   a. The let-down reflex would be eliminated
   b. Less tropic hormones would be made
   c. **Less growth hormone would be released**
   d. Water concentration in the kidney filtrate would increase
   e. A & D

19. In regards to factors affecting blood pressure, which of the following is NOT TRUE?
   a. Angiotensin II is formed in the lungs
   b. Renin is released from the JGA
   c. Aldosterone is released from the zona glomerulosa
   d. **Factors that hyperpolarize the SA node increase BP**
   e. B & D

20. Under conditions that activate the vasomotor center, which of the following is likely to occur?
   a. **Increase peripheral resistance**
   b. Inhibit the cardio-acceleratory center
   c. Decrease heart rate
   d. Decrease contractile strength of the heart
   e. Activate the sympathetic nervous system

21. In regards to endocrine hormones, which of the following is NOT TRUE?
   a. Insulin promotes the formation of glycogen
   b. Thyroglobin cannot be cleaved if it is not iodinated
   c. **ACTH increases the synthesis and release of gonadocorticoids**
   d. Neural stimuli cause the release of hormones made by the PVN
   e. A & C

Use the following information to answer Question 22.

<table>
<thead>
<tr>
<th>I</th>
<th>↓ renin</th>
<th>IV</th>
<th>↑ diameter of blood vessels</th>
</tr>
</thead>
<tbody>
<tr>
<td>II</td>
<td>↑ aldosterone</td>
<td>V</td>
<td>↑ blood solute concentration</td>
</tr>
<tr>
<td>III</td>
<td>↓ ADH</td>
<td>VI</td>
<td>↑ aldosterone levels</td>
</tr>
</tbody>
</table>

22. Which of the following are likely effects when Angiotensin II levels increase?
   a. I, II & IV
   b. II & V
   c. II, III, V
   d. II, V & VI
   e. II, III & VI

23. Which of the following conditions is likely to result if electrical signaling through the left bundle branch was blocked?
   a. An ectopic focus will develop in the left ventricle
   b. Ventricular contraction will not be synchronized with atrial contraction
c. Ventricular contraction will not occur  
d. **Electrical signaling in the Purkinje fibers would not be possible**  
e. C & D

24. Of the following, which best describes how hormones derived from lipids function?

a. Lipid-based hormones bind with plasma membrane bound receptors that create an intra-cellular second message  
b. Lipid-based hormones pass through the plasma membrane into the nucleus where they bind directly with the DNA  
c. Lipid-based hormones pass through the plasma membrane into the nucleus where they bind with chaperones  
d. Lipid-based hormones bind with chaperones that guide them to the appropriate plasma membrane bound receptors  
e. **None of the above**

25. In regards to the anatomy of blood vessels, which of the following is NOT TRUE?

a. The tunica interna is comprised primarily of simple squamous epithelium  
b. **Meta-arterioles allow blood to bypass capillary beds**  
c. Continuous capillaries are the least permeable type of capillary  
d. Capacitance vessels have valves to prevent backflow  
e. C & D

26. Of the following types of antibodies, which may be found in saliva?

a. IgE  
b. **IgA**  
c. IgM  
d. IgG  
e. IgD

27. Which of the following aspects of heart function would be affected by factors that increase the time between the QRS wave and the next T wave?

a. Heart rate would increase  
b. The time delay between the T and P waves would decrease  
c. Blood pressure would decrease  
d. **End systolic volume would decrease**  
e. C & D

28. All of the following are characteristics of the endocrine system EXCEPT:

a. Endocrine secretions can be delivered to their targets by the lymphatic system  
b. Receptors for tropic hormones are located on cells of other endocrine glands  
c. Steroid-based hormones usually require chaperones  
d. **The release of most hormones is stimulated by neural stimuli**  
e. B & D

29. In regards to pituitary hormones, which of the following is TRUE?

a. ADH increases the amount of water reabsorbed by the glomerulus
b. The release of the adrenal medullary hormones is controlled tropically

c. The release of growth hormone is controlled by a neural stimulus

d. **Dopamine is the inhibiting hormone for prolactin**

e. None of the above is TRUE

30. All of the following are characteristic of blood pressure regulation EXCEPT:

a. Factors that increases intra-cellular levels of Ca2+ in the heart decrease ESV

b. **EDV increases in response to increased levels of ANP**

c. Baroreceptors are generally involved in acute changes in blood pressure

d. ADH increases water reabsorption by the loop of henle

e. Long-term regulation of blood pressure requires mechanisms that regulate blood volume