**Practice Test #2:** Name: \_\_\_\_\_\_\_\_\_\_KEY\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Anatomy and Physiology 212: Test #2: 50 points

**PUT YOUR NAME AND TEST FORM LETTER ON FRONT MIDDLE AND TOP.** Choose the **one best** answer for each question on scantron (double check for smears). For 1 pt write your name and draw a heart next to your name at the top and middle of your scantron.

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1) The four subunits of hemoglobin interact with each other such that the four hemes are either all oxygenated of deoxygenated. This interaction is associated with what?

a) Cooperativity b) Sigmoid binding curve c) Bohr Effect d) Oxygen saturation e) All of above

2) What would probably be observed if the smooth muscle of the resistance vessels vasodilated too much?

a) Hypotension b) Hypertension

3) a) True B) False: The fetus has a special hemoglobin that has a lower than normal oxygen binding affinity that lets it pull oxygen from the maternal circulation in the placenta.

*That is the trick, the* ***very high oxygen binding affinity*** *to gamma hemoglobin is what lets the fetus pull oxygen across the placenta to the fetus, therefore oxygen is also released slower within the fetus giving the fetus greater resistance to hypoxia when fetal blood flow is limited.*

4) a) True b) False: Hyperventilation causes the blood to become well oxygenated and have a very basic pH, therefore oxygen delivery to the brain is very poor resulting in possible syncope.

5) a) True/ b) False: Blood in the arteries of the pulmonary circuit carry deoxygenated blood.

6) Which of the following does not provide protection to the heart?

a) Epicardial fat b) Large amounts of lactate dehydrogenase c) Sternum

d) All of above protect the heart

7) The heart lies in a special location called the …….

a) Pericardial sac b) Thoracic Cavity c) Abdomen

8) What structures permit all cells of the myocardium to function as an electrical syncitium?

a) Gap junctions b) Synapses c) Desmosomes d) All of above

9) NORMAL heart rate, cardiac output and aortic blood pressure values are what?

a) 70 beats/minute, 4.9 liters/minute, 120 mmHg/80 mmHg

b) 50 beats/minute, 3.5 liters/minute, 140 mmHg/70 mmHg

c) 100 beats/minute, 35 liters/minute, 110 mmHg/60 mmHg

10) The \_\_\_\_\_\_is the inner lining of the heart that faces the atrial and ventricular chambers.

a) Epicardium b) Myocardium c) Endocardium d) Gap junction

11) \_\_\_\_\_\_\_\_indicates that cardiac cell death (heart attack) has occurred.

a) Hypoxia b) Ischemia c) Infarct d) Hyperemia

12) The mitochondria of the heart cells use oxygen to produce ATP. The typical heart can use about \_\_\_\_\_% of the oxygen used by the entire body. a) 0.1 b) 2 c) 10 d) 30

13) During inspiration, the heart rate typically \_\_\_\_\_\_\_\_\_ for a few beats because there is a negative thoracic pressure that \_\_\_\_\_\_\_\_\_\_venous return into the right atrium.

a) Increases, increases b) Increases, reduces c) Decreases, decreases d) decreases, decreases

14) A) True B) False: Acetylcholine (parasympathetic nervous system) causes the pacemakers cells of the SA node to leak sodium less rapidly decreasing the heart rate.

15) During the \_\_\_\_\_\_\_\_phase of the cardiac cycle, the atrioventricular valves are closed, the semilunar valves are open and blood is entering the pulmonary artery.

a) Atrial systole b) Ventricular ejection

c) Isovolumetric ventricular relaxation d) Septal depolarization

16) During the \_\_\_\_\_phase of the cardiac cycle, the atrioventricular and semilunar valves are both closed and the ventricular volume is not changing.

a) Atrial systole b) Ventricular ejection

c) Isovolumetric ventricular relaxation d) Septal depolarization

17) Cells found in which of the following locations can create a source for abnormal depolarizations, pre-ventricular contraction (PVC) and fibrillation?

a) AV nodal cells b) Ectopic foci

c) SA nodal cells d) Epicardial cells

18) In a healthy person, a pulse pressure of 15 mmHg would be most likely to be associated with what vessel? a) Vena cava b) Pulmonary artery c) Pulmonary vein d) Aorta

19) If a positive electrode were on the left leg and a negative electrode was on the right arm you would be looking at the heart with ECG lead \_\_\_\_\_. Leads: A) (Lead I) B) (Lead II) C) (Lead III)

20) a) True b) False: If the left ventricle underwent hypertrophy (enlarged) the R-wave on the ECG would show a more positive R-amplitude. (-)on right arm and (+) on left arm.

21) A wave of depolarization moving through a heart towards the negative electrode creates a \_\_\_\_\_\_\_\_\_voltage deflection on the ECG.

a) Positive b) Isoelectric c) Negative

22) What part of an ECG from Lead II represents the electric record of ventricular septal depolarization?

a) P-wave b) Q-wave c) R-wave d) S-wave e) T-wave

23) What occurs between the end of the S-wave and the middle of the T-wave on an ECG?

a) Atrial depolarization b) Atrial contraction c) ventricular depolarization d) ventricular contraction

e) competition of ventricular repolarization



24) Based on the ECG above, what kind of heart block does the person appear to have?

a) Preventricular contraction (PVC) b) Sinus Tachycardia c) First degree d) Third Degree

e) Fibrillation

25) If your right ventricle failed, you would probably see edema (excess tissue fluids) accumulate where?

a) Lung b) Ankle

26) A) True B) False: Angiogenesis in the heart is stimulated by regular exercise. This improves oxygen delivery to the heart and carbon dioxide removal, improving cardiac and exercise performance.

27) Gas exchange increases in a capillary bed if the smooth muscle cell at the precapillary sphincter…..

a) Vasodilates (relaxes) b) Vasoconstricts



On the Frank-Starling curve shown above:

28) If you were at point “X” where would your stroke volume be if the EDV increased slightly due to straining while on a toilet, but not in a manner that caused heart failure? (A, B, **C,** D, or E)

29) If the heart began to experience hypoxia and the EDV stayed unchanged the stroke volume would be associated with what point? (A, B, C, **D**, or E)

30) If your aortic blood pressure was 120/80 at heart level while standing up, about what would the blood pressure be in the brain 25 inches above the heart? a) 170/130 b) 90/50 c) 80/40 d) 70/30

31) Equations: ΔP= Q(R) R=ΔP/Q Q=ΔP πr4 /8ηL R= 8ηL/π4

A 50% increase in which of the following items would probably have the greatest ability to increase blood flow through a blood vessel? a) Viscosity b) Pressure gradient c) Radius d) Resistance

32) What kind of shock is mediated by an immune reaction and increased capillary permeability?

a) Septic b) Hypovolemic c) Neurogenic d) Anaphylactic

33) If you had a heart attack in **the left** ventricle and you ran an ECG, what might you see with respect to the MEA? A) Left Shift **B) Right Shift**

*This might be expected because there would now be less myocardium depolarizing in the left direction.*

34) Cardiac arteries are prone to the formation of atherosclerosis because they have \_\_\_\_at many locations (especially in the hard working left ventricle). a) Laminar flow b) Turbulent flow

35) During strenuous exercise, blood flow to the \_\_\_\_\_\_increases to help the body remove heat.

a) Gut b) Brain c) Heart d) Lung e) Skin

36) The volume of blood in what compliant vessel changes most dramatically when the body needs to dramatically increase blood pressure?

a) Aorta b) Vena cava c) Saphenous vein d) Pulmonary artery e) All vessels share equal change

37) Which systemic vessels have the greatest surface area, provide almost all gas/nutrient exchange and a relatively small volume of blood? a) Arteries b) Capillaries c) Veins

 **Letters🡪 A B C D E 🡨Letters (Assume healthy person/156 lbs)**



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38) What is the blood pressure in the ascending aorta of the heart (see diagram)?

A) 200/150 B) 150/125 C) 150/100

39) What is the mean arterial blood pressure in the ascending aorta (see diagram)?

A) 150-100/2 + 100 =125 mmHg B) 150-100/3+100= 116.7 mmHg C) 120/80 + 125mmHg = 126.5 mmHg

40) The heart rate is about what (see diagram)?

A) 1 beats/3 second X 60 seconds/beat =20 beats/minute

B) 1 beat/second X 60 beats/minute = 60 beats/minute

C) 1beat/0.33 second X 60 seconds/minute = 180 beats/minute

41) What term describes this rate of the heart (see diagram)?

A) Normal Sinus Rhythm, B) Tachycardia C) Bradycardia?

42) What is the pulse pressure for this heart (see diagram)?

A) 150-100mmHg B) 125-100 mmHg C) 150-75 mmHg D) 200-100 mmHg

43) What is the stroke volume for the heart (see diagram)?

a) 200 ml +100 ml=300ml b) 200 ml -100ml=100ml c) 150 ml –100 ml=50 ml

44) What is the cardiac output (see diagram)?

a) 100 ml/beat X 180 beats/minute= 18,000 ml/min

b) 300 ml/beat X 20 beats/minute= 6,000 ml/min

d) 50 ml/beat X 20 beats/minute = 1,000 ml/min

45) The cardiac output for this person in the diagram is \_\_\_\_\_\_\_relative to normal.(see diagram)

a) Normal. b) High c) Low

46) If the left atrioventricular (mitral) valve failed to close properly you be most likely to hear an extra heart sound (bruit) at what letter? ***Point A, B, C, D or E*** –see diagram above

47) The wave of depolarization in the heart is probably attempting to move through the AV node at this time in the heart. ***Point A, B, C, D or E*** –see diagram above

48) **On Back of Scantron** 3 pt What might cause the conditions observed in this person? If the condition is “normal resting” then explain why it is normal resting (20-40 words)

 *See Notes: Person might be exercising. Blood pressure increases to drive more blood through the capillaries for gas exchange. Strove volume increases as more blood is pumped back into the heart (venous return) and heart rate goes up as sympathetic nervous system causes SA node to leak sodium more rapidly. Other options could also explain this.*

**Extra Credit on Back of Scantron:**

1 pt: What type of Mean Electrical Axis (MEA)s shown?

**Normal**  OR **Slight Right Shift** OR **Slight Left Shift**

1 pt: Describe two things that could cause this MEA? (5-10 words per item)

*Possibilities include: right ventricular infarct, left ventricular hypertrophy, maybe the heart was lying horizontally, other options possible*

