1. You have exam version A. Please bubble in an “a” for question 1. Not worth points!

2. (PeerWise) Which of the following descriptions is characteristic of fast-glycotic Type 2b fibers?
   a. Color of muscle is RED
   b. Rate of fatigue is SLOW
   c. Number of capillaries is HIGH
   d. **Type of myosin is FAST**
   e. Source of ATP is aerobic respiration

3. What gives slow-oxidative muscle fiber its dark red color?
   a. A low amount of myosin
   b. **A high amount of myoglobin**
   c. A high amount of glycogen
   d. The myofibrils
   e. The low amount of capillaries

4. What is the primary “weakness” of a fast oxidative muscle fiber?
   a. **Fatigues in less than an hour**
   b. Cannot use oxygen to make ATP
   c. Myofibrils are small
   d. Has a slow contraction velocity
   e. Has no myoglobin

5. In the figure to the right, the light-stained areas represent:
   a. **Type 1 fibers**
   b. Type 2a fibers
   c. Type 2b fibers

6. (PeerWise) Which of the following is NOT a result of endurance training?
   a. a change from Type 2b to Type 2a muscle fibers
   b. hypertrophy of the heart
   c. a lower resting heart rate
   d. **a decreased amount of mitochondria in the muscle fibers**

7. Which is FALSE about measuring blood pressure?
   a. The first appearance of the sound marks systolic pressure
   b. Pressure in the cuff drops during the reading
   c. **Blood pushing against venous valves causes the sound**
   d. The last appearance of the sound marks diastolic pressure
   e. The cuff should be inflated to a higher pressure when measuring blood pressure in someone with high blood pressure.

8. (PeerWise) In which blood vessel is oxygen exchanged between blood and the body?
   a. Arteries
   b. Venules
c. Arterioles

d. Capillaries

e. Veins

9. Which is the best explanation of why venoconstriction increases cardiac output?
   a. The majority of blood is on the venous side of the circulatory system
   b. Venoconstriction pushes blood through arteries faster
   c. Venoconstriction redirects blood to the heart and away from skeletal muscle
   d. Constriction of valves in veins increases venous return
   e. Cardiac output is defined by venoconstriction and vasoconstriction

   Venoconstriction increases blood flow to heart because so much of blood is “stored” in the stretchy venous side. The veins are a ready reservoir to increase cardiac output by making veins less stretchy. None of the other options are even vaguely true.

10. (PeerWise) Which choice below has the correct order for blood from highest pressure to lowest pressure?
   a. Arterioles, right atrium, capillaries
   b. Arteries, veins, capillaries
   c. Arterioles, arteries, veins
   d. Arterioles, capillaries, veins
   e. Capillaries, veins, arterioles

11. Cardiac output is best considered as a function of:
   a. Heart rate and SA node firing rate
   b. Stroke volume and heart rate
   c. Ventricular pressure and stroke volume
   d. Ventricular pressure and aortic pressure

12. (PeerWise) Which of the following best describes the Frank-Starling Law of the heart?
   a. The Sympathetic NS fires more, which results in an increased stroke volume
   b. A healthy heart can pump out however much blood is put into it
   c. Epinephrine is released by the adrenal gland
   d. Venoconstriction increases venous return
   e. More cardiac output is a result of increased epinephrine

13. (PeerWise) Epinephrine released by the adrenal gland directly _____
   a. increases ventricular contraction
   b. increases end-systolic volume (ESV)
   c. increases skeletal muscle contraction
   d. decreases cardiac output
   e. decreases heart rate

14. Which of the following contributes to the INCREASE of stroke volume?
   a. a reduced EDV
   b. a faster heart rate
   c. sympathetic nerves to ventricular muscle
   d. Epinephrine to SA node
   e. parasympathetic nerves to the SA node
15. (PeerWise) Which of the following is a result of local factors during exercise?
   a. Reduced blood flow to certain organs
   b. Increased vasoconstriction
   c. Dilated arterioles
   d. Increased sympathetic nervous system
   e. Increased venous return

16. (PeerWise) Which of the following is NOT result of exercise hypertrophy of the heart?
   a. Increased end-diastolic volume
   b. Thicker heart muscle
   c. Increased contraction strength
   d. Increased end-systolic volume
   e. Larger heart chamber

17. (PeerWise) A marathon runner would have a __________ resting heart rate and their maximum heart rate will be ________________ compared to a non-runner.
   a. lower; the same
   b. higher; lower
   c. lower; higher
   d. higher; higher
   e. lower; lower

18. (PeerWise) Which is NOT a treatment for coronary artery disease?
   a. Bypass surgery
   b. Stent surgery
   c. Drugs
   d. Exercise and diet
   e. Surgical removal of plaque

19. Atherosclerosis can cause all of the following EXCEPT:
   a. Artery blockage due to ruptured plaque
   b. Stroke
   c. Valve disease
   d. Ischemia
   e. Myocardial infarction

20. What is considered an effective (if expensive) treatment for a cerebral aneurysm to prevent rupture?
   a. Stent
   b. Platinum coil
   c. Blood thinners
   d. Bypass surgery

21. What does a carotid endarterectomy help prevent?
   a. Stroke
   b. Heart attack
   c. Aneurysm
   d. Hypertension
22. The definition of heart failure is:
   a. **Insufficient cardiac output**
   b. Enlarged cardiac muscle
   c. Weakened cardiac muscle
   d. Blockage of blood flow
   e. Widespread edema and shortness of breath

23. Diastolic heart failure is:
   a. Often due to valve regurgitation
   b. A result of weak contractions of the heart
   c. A problem with the heart emptying
   d. **Characterized by a stiff heart**

24. Systolic heart failure is:
   a. A problem with the heart filling
   b. **Often the result of several small heart attacks**
   c. A result of valve stenosis
   d. Characterized by high ventricular pressure

25. A person has an enlarged heart with a reduced stroke volume. Which is the LEAST likely diagnosis?
   a. Diastolic heart failure
   b. Systolic heart failure
   c. Hypertrophic cardiomyopathy
   d. Exercise hypertrophy

26. What does the figure to the right represent?
   a. Systolic heart failure
   b. **Diastolic heart failure**

27. What color is blood?
   a. **Red**
   b. Yellow
   c. Green
   d. Blue
   e. Red or blue, depending on oxygen

28. What valve separates the right atrium from the right ventricle?
   a. Aortic
   b. Pulmonary
   c. **Tricuspid**

29. What type of valve is the arrow pointing to in the figure to the right?
   a. Semilunar
   b. **Atrio-ventricular**
30. During what part of the cardiac cycle are both the AV and semilunar valves closed?
   a. Late diastole
   b. Atrial systole
   c. **Isovolumic ventricular contraction**
   d. Ventricular ejection

31. The first heart sound is associated with:
   a. The AV valves opening
   b. **The AV valves closing**
   c. The semilunar valves opening
   d. The semilunar valves closing

32. During diastole, blood leaks back into the left atrium. This is:
   a. Mitral prolapse
   b. **Mitral regurgitation**
   c. Mitral stenosis
   d. Aortic regurgitation
   e. Aortic stenosis

33. In the diagram to the right, the shaded curve represents a disease state. Which of the following is NOT true of the disease?
   a. The EDV is about 200 ml
   b. The stroke volume is elevated
   c. The maximum ventricular pressure is higher than normal
   d. The lowest ventricular volume is about 50 ml
   e. **The heart is unable to fill with blood**

34. How would a Wiggers diagram show hypertension?
   a. Elevated atrial volume
   b. Elevated atrial and ventricular pressure
   c. **Elevated ventricular and aortic pressure**
   d. Elevated aortic volume

35. Which of the following is not a correct direction for an action potential to travel through the conduction pathways in the heart?
   a. SA node to atrial muscle
   b. AV node to bundle branches
   c. **Purkinje fibers to AV node**
   d. Bundle branches to Purkinje fibers

36. Which of the following does NOT contain myosin for muscle contraction?
   a. Heart muscle cell
   b. Skeletal muscle fiber
   c. **Motor neuron**
37. Which of the following have/has a resting membrane potential?
   a. Neurons only
   b. Muscle cells and neurons only
   c. **Muscle cells, heart cells, and neurons**
   
   Since heart cells conduct action potentials, they must have a resting membrane potential.

38. Which of the following produces ONLY an early QRS wave?
   a. PVCs
   b. Atrial fibrillation
   c. Atrial flutter
   d. AV block
   e. Ventricular fibrillation

39. Which of the following is the correct relationship of events in an action potential in a post-synaptic membrane?
   a. Ligand binds to ligand-gated sodium channel, membrane becomes more negative inside
   b. Voltage-gated potassium channel opens, membrane depolarizes
   c. **Voltage-gated sodium channel opens, membrane becomes more positive inside**
   d. Voltage-gated potassium channel closes, membrane returns to resting potential
   
   Two right answers

40. Afferent neurons:
   a. **Carry sensory information to the brain**
   b. Are part of the autonomic nervous system
   c. Are part of the central nervous system
   d. Are part of the somatic nervous system

41. Control of heart rate is:
   a. **Autonomic**
   b. Somatic

42. If the figure to the right is a neuromuscular junction, the number “4” represents:
   a. The synapse
   b. **A ligand-gated sodium channel**
   c. A sodium-potassium pump
   d. ATP
   e. Myosin

43. Nicotine is an example of an:
   a. **Agonist**
   b. Antagonist

44. The neuromuscular junction is found at the:
   a. Muscle body
   b. Sarcomere
   c. Muscle fascicle
d. Muscle fiber
e. Myofibril

45. Which band contains only actin?
   a. A band
   b. I band
   c. H zone

46. In order for it to function correctly, is important that the sarcoplasmic reticulum be near:
   a. The T tubules and troponin
   b. Mitochondria and microtubules
   c. Sarcolemma and mitochondria
   d. The Z disk and H zone

47. The binding of ATP to myosin causes the myosin to:
   a. Move to the 90° position
   b. Bind to actin
   c. Release actin
   d. Pull on actin

48. Botulinum toxin acts on:
   a. Ach binding at the postsynaptic cell
   b. Ach reuptake in the presynaptic cell
   c. Vesicle binding in the presynaptic cell
   d. Ligand binding in the postsynaptic cell

49. Sarin blocks the binding site of:
   a. Sodium potassium pumps
   b. Acetylcholinesterase
   c. Ligand-gated sodium channels
   d. Myosin

50. Muscle cells have enough creatine phosphate for:
   a. 4 sec of contraction
   b. 1 min of contraction
   c. 20 min of contraction
   d. Over 1 hour of contraction

51. Which of the following best describes aerobic respiration compared to anaerobic respiration?
   a. Fast ATP production but requires oxygen
   b. Produces less ATP but can utilize fats as well as glucose for fuel
   c. Requires oxygen but produces more powerful contractions
   d. Requires mitochondria but produces more ATP

This is the end of the exam.