DIRECTIONS: **Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the <u>ONE</u> that is <u>BEST</u> in each case and blacken the appropriate space on the Scantron sheet.**

1. Which of the following structures is correctly matched with its function?

(A) Sarcoplasmic reticulum – region of muscle cell membrane directly under the axon terminal
(B) Myofilaments – the contractile proteins of muscle
(C) Sarcomere – Ca^{++} storage site inside muscle cell
(D) Troponin – directly covers myosin binding sites
(E) End plate – contains Ca^{++} voltage gated channels

2. Put the following events at the neuromuscular junction in their correct order. Assume that an action potential has been generated on the motor nerve:

1. Acetylcholine is released into the synaptic cleft
2. Na^{+} flows in
3. Acetylcholine binds to receptors on end plate
4. Chemically-gated channels open
5. The axon terminal depolarizes
6. End plat potential is produced
7. Synaptic vesicles fuse to cell membrane
8. Voltage-gated Ca^{2+} channels open

The correct order is:

(A) 6, 5, 8, 7, 1, 3, 4, 2
(B) 5, 8, 7, 1, 3, 6, 4, 2
(C) 5, 8, 7, 1, 3, 4, 2, 6
(D) 3, 4, 2, 6, 5, 8, 7, 1
(E) 7, 1, 3, 4, 2, 6, 5, 8

DIRECTIONS: **Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the ONE that is BEST in each case and blacken the appropriate space on the Scantron sheet.**

3. Which of the following is correct concerning excitation contraction coupling and relaxation?

(A) Ca^{++} binds to tropomyosin
(B) Action potentials travel along the sarcomere
(C) Ca^{++} is stored inside the myofibrils
(D) Troponin pulls tropomyosin off the myosin binding sites
(E) Ca^{++} is pumped into sarcoplasmic reticulum by facilitated diffusion

4. An experimental drug is being tried out on UWO student volunteers. It blocks the release of all Ca^{2+} from the sarcoplasmic reticulum. Which of the following would you expect to see in these volunteers?

(A) There will be a decrease in acetylcholine released from the motor neuron but a muscle contraction will still take place
(B) There will be a smaller endplate potential (EPP) but a muscle contraction will still take place
(C) There will be no sliding of actin over myosin
(D) The power stroke will take place but actin will be unable to release from myosin
(E) ATP will not be able to energize myosin

5. A laboratory experiment was conducted on mice. These mice were given a drug that dilated their blood vessels. As a result,

(A) blood pressure increased in the blood vessels
(B) the resistance to flow increased because the pressure gradient increased
(C) the blood within their vessels experienced a lower resistance to flow
(D) the resistance to blood flow did not changed
(E) the viscosity of the blood increased due to a decrease in blood volume

6. Which of the following is a characteristic of cells in the SA node?

(A) They have the slowest spontaneous generation of action potentials
(B) These cells have a stable resting membrane potential of -60 mV
(C) The lowest membrane potential is -70 mV without any autonomic input
(D) When at rest, the K^+ permeability decreases
(E) These cells are completely impermeable to Na^+ and Ca^{++}

DIRECTIONS: **Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the <u>ONE</u> that is <u>BEST</u> in each case and blacken the appropriate space on the Scantron sheet.**

7. Which of the following events in the heart is correctly matched with its electrocardiograph (ECG) signal?

(A) Repolarization of the atria – T wave
(B) Ventricular relaxation – QRS complex
(C) Atrial systole – P wave
(D) Late ventricular diastole – QRS complex
(E) Closing of the aortic valve – P wave

8. You are monitoring the cardiovascular system of a 20 year old student who is exercising at their **maximum** intensity and acquire the following data:

end diastolic volume	250 ml
cardiac output	43 L/min
systolic pressure	140 mmHg
diastolic pressure	80 mmHg

This student's end systolic volume is

(A) 28 ml
(B) 35 ml
(C) 50 ml
(D) 75 ml
(E) 85 ml

9 Which of the following is correct concerning the aorta and large arteries?

(A) Blood in these vessels moves very slowly
(B) Relative to their diameter, the vessel walls are the thickest of all the blood vessels
(C) The walls of these vessels contain no elastic tissue and mostly smooth muscle that is controlled by the autonomic nervous system (ANS)
(D) There is a very large overall drop in blood pressure through these vessels
(E) These vessels absorb the shock of the blood as it is pumped out of the heart

DIRECTIONS: **Each of the questions or incomplete statements below is followed by five suggested answers or completions. Select the <u>ONE</u> that is <u>BEST</u> in each case and blacken the appropriate space on the Scantron sheet.**

10. You are walking along a nice quiet street when all of a sudden a deep growling sound comes from the bushes right beside you. Which of the following would likely occur?

(A) The slope of the pacemaker potential will increase
(B) More K+ will leak out of the cells in the SA node
(C) Blood vessels in your skeletal muscles will dilate
(D) Stroke volume will decrease
(E) Both A and C are correct

11. A physiology 130 student was given an unknown drug that had the following effects:

i. No change in cardiac output (CO)
ii. Decreased mean arterial pressure (MAP)

Which of the following may be correct concerning this unknown drug?

(A) This drug may have attached to and activated beta receptors in the blood vessels
(B) This drug may be atrial natriuretic factor
(C) This drug may have decreased the slope of the pacemaker potential
(D) This drug may have decreased body temperature
(E) This drug could have increased the influx of Ca^{++} into all cardiac muscle cells

DIRECTIONS: For each of the statements below, ONE or MORE of the completions given is correct. Answer

(A) if only 1, 2 and 3 are correct
(B) if only 1 and 3 are correct
(C) if only 2 and 4 are correct
(D) if only 4 is correct
(E) if ALL are correct

12. Hyperphagia may result from

B
1. increased release of the neurotransmitter (hormone) orexin
2. damage to the ventromedial hypothalamus
3. activation of the lateral hypothalamic nucleus
4. increased release of the hormone leptin

13. Basal ganglia disease may result in

C
1. loss of equilibrium (balance)
2. increased muscle tone
3. lack of coordination in a movement
4. sudden and violent involuntary movements

14. Activation of the right postcentral gyrus of the cerebral cortex is most likely to result in

D
1. increased sense of smell
2. tremor in the right side of the body
3 decreased sexual drive
4. feeling of sensations from the left side of the body

15. Increased tension in the muscle is

C
1. relayed through group II afferent fibers to the spinal cord
2. relayed by 1b sensory fibers to the central nervous system
3. mediated to the central nervous system by 1a afferent fibers
4. detected by Golgi tendon organs

DIRECTIONS SUMMARIZED

A	B	C	D	E
1,2,3	1,3	2,4	4 only	all are correct

16. Activation of gamma motor neurons may result in

D
1. increase tension in muscle fibers
2. decreased sensitivity of the muscle spindle during muscle contraction
3. contraction of the muscle
4. stretching of the muscle spindle

17. The smaller areas of the cerebral cortex are devoted to the representation of

C
1. lips
2. genitalia
3. body areas that have the greatest density of sensory units
4. areas of the body that contain large motor units

18. A patient accidentally takes a drug that results in the rapid degeneration of neurons in the basal ganglia. The clinical symptoms the patient may show:

B
1. athetosis
2. hypotonia
3. resting tremor
4. dysmetria

19. Activation of the supraoptic nucleus of the hypothalamus may result

E
1. in the release of oxytocin
2. from the stimulation of the nipple on the breast
3. in milk let-down
4. in release of vasopressin

20. Parkinson's disease is associated with

D
1. a hyper-excitability of the patient
2. increased Gaba release in the basal ganglia
3. loss of long term memory
4. increased activity of cholinergic neurons in the basal ganglia

DIRECTIONS SUMMARIZED

A	B	C	D	E
1,2,3	**1,3**	**2,4**	**4 only**	**all are correct**

21. A neurological patient that becomes obese as a result of over eating is likely to have

B

1. a tumour that activates the lateral hypothalamic area
2. a tumour that destroys the suprachiasmatic nucleus
3. a tumour that damages the ventromedial hypothalamus
4. decreased release of the transmitter dopamine in the substantia nigra

22. Heat loss mechanisms for the body can be <u>increased</u> by

B

1. decreasing the breakdown of food
2. decreasing sweating
3. increasing blood flow to the skin
4. shivering

23. During the Acting-Myosin-ATP cycle

C

1. ADP is released from myosin before the powerstroke and after Pi (inorganic phosphate) is released
2. When ATP is split it increases the affinity of myosin for actin
3. ATP is split directly after the action potential occurs on the muscle cell and immediately before the powerstroke
4. Attachment of a new molecule of ATP to myosin occurs after the power stroke

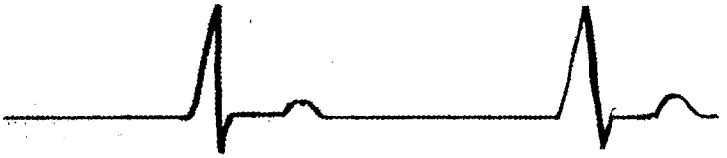
24. You are filling a bucket with water. While doing so, you are holding your arm at a 90° angle at the elbow. As the bucket fills with water, which of the following events will be occurring in the muscle?

A

1. motor unit recruitment
2. high frequency action potentials in the motor nerve
3. summation of twitch contractions
4. shortening of thin myofilaments

DIRECTIONS SUMMARIZED

A	B	C	D	E
1,2,3	1,3	2,4	4 only	all are correct



25. The above diagram shows an abnormal electrocardiogram (ECG) from a patient. Based on this diagram, which of the following may be correct?

B

1. Conduction of the action potential through the atrial muscle is impaired
2. Purkinje fibers are unable to conduct the action potential to the ventricular muscle.
3. This patient will have a lower than normal end diastolic volume
4. The atrioventricular (AV) node is damaged

26. An increase in cardiac output can be achieved by which of the following?

E

1. An increase in sympathetic nervous system activity
2. An increase in stroke volume
3. A decrease in end systolic volume (ESV)
4. contracting and relaxing skeletal muscle

27. Preload

B

1. is directly related to the end diastolic volume
2. is greater if there is the more Ca^{2+} in the cells of the SA node
3. is greater if there is more blood in the ventricle
4. is greater if the parasympathetic nervous system has been activated

DIRECTIONS SUMMARIZED

A	B	C	D	E
1,2,3	**1,3**	**2,4**	**4 only**	**all are correct**

28. While examining the blood flow through a vessel you notice that the flow decreases. Which of the following could have caused this decrease in flow?

A

1. A reflex response to a sudden increase in pressure
2. A decrease in carbon dioxide (CO_2) released by the tissue that the blood vessels is flowing through
3. Angiotensin II
4. Histamine

29. Which of the following will cause a vasodilation of blood vessels?

D

1. Vasopressin (antidiuretic hormone, ADH)
2. Norepinephrine
3. A decrease in adenosine in the blood
4. Epinephrine (adrenaline) acting on Beta receptors

30. The baroreceptor reflex helps to maintain a relatively constant mean arterial pressure (MAP). Which of the following will occur through the baroreceptor reflex in response to an increase in MAP?

E

1. Increased influx of Ca^{++} into contractile cells of the heart
2. Increased release of acetylcholine onto the SA node
3. decreased activity from baroreceptors in the aortic arch and carotid sinuses
4. decreased total peripheral resistance (TPR)

Minitest II
Question Answers

1	B
2	C
3	D
4	C
5	C
6	D
7	C
8	B
9	E
10	E
11	A/B
12	B
13	C
14	D
15	C
16	D
17	C
18	B
19	E
20	D
21	B
22	B
23	C
24	A
25	B
26	E
27	B
28	A
29	D
30	C