**1. Increasing the afterload on a skeletal muscle fiber:**

1. Increases the velocity of shortening
2. Decreases the force produced by the muscle during shortening
3. Decreases the interval between excitation and shortening
4. Increases the amount of shortening
5. None of the above

**2. Release of synaptic transmitter by exocytosis would be blocked most effectively by preventing:**

1. Propagation of the action potential into the nerve terminal membrane
2. Depolarization of the nerve terminal membrane
3. Flow of Ca2+ into the nerve terminal membrane
4. Flow of Na+ into the nerve terminal membrane
5. Flow of K+ out of the nerve terminal membrane

**3. Which of the following causes rigor mortis?**

1. No action potentials in motoneurons
2. An increase in intracellular Ca2+ level
3. A decrease in intracellular Ca2+ level
4. A decrease in adenosine triphosphate (ATP) level
5. An increase in ATP level

**4. Repetitive stimulation of a skeletal muscle fiber will cause an increase in contractile strength because repetitive stimulation causes:**

1. Continuation of cross-bridge cycling
2. An increase in the concentration of calcium in the myoplasm
3. An increase in the magnitude of the end-plate potential
4. An increase in the number of muscle myofibrils generating tension
5. An increase in the velocity of muscle contraction

**5. Muscle fatigue is due to:**

1. Inability of the action potential to spread over the muscle
2. Failure of transmission in the motor nerve
3. Failure of neuro-muscular transmission
4. Depletion of adenosine triphosphate (ATP) stores
5. Failure of re-uptake of Ca2+ into the terminal cisternae

**6. Which one of the following hypothalamic nuclei is responsible for the detection of the core body temperature?**

1. The lateral hypothalamus
2. The arcuate nucleus
3. The posterior nucleus
4. The paraventricular nucleus
5. The anterior hypothalamus

**7. The most significant source of heat in the body is:**

1. Conductive heat loss
2. Cellular respiration
3. Shivering
4. Evaporation
5. Convective heat loss

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**MSS Final Exam in Physiology**

**Second Semester 2010-2011**

**1. The amount of force produced by a skeletal muscle can be increased by:**

1. Increasing extracellular Mg2+
2. Decreasing extracellular Ca2+
3. Increasing the activity of acetylcholine esterase
4. Decreasing the interval between contractions
5. Increasing the preload beyond 2.2 μm

**2. The correct sequence (in time) for events at the neuromuscular junction is:**

1. Action potential in the motor nerve → depolarization of the muscle end-plate → uptake of Ca2+ into the presynaptic nerve terminal
2. Uptake of Ca2+ into the presynaptic terminal → release of acetylcholine (Ach) → depolarization of the muscle end-plate
3. Release of Ach → action potential in the motor nerve → action potential in the muscle
4. Uptake of Ca2+ into the motor end-plate → action potential in the motor end-plate → action potential in the muscle
5. Release of Ach → action potential in the muscle end-plate → action potential in the muscle

**3. Contraction of skeletal muscles:**

1. Is associated with sarcomere shortening when contraction is isometric
2. Produces more work when the muscle contracts isometrically than when the muscle contracts isotonically
3. Depends on external Ca2+
4. Decrease in magnitude when rapid repeated stimulation is applied
5. Does not depend on action potential

**4. The I-band of a skeletal muscle sarcomere is composed of which of the following?**

1. Actin only
2. Myosin only
3. Both actin and myosin
4. One Z-line and myosin
5. None of the above

**5. The function of tropomyosin in skeletal muscle is:**

1. Sliding on actin to produce shortening
2. Releasing Ca2+ after initiation of contraction
3. Binding to myosin during contraction
4. Acting as a relaxing protein at rest by covering the binding sites on actin
5. Entirely different from its function in cardiac muscle

**6. In thermoregulation all of the following are true EXCEPT:**

1. Respiratory heat loss is insignificant under normal conditions
2. Brown fat is an important source of heat production in neonates
3. Shivering is due to impulses conducted via autonomic efferents
4. Peripheral vasodilation increases heat loss
5. Sweating is mediated by sympathetic cholinergic neurones

**7. When a person's hypothalamic thermostat is set to a higher level and the actual body temperature is below that level, the person may \_\_\_\_\_\_\_\_:**

1. Pant
2. Shiver
3. Exhibit vasodilation of skin vessels
4. Perspire heavily
5. Feel sleepy

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**1. The following is true regarding the alpha motoneurone EXCEPT:**

1. Is myelinated
2. Innervates only one skeletal muscle fiber
3. Has its cell body in the ventral horn of the spinal cord
4. Might receive an input directly from afferent fibers in the spinal cord
5. Is always stimulatory in its action

**2. Excitation contraction coupling involves all of the following EXCEPT:**

* + 1. Release of Ca2+ from troponin
    2. Formation of cross bridges between actin and myosin
    3. Spread of depolarization along the transverse tubules
    4. Hydrolysis of ATP to ADP
    5. Increase in the sarcoplasmic Ca2+ concentration

**3. The energy of muscle contraction is derived from all of the following EXCEPT:**

1. ATP and creatin phosphate
2. Muscle glycogen
3. Glucose
4. ADP and cyclic AMP
5. Free fatty acids

**4. For skeletal muscle one would expect an inverse relationship between:**

1. Muscle length and force of contraction
2. Load opposing contraction and velocity of contraction
3. Velocity of contraction and efficiency of contraction
4. Muscle mass and cross-sectional area
5. Rest length and contracted length

**5. Increase in the force of movement of a limb can occur for all of the following EXCEPT:**

1. Recruitment of more motor units
2. Recruitment of additional muscle groups
3. Increased rate of stimulation of muscle fibers
4. Greater muscle action potential duration
5. Muscle hypertrophy

**6. Which of the following is the subconscious physiologic response to hypothermia?**

1. Covering up with a blanket
2. Turning electrical heaters on
3. Drinking warm fluids
4. Increasing physical activity
5. Shivering

**7. Heat stroke is primarily caused by:**

1. Excessive heat production
2. The inability to sweat
3. Conductive heat gain
4. Inability to lose heat by radiation
5. Too much clothing