**Essentials of Anatomy and Physiology, 5e** (Martini/Nath)

**Chapter 7  The Muscular System**

**Multiple-Choice Questions**

1) Which of the following is (are) a function of skeletal muscle?
   A) produce movement
   B) maintain posture
   C) maintain body temperature
   D) A and B only
   E) all of the above

   Answer: E
   Diff: 1
   Learning Outcome: 7.1
   Skill Level: 1 Reviewing Facts and Terms

2) Which of the following statements describes how muscles help maintain homeostasis?
   A) The contractions of skeletal muscles pull on tendons and move elements of the skeleton.
   B) Skeletal muscles are responsible for guarding the openings of the digestive and urinary tracts.
   C) Skeletal muscles are responsible for the pumping action of the heart.
   D) Skeletal muscles support the weight of some internal organs.
   E) Skeletal muscle contractions help maintain body temperature.

   Answer: E
   Diff: 1
   Learning Outcome: 7.1
   Skill Level: 1 Reviewing Facts and Terms

3) Connective tissue that surrounds an entire muscle is called
   A) endomysium.
   B) perimysium.
   C) sarcolemma.
   D) sarcomere.
   E) epimysium.

   Answer: E
   Diff: 1
   Learning Outcome: 7.2
   Skill Level: 1 Reviewing Facts and Terms
4) Muscle fascicles are separated by
A) endomysium.
B) perimysium.
C) epimysium.
D) sarcolemma.
E) periosteum.
Answer: C
Diff: 1
Learning Outcome: 7.2
Skill Level: 1 Reviewing Facts and Terms

5) Myofibrils are made primarily of
A) actin and myosin.
B) epimysium.
C) ATP and ADP.
D) troponin.
E) tropomyosin.
Answer: A
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

6) Skeletal muscle fibers differ from "typical cells" in that these muscle fibers
A) lack a plasma membrane.
B) have many nuclei.
C) are very small.
D) lack mitochondria.
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

7) The advantage of having many nuclei in a skeletal muscle fiber is
A) the ability to contract.
B) the ability to produce more ATP with little oxygen.
C) the ability to repair the fiber after an injury.
D) the ability to produce large amounts of the enzymes and structural proteins needed for contraction.
E) none of the above
Answer: D
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms
8) The skeletal muscles store calcium ions in the
A) sarcolemma.
B) sarcomere.
C) sarcosome.
D) sarcoplasmic reticulum.
E) sarcoplasm.
Answer: D
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

9) The area between Z lines is the
A) sarcolemma.
B) sarcomere.
C) sarcoplasmic reticulum.
D) myofibril.
E) myofilament.
Answer: B
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

10) The center of the sarcomere is the
A) Z line.
B) M line.
C) H band.
D) A band.
E) I band.
Answer: B
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

11) The area of the sarcomere that contains only thick filaments and no zone of overlap is the
A) Z line.
B) M line.
C) H band.
D) A band.
E) I band.
Answer: C
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms
12) The terminal cisternae are parts of the
A) myofilaments.
B) sarcoplasmic reticula.
C) myofibrils.
D) I bands.
E) sarcolemma.
Answer: B
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

13) The tropomyosin molecules are attached to
A) actin molecules.
B) myosin molecules.
C) troponin molecules.
D) ATP molecules.
E) calcium ions.
Answer: C
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

14) The skeletal muscle organelles that actually contracts is (are) the
A) sarcolemma.
B) sarcomere.
C) transverse tubules.
D) myotubules.
E) myofibrils.
Answer: E
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

15) What is the function of the transverse tubule?
A) the storage of calcium ions
B) to transmit muscle impulses to the cell's interior
C) to store sodium ions
D) to allow cross-bridge attachment
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms
16) The striated appearance of skeletal muscle results from
A) transverse tubule pattern.
B) the sarcoplasmic reticulum.
C) cisternae placement.
D) sarcomere arrangement.
E) all of the above
Answer: D
Diff: 2
Learning Outcome: 7.3
Skill Level: 1 Reviewing Facts and Terms

17) Neurotransmitters that cause skeletal muscle contraction are normally stored in
A) myofibrils.
B) motor neuron endings.
C) motor units.
D) motor end plates.
E) actin.
Answer: B
Diff: 1
Learning Outcome: 7.4
Skill Level: 1 Reviewing Facts and Terms

18) The enzyme acetylcholinesterase causes acetylcholine to
A) decompose.
B) synthesize.
C) bond to actin.
D) be secreted.
E) form cross-bridges.
Answer: A
Diff: 1
Learning Outcome: 7.4
Skill Level: 1 Reviewing Facts and Terms

19) At rest, myosin molecules are
A) bound to other myosin molecules.
B) bound to troponin molecules.
C) blocked from binding tropomyosin molecules.
D) bound to ATP molecules.
E) blocked from binding to calcium ions.
Answer: C
Diff: 1
Learning Outcome: 7.4
Skill Level: 1 Reviewing Facts and Terms
20) The ________ contains vesicles filled with acetylcholine.
A) synaptic knob     
B) motor end plate     
C) neuromuscular junction     
D) synaptic cleft     
E) transverse tubule  
Answer: A  
Diff: 1  
Learning Outcome: 7.4  
Skill Level: 1 Reviewing Facts and Terms

21) The specialized sarcolemma that contains acetylcholine receptors is the
A) synaptic knob.  
B) motor end plate.  
C) motor unit.  
D) synaptic cleft.  
E) I band.  
Answer: B  
Diff: 1  
Learning Outcome: 7.4  
Skill Level: 1 Reviewing Facts and Terms

22) In response to action potentials arriving from the transverse tubules, the sarcoplasmic reticulum releases
A) acetylcholine.  
B) sodium ions.  
C) potassium ions.  
D) calcium ions.  
E) all of the above  
Answer: D  
Diff: 1  
Learning Outcome: 7.4  
Skill Level: 1 Reviewing Facts and Terms

23) At the neuromuscular junction, the muscle fiber membrane is folded to form a
A) motor end plate.  
B) motor unit.  
C) neuroreceptor.  
D) neurotransmitter.  
E) motor neuron.  
Answer: A  
Diff: 1  
Learning Outcome: 7.4  
Skill Level: 1 Reviewing Facts and Terms
24) Rigor mortis occurs at death due to a lack of
A) cAMP.
B) DNA.
C) RNA.
D) ATP.
E) tRNA.
Answer: D
Diff: 1
Learning Outcome: 7.4
Skill Level: 1 Reviewing Facts and Terms

25) When a calcium ion binds to troponin,
A) tropomyosin moves out of the groove between the actin molecules.
B) active sites on the myosin are exposed.
C) actin heads will bind to myosin.
D) muscle relaxation occurs.
E) all of the above
Answer: A
Diff: 1
Learning Outcome: 7.4
Skill Level: 2 Reviewing Concepts

26) Rigor mortis that occurs in skeletal muscles a few hours after death is due to
A) excessive ATP and decreased permeability to calcium.
B) decreased ATP and increased permeability to calcium.
C) excessive ATP.
D) lack of oxygen.
E) lactic acid buildup.
Answer: B
Diff: 1
Learning Outcome: 7.4
Skill Level: 2 Reviewing Concepts

27) Which of the following is the smaller amount?
A) the concentration of calcium ions in the sarcoplasm of a resting muscle
B) the concentration of calcium ions in the sarcoplasmic reticulum of a resting muscle
Answer: A
Diff: 1
Learning Outcome: 7.4
Skill Level: 2 Reviewing Concepts
28) Myasthenia gravis is an autoimmune disorder in which antibodies attack acetylcholine receptors. The resulting muscle weakness is likely due to
A) increasing the amount of acetylcholinesterase in the synapse.
B) making the cells less permeable to sodium ions.
C) increasing the amount of potassium ion in the intercellular fluid.
D) making the plasma membranes more permeable to calcium ion.
E) antibodies competing with acetylcholinesterase for acetylcholine.
Answer: B
Diff: 2
Learning Outcome: 7.4
Skill Level: 3 Critical Thinking & Clinical Applications

29) Calcium ions are released from the sarcoplasmic reticulum during the ________ phase of contraction.
A) latent
B) contraction
C) twitch
D) relaxation
E) recovery
Answer: A
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms

30) An example of partial but sustained contraction is
A) treppe.
B) tetany.
C) muscle tone.
D) fatigue.
E) a twitch.
Answer: C
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms

31) The all-or-none response means that
A) all of the muscles in a region contract together.
B) when a muscle fiber contracts, it contracts completely.
C) all of the muscle fibers within a muscle contract together.
D) when a muscle fiber contracts, all of its ATP is converted to ADP.
E) none of the above
Answer: B
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms
32) In a recording of a muscle twitch, the delay between the stimulus and the muscle response is called the
A) refractory period.
B) latent period.
C) contraction period.
D) relaxation period.
E) both B and D
Answer: B
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms

33) The brief moment following stimulation when a muscle is unresponsive to another stimulus is called the
_________ period.
A) latent
B) contraction
C) relaxation
D) refractory
E) both C and D
Answer: D
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms

34) Increasing the frequency of stimulation so that a muscle contracts without relaxation is called
A) tetany.
B) a twitch.
C) relaxation.
D) recovery.
E) recruitment.
Answer: A
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms

35) Which of the following activities would employ isometric contractions?
A) flexing the forearm
B) chewing food
C) standing at attention
D) running
E) writing
Answer: C
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms
36) Contraction during muscle lengthening is called
A) eccentric contraction.
B) concentric contraction.
C) isometric contraction.
D) isotonic contraction.
E) all of the above
Answer: A
Diff: 1
Learning Outcome: 7.5
Skill Level: 1 Reviewing Facts and Terms

37) Which type of scenario is most likely?
A) Small motor units are recruited first.
B) Large motor units are recruited first.
C) Intermediate-sized motor units are recruited first.
D) All motor units are recruited.
E) The brain chooses motor units randomly.
Answer: A
Diff: 1
Learning Outcome: 7.5
Skill Level: 2 Reviewing Concepts

38) Which of the following would have the lowest density of motor units?
A) large muscles of the upper arms
B) postural muscles of the back
C) muscles that control the eye
D) leg muscles
E) the calf muscle
Answer: B
Diff: 2
Learning Outcome: 7.5
Skill Level: 2 Reviewing Concepts

39) Which of the following muscles would contract most quickly against the same load?
A) a muscle receiving 10 action potentials per second
B) a muscle receiving 20 action potentials per second
C) neither, muscles always contract at the same rate
Answer: B
Diff: 2
Learning Outcome: 7.5
 Skill Level: 2 Reviewing Concepts
40) Creatine phosphate serves to
A) cause the decomposition of ATP.
B) supply energy to synthesize ATP.
C) decompose ADP.
D) synthesize ADP.
E) synthesize glucose.
Answer: B
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

41) Decreasing tension in a muscle due to lowering levels of ATP is called
A) muscle fatigue.
B) the conduction of neural information to the muscle fiber.
C) muscle contraction.
D) muscle relaxation.
E) the striped appearance of skeletal muscle.
Answer: A
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

42) The amount of oxygen needed to support the conversion of lactic acid to glycogen is called the
A) oxygen debt.
B) refractory amount.
C) anaerobic threshold.
D) aerobic threshold.
E) aerobic conversion.
Answer: A
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

43) A muscle cramp is most likely due to lack of
A) ATP.
B) ADP.
C) actin.
D) myosin.
E) acetylcholine.
Answer: A
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms
44) Myoglobin stores
A) oxygen.
B) glycogen.
C) ATP.
D) calcium ions.
E) glucose.
Answer: A
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

45) A resting muscle generates most of its ATP by
A) conversion of creatine phosphate.
B) anaerobic respiration.
C) aerobic respiration.
D) the tricarboxylic acid cycle.
E) both C and D
Answer: C
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

46) Glycolysis
A) refers to the process of anaerobic respiration.
B) can replace ATP in binding to myosin molecules during contraction.
C) acts as the only source of ATP in muscle tissue.
D) is only active during strenuous exercise.
E) can usually make enough ATP for skeletal muscle function.
Answer: A
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

47) When myosin cycling generates less tension than the load,
A) an oxygen debt is repaid.
B) fatigue occurs.
C) relaxation occurs.
D) tetany occurs.
E) atrophy occurs.
Answer: C
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms
48) Increased oxygen consumption would accompany
A) increased heat production.
B) increased conversion of lactic acid to glucose.
C) increased aerobic respiration by muscle cells.
D) increased muscle activity.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 7.6
Skill Level: 1 Reviewing Facts and Terms

49) Fast fibers
A) have high resistance to fatigue.
B) have a high concentration of myoglobin.
C) have many mitochondria.
D) contract quickly.
E) all of the above
Answer: D
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms

50) Activities that require anaerobic endurance
A) require maximal contraction of muscles for short periods of time.
B) do not use ATP very quickly.
C) usually do not cause an individual to develop an oxygen debt.
D) do not rely on the energy reserves of creatine phosphate.
E) all of the above
Answer: A
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms

51) During activities requiring aerobic endurance,
A) glycogen and glycolysis are the primary sources of reserve energy.
B) oxygen debts are common.
C) most of the muscle’s energy is produced in mitochondria.
D) fatigue occurs in a few minutes.
E) all of the above
Answer: C
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms
52) Which of the following is true about red muscles?
A) Red muscles are slower than white muscles.
B) Red muscles have fewer mitochondria than white muscles.
C) Red muscles are dominant in a bodybuilder.
D) Red muscles contain less myoglobin than white muscles.
E) Red muscles fatigue quickly.
Answer: A
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms

53) A person whose genetic makeup makes him or her a better marathon runner than a sprinter probably has more ________ in his or her leg muscles.
A) fast fibers
B) intermediate fibers
C) slow fibers
D) dark fibers
E) noncontractile fibers
Answer: C
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms

54) The term used to describe muscular growth in response to usage is
A) multiple sclerosis.
B) muscular dystrophy.
C) atrophy.
D) hypertrophy.
E) myopathy.
Answer: D
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms

55) Because skeletal muscle contractions demand large quantities of ATP, skeletal muscles have
A) a rich nerve supply.
B) a rich vascular supply.
C) very few mitochondria.
D) little need for oxygen.
E) all of the above
Answer: B
Diff: 1
Learning Outcome: 7.7
Skill Level: 1 Reviewing Facts and Terms
56) Multi-unit smooth muscle
A) is composed of sheets of muscle cells.
B) is found in the wall of the stomach.
C) tends to contract rhythmically.
D) is connected by gap junctions.
E) none of the above
Answer: E
Diff: 1
Learning Outcome: 7.8
Skill Level: 1 Reviewing Facts and Terms

57) Compared to skeletal muscle, smooth muscle
A) contracts faster.
B) relaxes faster.
C) contracts and relaxes faster.
D) contracts faster and relaxes more slowly.
E) contracts and relaxes more slowly.
Answer: E
Diff: 1
Learning Outcome: 7.8
Skill Level: 1 Reviewing Facts and Terms

58) Which of the following is characteristic of cardiac muscle?
A) Cardiac muscles are striated.
B) Cardiac muscles achieve tetany with every contraction.
C) Cardiac muscle fibers are multinucleated.
D) Cardiac muscles are faster than skeletal muscles.
E) Neurons that innervate cardiac muscles are under voluntary control.
Answer: A
Diff: 1
Learning Outcome: 7.8
Skill Level: 1 Reviewing Facts and Terms

59) Nonstriated, involuntary muscle is
A) cardiac.
B) red skeletal.
C) smooth.
D) white skeletal.
E) intermediate skeletal.
Answer: C
Diff: 1
Learning Outcome: 7.8
Skill Level: 1 Reviewing Facts and Terms
60) Which of the following can be a stimulus for contraction in all three muscle tissue types?
A) epinephrine  
B) thyroid hormone  
C) testosterone  
D) parathyroid hormone  
E) acetylcholine  
Answer: E  
Diff: 1  
Learning Outcome: 7.8  
Skill Level: 1 Reviewing Facts and Terms

61) The less-movable end of a skeletal muscle is the
A) insertion.  
B) belly.  
C) origin.  
D) proximal end.  
E) distal end.  
Answer: C  
Diff: 1  
Learning Outcome: 7.9  
Skill Level: 1 Reviewing Facts and Terms

62) Which of the following terms is a descriptive word for a muscle's size?
A) levator  
B) extensor  
C) tensor  
D) longissimus  
E) adductor  
Answer: D  
Diff: 1  
Learning Outcome: 7.9  
Skill Level: 1 Reviewing Facts and Terms

63) Muscles whose names contain the root cervi- would be found in the
A) head.  
B) neck.  
C) chest.  
D) abdomen.  
E) groin.  
Answer: B  
Diff: 1  
Learning Outcome: 7.9  
Skill Level: 1 Reviewing Facts and Terms
64) Which of the following muscles is named for its shape?
A) pectoralis major
B) biceps brachii
C) deltoid
D) erector spinae
E) tibialis anterior
Answer: C
Diff: 1
Learning Outcome: 7.9
Skill Level: 1 Reviewing Facts and Terms

65) Which of the following is a muscle of facial expression?
A) masseter
B) buccinator
C) mentalis
D) temporalis
E) medial and lateral pterygoid
Answer: C
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

66) The "kissing muscle" that purses the lips is the
A) zygomaticus.
B) orbicularis oris.
C) buccinator.
D) orbicularis oculi.
E) temporalis.
Answer: B
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

67) The origin of the frontal belly of the occipitofrontalis muscle is the
A) mandible.
B) frontal bone.
C) occipital bone.
D) galea aponeurotica.
E) temporal bone.
Answer: D
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms
68) The muscle that inserts on the coronoid process of the mandible is the
A) temporalis.
B) masseter.
C) lateral pterygoid.
D) medial pterygoid.
E) platysma.
Answer: A
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

69) Which of the following muscles has its insertion on the cartilage of the ribs?
A) internal oblique
B) external intercostals
C) transversus abdominis
D) internal intercostals
E) both A and B
Answer: A
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

70) The muscle that inserts on the superior surface of the pubis around the symphysis is the
A) internal oblique.
B) external oblique.
C) rectus abdominis.
D) transversus abdominis.
E) diaphragm.
Answer: C
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

71) Which of the following describes the action of the trapezius?
A) adducts the arm
B) adducts and flexes the humerus
C) retracts the shoulder and adducts the scapula
D) medial rotation of the humerus
E) lateral rotation of the humerus
Answer: C
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms
72) Which of the following is considered a postural muscle?
A) erector spinae  
B) biceps brachii  
C) triceps brachii  
D) rectus femoris  
E) hamstrings

Answer: A
Diff: 1
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

73) A muscle that inserts on the radial tuberosity is most likely involved in
A) elbow flexion.  
B) elbow extension.  
C) protraction.  
D) pronation.  
E) elbow abduction.

Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

74) Which of the following is a lateral spinal flexor when used unilaterally?
A) iliocostalis group  
B) spinalis group  
C) longissimus group  
D) quadratus lumborum  
E) both A and B

Answer: D
Diff: 2
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms

75) Newborns are most likely to develop which muscles most quickly?
A) the masseter and buccinator  
B) the buccinator and orbicularis oris  
C) the orbicularis oris and risorius  
D) the risorius and zygomaticus  
E) the levator labii and mentalis

Answer: B
Diff: 2
Learning Outcome: 7.10
Skill Level: 1 Reviewing Facts and Terms
76) Muscles that insert into the deltoid tuberosity are most likely to
A) flex the shoulder.
B) extend shoulder.
C) abduct the shoulder.
D) adduct the shoulder.
E) none of the above
Answer: C
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

77) Which of the following inserts into fascia, rather than a bone?
A) extensor carpi ulnaris
B) flexor carpi radialis
C) extensor digitorum
D) palmaris longus
E) flexor digitorum
Answer: D
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

78) The transverse processes of the upper cervical vertebrae are the origin of the
A) levator scapulae.
B) rhomboideus major.
C) subclavius.
D) supraspinatus.
E) pectoralis major.
Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

79) Which of the following is the origin of the pectoralis minor?
A) vertebral border near the spine
B) coracoid process of the scapula
C) mastoid region of the skull
D) occipital bone of the skull
E) upper pairs of ribs
Answer: E
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms
80) Which of the following moves the humerus?
A) pectoralis minor
B) deltoid
C) serratus anterior
D) rhomboideus
E) trapezius
Answer: B
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

81) The muscle that adducts and rotates the scapula laterally is the
A) rhomboideus.
B) levator scapulae.
C) serratus anterior.
D) pectoralis minor.
E) subclavius.
Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

82) The muscle that inserts on the superior angle of the scapula is the
A) serratus anterior.
B) trapezius.
C) sternocleidomastoid.
D) pectoralis minor.
E) levator scapulae.
Answer: E
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

83) Which of the following originates from the sternum?
A) pectoralis major
B) teres major
C) teres minor
D) subscapularis
E) supraspinatus
Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms
84) The minor abductor of the upper arm that works as a synergist is the
A) supraspinatus.
B) subscapularis.
C) deltoid.
D) biceps brachii.
E) teres major.
Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

85) The muscle that adducts and extends the humerus is the
A) coracobrachialis.
B) deltoid.
C) trapezius.
D) latissimus dorsi.
E) triceps brachii.
Answer: D
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

86) The muscle that extends the arm while doing push-ups is the
A) deltoid.
B) pectoralis major.
C) brachialis.
D) triceps brachii.
E) biceps brachii.
Answer: D
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

87) Which of the following is the origin of the pronator teres?
A) olecranon process of the ulna
B) infraglenoid tuberosity of the scapula
C) lateral epicondyle of the humerus
D) medial epicondyle of the humerus
E) base of the second metacarpal
Answer: D
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms
88) Which of the following is a synergist for elbow flexion?
A) brachioradialis
B) triceps brachii
C) pronator quadratus
D) biceps brachii
E) latissimus dorsi
Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

89) The muscle that inserts on the iliotibial tract and gluteal tuberosity of the femur is the
A) gracilis.
B) sartorius.
C) rectus femoris.
D) gluteus medius.
E) gluteus maximus.
Answer: E
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

90) The muscle that originates along the entire length of the linea aspera of the femur is the
A) vastus lateralis.
B) vastus medialis.
C) iliacus.
D) rectus femoris.
E) biceps femoris.
Answer: B
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms

91) The muscle directly deep to the gastrocnemius is the
A) peroneus.
B) extensor digitorum.
C) soleus.
D) tibialis posterior.
E) tibialis anterior.
Answer: C
Diff: 1
Learning Outcome: 7.11
Skill Level: 1 Reviewing Facts and Terms
92) The muscle that dorsiflexes the foot is the 
A) tibialis anterior.  
B) tibialis posterior.  
C) soleus.  
D) peroneus.  
E) gastrocnemius.  
Answer: A 
Diff: 1  
Learning Outcome: 7.11 
Skill Level: 1 Reviewing Facts and Terms

93) The rotator cuff refers to muscles surrounding the 
A) pelvic girdle.  
B) pectoral girdle.  
Answer: B 
Diff: 1  
Learning Outcome: 7.11 
Skill Level: 1 Reviewing Facts and Terms

94) Which of the following muscles contracts when grasping an object in the hand? 
A) palmaris longus  
B) flexor digitorum  
C) extensor carpi radialis  
D) pronator teres  
E) supinator  
Answer: B 
Diff: 1  
Learning Outcome: 7.11 
Skill Level: 1 Reviewing Facts and Terms

95) Muscles comprising the quadriceps group include the 
A) rectus femoris, vastus intermedius, vastus lateralis, and vastus medialis.  
B) rectus femoris, tibialis anterior, soleus, and adductor longus.  
C) peroneus, gastrocnemius, vastus intermedius, and rectus femoris.  
D) iliopsoas, gracilis, adductor magnus, biceps femoris, and gracilis.  
E) semitendinosus, biceps femoris, rectus femoris, and vastus medialis.  
Answer: A 
Diff: 1  
Learning Outcome: 7.11 
Skill Level: 1 Reviewing Facts and Terms
96) Tom is having difficulty dorsiflexing and evertting his right foot. Which muscle(s) is/are most likely involved in this problem?
A) tibialis anterior
B) soleus
C) gastrocnemius
D) flexor digitorum
E) both B and C
Answer: A
Diff: 1
Learning Outcome: 7.11
Skill Level: 2 Reviewing Concepts

97) In addition to the number and type of muscle fibers in a muscle, peak athletic performance requires
A) a good blood supply and system of blood delivery.
B) a well-developed respiratory system.
C) the coordination of the nervous system.
D) good supplies of nutrients.
E) all of the above
Answer: E
Diff: 1
Learning Outcome: 7.13
Skill Level: 1 Reviewing Facts and Terms

98) Which of the following is an muscular adaptation as a result of exercise?
A) Muscle fibers become smaller in diameter.
B) Muscles become less elastic.
C) Muscles fatigue more rapidly.
D) Muscle fibers increase their reserves of glycogen.
E) Muscle fibers become less efficient.
Answer: D
Diff: 1
Learning Outcome: 7.13
Skill Level: 1 Reviewing Facts and Terms
Fill in the Blank Questions

1) A sheath of connective tissue surrounding a bundle of striated muscle fibers is called ________________.
   Answer: perimysium  
   Diff: 1  
   Learning Outcome: 7.2  
   Skill Level: 1 Reviewing Facts and Terms

2) A sheath surrounding each skeletal muscle fiber is called _________________________. 
   Answer: endomysium  
   Diff: 1  
   Learning Outcome: 7.2  
   Skill Level: 1 Reviewing Facts and Terms

3) The protein ________________________ works with myosin and is responsible for muscle contraction and relaxation.  
   Answer: actin  
   Diff: 1  
   Learning Outcome: 7.3  
   Skill Level: 1 Reviewing Facts and Terms

4) A muscle ________________________ contains a sarcolemma, sarcoplasm, filaments, and myofibrils.  
   Answer: fiber  
   Diff: 1  
   Learning Outcome: 7.3  
   Skill Level: 1 Reviewing Facts and Terms

Matching Questions

1) Match the muscle in the first column with its action in the second column. 
   _____ 1. rectus femoris     A. dorsiflexion  
   _____ 2. adductor magnus    B. extends leg  
   _____ 3. biceps femoris     C. plantar flexion  
   _____ 4. gastrocnemius      D. adducts thigh  
   _____ 5. tibialis anterior   E. flexes leg  
   Answer: 1-B, 2-D, 3-E, 4-C, 5-A  
   Diff: 2  
   Learning Outcome: 7.11  
   Skill Level: 1 Reviewing Facts and Terms
Essay Questions

1) Mary wants to enter a marathon and consults you as to what type of muscle fibers she needs to develop and how she should go about it. What would you suggest to her?
Answer: Marathons require aerobic endurance. Mary would want to develop her slow fibers for long-term endurance. She would achieve this by engaging in activities that involve long-term mild to moderately intense workouts involving mostly leg and postural muscles, such as jogging, biking, swimming, and core exercises. Repeated long-term stimulation will help the slow fibers develop more mitochondria and a higher concentration of aerobic enzymes as well as slightly increase the size and strength of the muscles (hypertrophy).
Diff: 2
Learning Outcome: 7.7
Skill Level: 3 Critical Thinking & Clinical Applications

2) While unloading her trunk, Amy pulls a muscle and as a result has difficulty moving her arm. The doctor in the emergency room tells her that she pulled her latissimus dorsi. Amy tells you that she thought the latissimus dorsi was a back muscle and doesn't understand what that has to do with her arm. What would you tell her?
Answer: Although the latissimus is located across the back, it inserts on the humerus, the large bone of the upper arm. When the muscle contracts, it contributes to extension, adduction, and medial rotation of the humerus. All of these arm movements would be in part impaired if the muscle were damaged.
Diff: 1
Learning Outcome: 7.11
Skill Level: 3 Critical Thinking & Clinical Applications
Using the figure above, identify the labeled part.

1) Label A: ________
   Answer: T tubules
   Diff: 1
   Learning Outcome: 7.3
   Skill Level: 1 Reviewing Facts and Terms

2) Label B: ________
   Answer: Cisterna
   Diff: 1
   Learning Outcome: 7.3
   Skill Level: 1 Reviewing Facts and Terms

3) Label C: ________
   Answer: Sarcoplasmic reticulum
   Diff: 1
   Learning Outcome: 7.3
   Skill Level: 1 Reviewing Facts and Terms

4) Label D: ________
   Answer: Triad
   Diff: 1
   Learning Outcome: 7.3
   Skill Level: 1 Reviewing Facts and Terms

5) Label E: ________
   Answer: Sarcolemma
   Diff: 1
   Learning Outcome: 7.3
   Skill Level: 1 Reviewing Facts and Terms
6) Label F: ________  
Answer: Mitochondria  
Diff: 1  
Learning Outcome: 7.3  
Skill Level: 1 Reviewing Facts and Terms  

7) Label G: ________  
Answer: Thick filament  
Diff: 1  
Learning Outcome: 7.3  
Skill Level: 1 Reviewing Facts and Terms  

8) Label H: ________  
Answer: Thin filament  
Diff: 1  
Learning Outcome: 7.3  
Skill Level: 1 Reviewing Facts and Terms  

9) Label I: ________  
Answer: Myofilaments  
Diff: 1  
Learning Outcome: 7.3  
Skill Level: 1 Reviewing Facts and Terms  

10) Label J: ________  
Answer: Myofibril  
Diff: 1  
Learning Outcome: 7.3  
Skill Level: 1 Reviewing Facts and Terms