

Islip Science Olympiad – Anatomy – December 12, 2015

Integumentary, Skeletal and Muscular System.

TEAM NAME:: _____ TEAM Numer: _____

MULTIPLE CHOICE. Choose the one alternative that best completes the statement or answers the question.

- 1) Which of the following structures constitutes part of the axial skeleton? 1) _____
 - A) leg bones
 - B) pelvic girdle
 - C) skull
 - D) hand and foot bones
 - E) shoulder girdle

- 2) Which of the following attaches the forelimbs to the axial skeleton in a human? 2) _____
 - A) pelvis
 - B) pelvic girdle
 - C) vertebra
 - D) shoulder girdle
 - E) appendicular skeleton

- 3) The contacting surfaces of a moving joint, such as your hip joint, consist of 3) _____
 - A) fibrous connective tissue.
 - B) compact bone.
 - C) spongy bone.
 - D) collagen.
 - E) cartilage.

- 4) Which part of a bone contains mostly stored fat? 4) _____
 - A) red bone marrow
 - B) yellow bone marrow
 - C) fibrous connective tissue
 - D) spongy bone
 - E) cartilage

- 5) Which part of a bone contains the cells that produce blood cells? 5) _____
 - A) spongy bone
 - B) yellow bone marrow
 - C) compact bone
 - D) cartilage
 - E) fibrous connective tissue

- 6) Bone is composed of 6) _____
 - A) channels containing lymphoid tissue.
 - B) hardened cartilage.
 - C) living cells.
 - D) a hard composite of phosphate and sodium ions.
 - E) compartments for transporting nutrients.

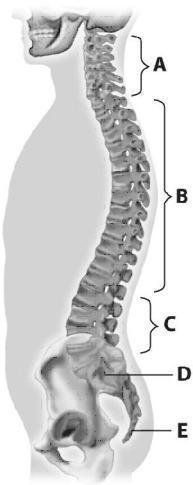
- 7) To repair and heal a broken bone, physicians will 7) _____
A) graft new bone to the region.
B) prescribe a regime of bed rest and calcium supplements.
C) return the broken bone parts to their natural position and then immobilize them.
D) inject calcium into the region of the broken bone.
E) exercise the area of the broken bone.
- 8) Osteoporosis is characterized by 8) _____
A) structural deterioration of bone tissue.
B) hairline cracks in long bones, such as the femur.
C) good bone health.
D) lack of vitamin E in bone tissue.
E) low phosphate levels in bone.
- 9) Osteoporosis is emerging as a health concern for 9) _____
A) postmenopausal women.
B) women in their 20s and 30s.
C) men and younger people in general.
D) teenage men.
E) men over the age of 65.
- 10) The shoulder joint where the humerus meets the shoulder girdle is an example of 10) _____
A) a pivot joint.
B) a hinge joint.
C) a fixed joint.
D) a ball-and-socket joint.
E) a sliding joint.
- 11) If you lay your forearm along the table, you can rotate it so that your hand changes from a palm-down to a palm-up position. This is possible because your radius and ulna join at a 11) _____
A) suture joint.
B) twist joint.
C) ball-and-socket joint.
D) pivot joint.
E) hinge joint.
- 12) Muscles are connected to bones by 12) _____
A) tendons.
B) other muscles.
C) myofibrils.
D) Sharpey's fibers.
E) ligaments.
- 13) Skeletal muscles 13) _____
A) contain deposits of calcium phosphate.
B) push on bones to make them move.
C) are found in and around internal organs.
D) work in antagonistic pairs.
E) get longer when they contract.

- 14) Which of the following statements about skeletal muscle fibers is *true*? 14) _____
- A) Each muscle fiber is composed of globular proteins.
 - B) Each muscle fiber contains one sarcomere.
 - C) Each muscle fiber is composed of multinucleated cells.
 - D) Each muscle fiber is a bundle of sarcomeres.
 - E) Each muscle fiber contains actin and myosin.
- 15) Functionally, the muscle fiber's fundamental unit of contraction is the 15) _____
- A) thick filament.
 - B) thin filament.
 - C) Z line.
 - D) sarcomere.
 - E) myofibril.
- 16) Structurally, a sarcomere is 16) _____
- A) an array of Z units.
 - B) an array of myofibrils.
 - C) the region between two Z lines.
 - D) the region between a thick filament and the next thin filament.
 - E) the region between two thick filaments.
- 17) A thick filament consists of 17) _____
- A) myosin and regulatory filaments.
 - B) actin and myosin.
 - C) actin and regulatory proteins.
 - D) actin.
 - E) myosin.
- 18) Which of the following options lists muscle components in the correct order from smallest to largest? 18) _____
- A) sarcomeres, myofibrils, muscle fibers, muscle
 - B) muscle, sarcomeres, myofibrils, muscle fibers
 - C) muscle, sarcomeres, muscle fibers, myofibrils
 - D) myofibrils, muscle, sarcomeres, muscle fibers
 - E) sarcomeres, myofibrils, muscle, muscle fibers
- 19) According to the sliding filament model of muscle contraction, a sarcomere contracts when its 19) _____
- A) thick filaments slide across its Z lines.
 - B) thick filaments shorten, pulling the opposed sets of thin filaments past each other.
 - C) thin filaments slide toward each other across its thick filaments.
 - D) thick filaments slide toward each other across its thin filaments.
 - E) thin filaments slide across its Z lines.
- 20) Changes occur within a sarcomere during muscle contraction. One change is that the 20) _____
- A) thick filaments move closer together.
 - B) thin filaments get thicker.
 - C) thick filaments get thicker.
 - D) Z lines move closer to the plasma membrane.
 - E) Z lines move closer together.

- 21) During muscle contraction, 21) _____
A) only the thin filaments shorten.
B) only the thick filaments shorten.
C) only the sarcomere shortens.
D) both the thick and thin filaments shorten.
E) both the thick filaments and the sarcomere shorten.
- 22) Which of the following statements best describes the molecular basis of muscle shortening? 22) _____
A) Individual filamentous proteins contract.
B) Individual filamentous proteins shorten by coiling.
C) Protein filaments crawl along other protein filaments.
D) Rod-shaped protein polymers shorten by losing subunits from their ends.
E) Rod-shaped, gel-like proteins contract by dehydrating.
- 23) The sequence of events that cause a muscle to contract can be summed up in the correct order as 23) _____
A) detach, pull, extend, contract.
B) pull, contract, detach, recoil.
C) detach, extend, contract, attach.
D) detach, extend, attach, pull.
E) recoil, detach, extend, pull.
- 24) The neurotransmitter found at the synapse between nerves and human skeletal muscle cells is 24) _____
A) dopamine.
B) epinephrine.
C) serotonin.
D) acetylcholine.
E) glutamate.
- 25) A motor unit is 25) _____
A) a motor neuron and all of the muscle fibers it controls.
B) one of the connective tissue-wrapped bundles of muscle fibers in a muscle.
C) the muscle or group of muscles that accomplishes a specific movement.
D) the bundle of axons that goes from the spinal cord to a muscle.
E) a bundle of axons and all of the muscle fibers they control.
- 26) Which of the following statements regarding exercise is *true*? 26) _____
A) Aerobic exercise decreases the size and number of muscle mitochondria.
B) Muscles are strengthened when their supply of ATP does not keep up with demand.
C) Aerobic exercise decreases the efficiency and fatigue resistance of muscles.
D) Anaerobic exercise supplies only a fraction of the ATP obtainable through aerobic exercise.
E) World-class athletes usually focus on aerobic and not anaerobic exercise.
- 27) Muscles that are constantly active, such as those maintaining our body posture, have a high proportion of 27) _____
A) slow, fatigue-susceptible fibers.
B) fast, fatigue-resistant fibers.
C) slow, fatigue-resistant fibers.
D) fast, fatigue-susceptible fibers.
E) both slow and fast fatigue-resistant fibers.

28)

28) _____



Which part of this figure depicts the thoracic vertebrae?

A) part A

B) part B

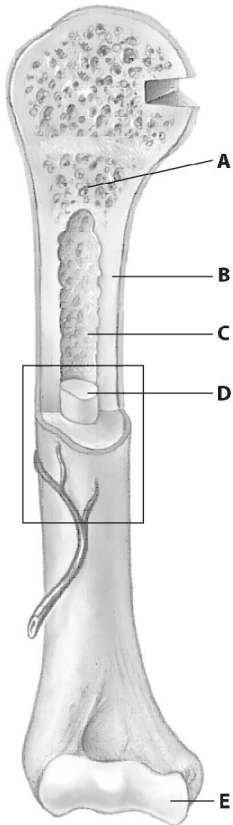
C) part C

D) part D

E) part E

29)

29) _____



Which part of this figure depicting a bone shows spongy bone tissue?

A) part A

B) part B

C) part C

D) part D

E) part E

- 34) The hair follicle is indicated by _____. 34) _____
 A) Label A B) Label B C) Label C
 D) Label D E) Label E F) Label F
- 35) The layer responsible for whorled ridges on the epidermal surfaces is indicated by _____. 35) _____
 A) Label A B) Label B C) Label C
 D) Label D E) Label E F) Label F
- 36) The arrector pili muscle is represented by _____. 36) _____
 A) Label A B) Label B C) Label C
 D) Label D E) Label E F) Label F
- 37) The gland that produces a mixture of oily substances and fragmented cells is indicated by _____. 37) _____
 A) Label A B) Label B C) Label C
 D) Label D E) Label E F) Label F
- 38) The gland that produces sweat is indicated by _____. 38) _____
 A) Label A B) Label B C) Label C
 D) Label D E) Label E F) Label F
- 39) The type of burn that involves injury to the epidermis and the upper region of the dermis and is red, blistered, and painful is termed as a _____-degree burn. 39) _____
 A) fourth B) first C) second D) third
- 40) Hair color is due to a pigment known as _____. 40) _____
 A) hemoglobin B) carotene C) melanin D) keratin
- 41) The most important minerals stored in bones are _____. 41) _____
 A) calcium and potassium
 B) sodium and phosphorus
 C) sodium and potassium
 D) calcium and phosphorus
 E) calcium and iron

42)

42) _____

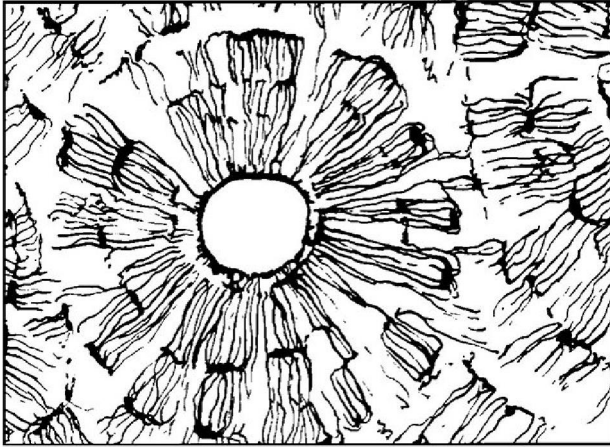


Figure 5.3

The arrangement of bone tissue shown in Figure 5.3 consists of _____.

- A) neurons
 - B) red marrow
 - C) yellow marrow
 - D) trabeculae
 - E) osteons (Haversian systems)
- 43) The small cavities in bone tissue where osteocytes are found are called _____.
- A) lamellae
 - B) central (Haversian) canals
 - C) lacunae
 - D) trabeculae
 - E) perforating (Volkmann's) canals
- 44) What kind of tissue is the forerunner of long bones in the embryo?
- A) loose fibrous connective tissue
 - B) fibrocartilage
 - C) hyaline cartilage
 - D) elastic connective tissue
 - E) dense fibrous connective tissue
- 45) Identify the bones that do NOT house a paranasal sinus _____.
- A) maxillary bones
 - B) frontal bones
 - C) zygomatic bones
 - D) ethmoid bones
 - E) sphenoid bones
- 46) Which of these bones is associated with the hand?
- A) calcaneus
 - B) talus
 - C) metatarsals
 - D) tarsals
 - E) metacarpals

- 47) Cross bridges are created when myosin heads bind to _____. 47) _____
A) thick filaments
B) sarcoplasmic reticula
C) thin filaments
D) sarcomeres
E) myosin filaments
- 48) The least movable point of muscle attachment to a bone is termed its _____. 48) _____
A) action
B) function
C) insertion
D) bone marking
E) origin
- 49) Which of these muscles is a synergist to masseter? 49) _____
A) sternocleidomastoid
B) temporalis
C) buccinator
D) trapezius
E) orbicularis oris
- 50) What is the main function of the quadriceps group? 50) _____
A) hand supination
B) foot inversion
C) arm flexion
D) thigh abduction
E) knee extension
- 51) Which muscle is an antagonist to gastrocnemius? 51) _____
A) fibularis brevis
B) soleus
C) sartorius
D) tibialis anterior
E) fibularis longus
- 52) Which one of the following muscles is involved in abduction of the arm at the shoulder joint? 52) _____
A) pectoralis major
B) deltoid
C) latissimus dorsi
D) biceps brachii
E) triceps brachii
- 53) What condition results if muscles are not used, such as when immobilized in a cast for healing a broken bone? 53) _____
A) lordosis
B) spina bifida
C) scoliosis
D) atrophy
E) hypertrophy

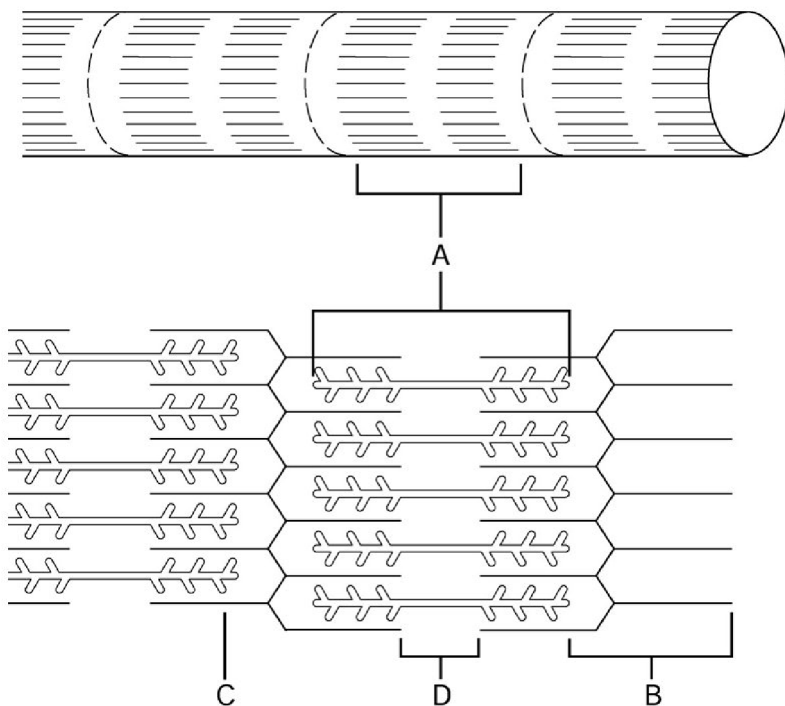


Figure 6.1

Using Figure 6.1, match the following:

- 54) The I band within a skeletal muscle fiber is indicated by _____. 54) _____
 A) Label A B) Label B C) Label C D) Label D
- 55) The A band within a skeletal muscle fiber is indicated by _____. 55) _____
 A) Label A B) Label B C) Label C D) Label D
- 56) The H zone, located within the A band, lacks thin filaments and is represented by _____. 56) _____
 A) Label A B) Label B C) Label C D) Label D
- 57) Which of the following statements best describes the power stroke of muscle contraction? 57) _____
 A) The myosin head bends, pulling the thick filament toward the center of the sarcomere.
 B) The actin head bends, pulling the thick filament toward the center of the sarcomere.
 C) The myosin head bends, pulling the thin filament toward the center of the sarcomere.
 D) The myosin head bends, pushing the thick filament toward the center of the sarcomere.
 E) The actin head bends, pulling the thin filament toward the center of the sarcomere.
- 58) The hyoid bone is unique because it _____. 58) _____
 A) belongs to both the axial and appendicular skeletons
 B) is an irregular bone
 C) has no specific function
 D) is the only bone of the body that does not directly articulate with any other bone
 E) largely consists of cartilage
- 59) How many true ribs do humans have? 59) _____
 A) fifteen B) seven C) twelve D) three E) five

60) What feature is uniquely associated with cervical vertebrae?

60) _____

- A) spinous processes
- B) transverse foramina
- C) pedicles
- D) transverse processes
- E) vertebral foramina