

Unit 12: Human Skeletal and Muscular Systems

Multiple Choice Questions

MULTIPLE CHOICE QUESTIONS (EXERCISE)

1. Which structures are part of the appendicular skeleton?
 - (a) Ethmoid bone
 - (b) Floating ribs
 - (c) Lumbar vertebrae
 - (d) Humerus bone

2. The term muscle fibre or myofibre refers to;
 - (a) A cellular organelle
 - (b) A cell
 - (c) A tissue
 - (d) An organ

3. Which of these extends the entire length of a muscle fibre?
 - (a) Sarcomere
 - (b) Myofibril
 - (c) Myosin filament
 - (d) Actin filament

4. **Actin filaments are made of proteins;**
 - (a) Myosin and troponin
 - (b) Actin and troponin
 - (c) Actin and myosin
 - (d) Actin, tropomyosin and troponin
5. **In a muscle, the Z-line are the proteins for the attachment of the ends of;**
 - (a) Actin filaments
 - (b) Myosin filaments
 - (c) Both actin and myosin filaments
 - (d) Sarcomeres
6. **Sarcomere is a part between;**
 - (a) Two H-lines
 - (b) Two A-bands
 - (c) Two Z-lines
 - (d) Two I-bands
7. **Which part of muscle fibre releases calcium ions which trigger contraction?**
 - (a) Sarcolemma
 - (b) Sarcoplasm
 - (c) T-tubules
 - (d) Sarcoplasmic reticulum
8. **Which statement is correct to describe sliding filament model of muscle contraction?**
 - (a) Myosin filaments pull on the sarcomere so that actin filaments are shortened
 - (b) Myosin filaments pull on actin filaments so that sarcomere is shortened
 - (c) Actin filaments pull on myosin filaments so that sarcomere is shortened.
 - (d) Actin filaments pull on sarcomere so that myosin filaments are shortened.
9. **When a muscle fibre shortens, which of the following also shortens?**
 - (a) Actin filament
 - (b) Myosin filament
 - (c) Sarcomere
 - (d) Z-line
10. **Which statement correctly describes an event of muscle contraction?**
 - (a) Myosin heads bind to troponin.
 - (b) ATP binds to the actin binding site.
 - (c) ATP is used to detach the myosin head from actin.
 - (d) Troponin blocks the binding sites.
11. **Tendons connect bone and;**
 - (a) Bone
 - (b) Ligaments
 - (c) Muscle
 - (d) Cartilage
12. **What is true about antagonistic pair of muscles?**
 - (a) It provides a backup if one of the muscles is injured
 - (b) One muscle pushes while other pulls
 - (c) It allows muscles to produce opposing movements
 - (d) It doubles the strength of contraction

SLO BASED MULTIPLE CHOICE QUESTIONS

Bone and Cartilage

13. **The broad ends of a bone are called:**
 - (a) Epiphysis
 - (b) Diaphysis
 - (c) Metaphysis
 - (d) Paraphysis
14. **The middle part of long bone along the length is called:**
 - (a) Diaphysis
 - (b) Shaft
 - (c) Epiphysis
 - (d) Both (a) & (b)
15. **A dense layer of vascular connective tissue enveloping the bones except at the surface of the joints is called:**
 - (a) Periosteum
 - (b) Fascia
 - (c) Fasciculus
 - (d) Pericardium
16. **The thick layer under the periosteum; made up of hard material, osteocytes, collagen is called:**
 - (a) Spongy bone
 - (b) Compact bone
 - (c) Callus
 - (d) All of above
17. **The basic structural units of compact bone are called:**
 - (a) Neural canal
 - (b) Haversian canal
 - (c) Haversian system
 - (d) Lacuna
18. **The concentric layers of mineralized extra cellular matrix that contains collagen fibres & needle shaped**

crystals of calcium phosphate is:

- (a) Lacunae (b) Haversian canal
 - (c) Lamellae (d) Canaliculi
19. The concentric layers of lamellae surround a central canal are called:
- (a) Medullary canal
 - (b) Haversian canal
 - (c) Lacunae
 - (d) Periosteum
20. Red marrow is found in:
- (a) Ends of long bones
 - (b) Ribs
 - (c) Pelvis and sternum
 - (d) All of above
21. Yellow marrow:
- (a) Fills the shafts of long bones
 - (b) Consists mostly of fat cells
 - (c) Serves as an energy reserve
 - (d) All of above
22. Which of the following is incorrect about yellow marrow?
- (a) Produces WBCs
 - (b) Can be converted into red marrow
 - (c) It is energy reserve
 - (d) It is present in shaft of long bones
23. The body mass formed by bones is:
- (a) 80%
 - (b) Less than 20%
 - (c) Greater than 30%
 - (d) 59%
24. The type of bone cells which secrete unmineralized ground substances are:
- (a) Osteocytes (b) Osteoblasts
 - (c) Osteoclast
 - (d) Osteoprogenitor cells
25. The bone cells which maintain healthy bone tissue by secreting enzymes and bone mineral content, also regulate calcium release from bones are:
- (a) Osteocytes (b) Osteoblasts
 - (c) Fibroblasts (d) Osteoclasts
26. The cells of bones which are

important to the growth and repair of bone are:

- (a) Osteogenic cells (b) Stem cells
 - (c) Osteoblasts (d) Osteoclasts
27. Identify the cell:
- (a) Osteoblast
 - (b) Osteoclast
 - (c) Mature bone cell
 - (d) Stem cell
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28. The process of formation of bone is called:
- (a) Ossification (b) Remodelling
 - (c) Osteoporosis (d) Osteogenesis
29. The step of osteogenesis by which cartilage is replaced by bone by the deposition of minerals is called:
- (a) Ossification (b) Crystallization
 - (c) Petrification (d) Osteoporosis
30. Layer of connective tissue that surrounds the cartilage having blood vessels and nerves is called:
- (a) Periosteum (b) Perichondrium
 - (c) Piliiferous layer (d) Peritoneum
31. The cells that make the cartilage matter are:
- (a) Lacunae (b) Osteocytes
 - (c) Chondrocytes (d) Oligodendrocytes
32. The type of cartilage which is found in areas of the body that experience high stress and tension is:
- (a) Fibro cartilage
 - (b) Hyaline cartilage
 - (c) Elastic cartilage
 - (d) Both (b) and (c)
33. The most abundant and the most common type of cartilage is:
- (a) Fibro cartilage
 - (b) Hyaline cartilage
 - (c) Elastic cartilage
 - (d) All of the above
34. Which of the following is found in epiglottis?
- (a) Elastic cartilage
 - (b) Hyaline cartilage
 - (c) Fibro cartilage (d) Annulus fibrosus

35. Having limited repair-ability, no direct blood vessels/supply, the most likely it is:

- (a) Liver (b) Cartilage
(c) Bone (d) Adipose tissue

Skeleton

36. The adult human skeletal system consists of ___ bones.

- (a) 22 (b) 80
(c) 365 (d) 206

37. Which of the following is NOT the part of axial skeleton?

- (a) Skull (b) Spine
(c) Sternum (d) Patella

38. All of the following belongs to brain box (except):

- (a) Vomer (b) Frontal bone
(c) Ethmoid (d) Sphenoid bone

39. Inferior nasal concha belongs to:

- (a) Maxilla (b) Brain box
(c) Facial structure (d) Rib cage

40. The number of paired and unpaired facial bones are:

- (a) 2,4 (b) 6,2
(c) 2,6 (d) 4,2

41. Pick the odd one:

- (a) Nasal (b) Lacrimal
(c) Maxilla (d) Vomer

42. Small single bone, which lies at the base of skull below tongue, does not articulate with any other bone is:

- (a) Stapes (b) Atlas
(c) Hyoid (d) Sternum

43. Which of the following shows the correct sequence of vertebrae?

- (a) Cervical, thoracic, lumbar, pelvic
(b) Lumbar, cervical, pelvic, cervical
(c) Thoracic, pelvic, lumbar, cervical
(d) Pelvic, cervical, lumbar, thoracic

44. The 8th, 9th and 10th pairs of ribs are attached to the sternum by means of:

- (a) Common costal cartilage
(b) Articular cartilage

(c) Meniscus cartilage

(d) Fibro cartilage

45. Clavicle articulates with:

- (a) Sternum, scapula
(b) Vertebrae, ribs
(c) Pelvic girdle
(d) Tibia, fibula

46. Long bone, having spherical head, which fits into glenoid cavity is:

- (a) Femur (b) Tibia
(c) Ischium (d) Humerus

47. The total number of phalanges in an adult is:

- (a) 14 (b) 26
(c) 28 (d) 56

Joints

48. The type of joint in which bones are directly connected to each other by collagen are called:

- (a) Saddle joints
(b) Fibrous joints
(c) Pivot joints
(d) Cartilaginous joint

49. Sutures occur between:

- (a) Moveable bones of skull
(b) Tibia and fibula
(c) Teeth and their sockets
(d) Immovable bones of skull

50. Which of the following is an example of cartilaginous joints?

- (a) Pubic symphysis (b) Sutures
(c) Hip joint (d) Shoulder joint

51. The most common type of joints in the human body are:

- (a) Fibrous joints
(b) Synovial joints
(c) Cartilaginous joints
(d) All of above

52. The joint which allow movement in two planes, one bone having concave surface, other having convex surface is:

- (a) Gliding joint (b) Pivot joint
(c) Saddle joint (d) Hinge joint

53. Rotational movement around single axis is the characteristic of:

- (a) Pivot joint
- (b) Ball and socket joint
- (c) Fibrous joint
- (d) Synovial joint

54. The procedure in which a healthy joint from a donor is transplanted to replace the damaged joint, is called:

- (a) Total joint replacement
- (b) Particle joint replacement
- (c) Allograft transplantation
- (d) Chondrocyte implantation

55. The human vertebral column has a distinctive _____ curve.

- (a) C-shaped
- (b) S-shaped
- (c) Y-shaped
- (d) H-shaped

Disorders of Skeletal System

56. Which problems can arise due to improper posture?

- (a) Vertebral misalignment
- (b) Joint strain
- (c) Muscle imbalances
- (d) All of above

57. What will be your probable diagnosis if a patient present to you with pain, numbness, tingling in affected area, bowel and bladder dysfunction?

- (a) Spondylosis
- (b) Arthritis
- (c) Herniated disc
- (d) Sciatica

58. Choose the incorrect statement about disc slip.

- (a) May be caused due to trauma
- (b) May be caused due to vertebral misalignment
- (c) Degenerative changes due to aging
- (d) Result of autoimmune disorder

59. The most common cause of spondylosis is:

- (a) Natural degeneration of intervertebral discs
- (b) Aging
- (c) Genetic factors
- (d) Trauma

60. A female presented to you with pain in lower back, buttocks & legs. She has difficulty in moving the legs. What is your possible diagnosis?

- (a) Rheumatoid arthritis
- (b) Spondylosis
- (c) Sciatica
- (d) Disc-slip

61. The most common type of arthritis is:

- (a) Osteoarthritis
- (b) Rheumatoid arthritis
- (c) Gout
- (d) Ankylosing arthritis

62. An autoimmune synovial disorder in which synovial membrane becomes inflamed, most commonly wrist and hands, is:

- (a) Carpal tunnel syndrome
- (b) Spondylosis
- (c) Rheumatoid arthritis
- (d) Gout

63. A male of 63 years comes to Dr. Asif (Orthopedic physician), complains of severe pain in the 1st tarsometatarsal joint. His blood reports show high levels of uric acid. What will be most likely the disorders he is suffering from?

- (a) Gouty arthritis
- (b) Osteoarthritis
- (c) Hypophosphatemic rickets
- (d) Osteoporosis

64. A condition characterized by weakened bones, bone density decreased, is most likely:

- (a) Osteodystrophy
- (b) Osteoporosis
- (c) Osteoarthritis
- (d) Spondylosis

65. Which of the following class of drugs may cause osteoporosis?

- (a) Tetracyclines
- (b) NSAID
- (c) Corticosteroids
- (d) Vit. D supplements

66. Dislocated joint can only be successfully corrected by a:

- (a) Pulmonologist
- (b) Rheumatologist
- (c) Physiotherapist
- (d) Pathologist

67. An injury to the ligament is called as:

- (a) Strain (b) Sprain
(c) Stress (d) Twist

68. An injury to tendon is called:

- (a) Strain (b) Sprain
(c) Tendonitis (d) Wrick

69. The first aid treatment for joint dislocation and sprain includes:

- (a) Immobilize the affected area
(b) Apply ice and elevate affected limb
(c) Call for emergency medical service
(d) All of above

Muscles

70. The study of muscles is called:

- (a) Mycology (b) Myology
(c) Algology (d) Phycology

71. Which of the following tissue has the ability to contract in a coordinated way to produce movements?

- (a) Adipose tissue (b) Nervous tissue
(c) Muscle tissue (d) Connective tissue

72. The individual cells of the muscles are called:

- (a) Myofibers (b) Muscle fibres
(c) Myocytes (d) All of above

73. The tissue responsible for providing the force that pushes substances, such as blood and food through the body is:

- (a) Nervous tissue (b) Muscle tissue
(c) Adipose tissue (d) Connective tissue

74. Regularly striped, cylindrical, voluntary control are the key features of:

- (a) Cardiomyocytes (b) Skeletal muscles
(c) Smooth muscles (d) Ciliary muscles

75. Un-stripped, spindle shaped, one nucleus per cell are the characteristics

of:

- (a) Cardiac muscle (b) Smooth muscle
(c) Skeletal muscle
(d) Voluntary muscles

76. The commonality between skeletal muscles and cardiac muscles is:

- (a) Strips/striations
(b) One nucleus/cell
(c) Voluntary control
(d) Movement of skeleton

77. The similarity between smooth and cardiac muscles is:

- (a) Both are evolved at the same time
(b) Both are involuntary
(c) Both are striped
(d) Both are cylindrical shape

78. The collagen fibres and connective tissue which attach the muscle to bone are:

- (a) Ligaments (b) Fascia
(c) Chords (d) Tendons

79. Sarcolemma is

- (a) Cytoplasm of skeletal muscle fibre
(b) Endoplasmic reticulum of muscle fibre
(c) Plasma membrane of myocyte
(d) Sarcomere

80. Each muscle fibre contains elongated thread like structures called myofibrils.

- (a) 2 to 4 (b) 4 to 10
(c) 15 to 20 (d) 4 to 20

81. The thick myofilaments create:

- (a) I-band (b) Z-band
(c) A-band (d) H-band

82. The thin active filaments are attached to protein discs called:

- (a) M-line (b) Z-line
(c) H-Zone (d) A-band

- 83. The smallest unit of muscle contraction is called:**
 (a) Sarcomere
 (b) Sarcoplasmic reticulum
 (c) Sarcoplasm
 (d) I-band
- 84. The correct summary of structural organization of a skeletal muscles are**
 (a) Muscle fibres → myofibril → myofilaments
 (b) Myofibril → muscle fibre → myofilaments
 (c) Myofilaments, myocyte, microfilaments
 (d) Both (b) & (c)
- 85. There are ____ types of myofilaments**
 (a) 2 (b) 18
 (c) 100 (d) 25
- 86. The thin filaments overlap with thick filaments which creates**
 (a) I-band (b) H-band
 (c) A-band (d) Z-line
- 87. The dark line in the center of H-band is called:**
 (a) I-line (b) Z-line
 (c) M-line (d) both (a) & (b)
- 88. Thick myofilaments are about ____ in diameter:**
 (a) 7-8nm (b) 14 μm
 (c) 16 nm (d) 1-2 μm
- 89. Thin myofilaments are about ____ in diameter:**
 (a) 100 μm (b) 1-2 μm
 (c) 16 nm (d) 7-8 nm
- 90. The protein strand which wrap about active core and stiffen it, is**
 (a) Myosin (b) Troponin
 (c) Tropomyosin (d) G-protein
- 91. Twisted strand of pearls is the characteristic of:**
 (a) Myosin (b) Actin
 (c) Troponin (d) Tropomyosin
- 92. When a nerve impulse reaches sarcolemma ____ is released by motor neuron at synapse.**
 (a) Ca^{++} (b) Acetylcholine
 (c) ATP (d) Dopamine
- 93. Sliding filaments model explains**
 (a) Composition of muscle fibre
 (b) Physiology of muscle contraction
 (c) Stiffening of muscles after death
 (d) Levels of organizations of muscles
- 94. The 2nd step of sliding filament model is:**
 (a) Sarcomeres at relaxed state
 (b) Arrival of nerve impulse
 (c) Cross bridges and power stroke
 (d) Separation of myosin heads
- 95. When a muscle contracts, what does not happen?**
 (a) Sarcomere shortens
 (b) Z-lines move apart
 (c) H-zone disappears
 (d) A-bands came closer
- 96. The stiffening of muscles after death is called:**
 (a) Myasthenia gravis
 (b) Rigor mortis
 (c) Muscle fatigue (d) Tetany
- 97. The end of skeletal muscle which is attached to stationary bone during contraction is:**
 (a) Origin (b) Insertion
 (c) Belly (d) Ligament
- 98. The muscle which bends the bone at joint during contraction is:**
 (a) Flexor (b) Extensor
 (c) Medial rotator (d) Pronator
- 99. Flexion or bending of lower leg is done by.**
 (a) Quadriceps femoris (b) Biceps
 (c) Gastrocnemius (d) Hamstrings
- 100. The hamstring muscle originates at:**
 (a) Pelvic girdle and top of femur
 (b) Pectoral girdle and biceps tendon
 (c) Pelvic girdle and lower femur
 (d) Patella
- 101. The extensors of lower leg are**
 (a) Hamstrings (b) Quadriceps

- (c) Rectus femoris (d) Gluteus
102. Decline in muscle performance after prolonged or intense physical activity with pain, decreased muscle strength and reduced endurance indicates.
- (a) Cramps (b) Tetany
(c) Muscle fatigue (d) Tetanus
103. Sudden, involuntary painful tetanic contraction of muscle or group of muscles most commonly in feet and legs, occurs in:
- (a) Myositis (b) Cramps
(c) Sciatica (d) Tetanus
104. Involuntary muscle contractions or spasm due to increased muscle tone and hyperexcitability of the nerves

characterize:

- (a) Tetany (b) Tetanus
(c) Cramps (d) Epilepsy
105. The most common cause of tetany is:
- (a) Hypercalcemia (b) Hypokalemia
(c) Hypocalcemia (d) Hyperoxalemia
106. Pick the disease which is potentially life-threatening and more serious.
- (a) Tetany (b) Sciatica
(c) Ischemia of lower limb
(d) Tetanus
107. In human skeleton, joints serve as _ and bones act as _.
- (a) Fulcrums, rods (b) Rods, load
(c) Fulcrums, load (d) Rods and lever

ANSWER KEY

1.	d	2.	b	3.	b	4.	d	5.	a	6.	c	7.	d	8.	b
9.	c	10.	c	11.	c	12.	c	13.	a	14.	d	15.	a	16.	b
17.	c	18.	c	19.	b	20.	d	21.	d	22.	d	23.	b	24.	b
25.	a	26.	d	27.	c	28.	d	29.	a	30.	b	31.	c	32.	a
33.	b	34.	a	35.	b	36.	d	37.	d	38.	a	39.	c	40.	b
41.	d	42.	c	43.	c	44.	a	45.	a	46.	d	47.	d	48.	b
49.	d	50.	a	51.	b	52.	c	53.	a	54.	c	55.	b	56.	d
57.	c	58.	d	59.	a	60.	c	61.	a	62.	c	63.	a	64.	b
65.	c	66.	c	67.	b	68.	a	69.	d	70.	b	71.	c	72.	d
73.	b	74.	b	75.	b	76.	a	77.	b	78.	d	79.	c	80.	d
81.	c	82.	b	83.	a	84.	a	85.	a	86.	c	87.	c	88.	c
89.	d	90.	c	91.	b	92.	b	93.	b	94.	b	95.	b	96.	b
97.	a	98.	a	99.	d	100.	a	101.	b	102.	c	103.	b	104.	a
105.	c	106.	d	107.	a										