Locomotion and Movement

Chapter 20

FACT/DEFINITION TYPE QUESTIONS

1. The macrophages in human body exhibit
(a) ciliary movement
(b) amoeboid movement
(c) no movement
(d) movement with the blood flow only

2. Striated muscle fibres are found in
(a) urinary bladder (b) lungs
(c) gall bladder (d) leg muscles

3. Smooth muscle is
(a) found in walls of heart only.
(b) found in the walls of all the hollow organs except heart.
(c) attached to the bones only.
(d) found only in the walls of alimentary canal.

4. Cardiac muscles are different from that of skeletal muscles as the former are
(a) striated but involuntary.
(b) non striated and involuntary.
(c) smooth or unstriated.
(d) voluntary in action.

5. Striations in the striated muscles are due to
(a) absence of myofilaments.
(b) presence of myofilaments.
(c) specialized arrangement of myofilaments.
(d) projections of myosin.

6. Which set clearly identify striated muscles?
(a) Cylindrical, Syncytial and Unbranched
(b) Spindle, Unbranched and Uninucleated
(c) Cylindrical, Striped and Nucleated
(d) Cylindrical, Striped and Branched

7. Actin protein occurs in which of the following two forms ?
(a) Polymeric F- actin and monomeric G- actin
(b) Monomeric F- actin and polymeric G-actin
(c) The tail and a head
(d) F-actin and G- actin, but both globular.

8. Anisotropic band is
(a) thick and dark (b) thin and dark
(c) thick and light (d) thin and light

9. A-band of the myofibril contains
(a) only thick filaments
(b) only thin filaments
(c) both thick and thin filaments
(d) no filaments

10. Troponin
(a) produces sliding movement of microtubules
(b) contains globular head
(c) binding to Ca^{+2} produces skeletal muscle contraction.
(d) covers the active site of actin.

11. During muscle contraction in humans the
(a) actin filaments shorten.
(b) sarcomere does not shorten.
(c) A-band remain same.
(d) A, H and I bands shorten.

12. A sarcomere is best described as a
(a) movable structural unit within a myofibril bounded by H zones.
(b) fixed structural unit within a myofibril bounded by Z lines.
(c) fixed structural unit within a myofibril bounded by A bands.
(d) movable structural unit within a myofibril bounded by Z lines.

13. Which muscle protein acts as ATPase?
(a) Actin (b) Troponin
(c) Myosin (d) Tropomyosin

14. During resting stage the binding site of actin for myosin remains masked by
(a) troponin (b) G-actin
(c) tropomyosin (d) meromyosin

15. Which of the following is the store house of calcium in muscles?
(a) Sarcosome
(b) Sarcoplasmic reticulum
(c) Creatine phosphate
(d) Sarcomere

16. Red muscle fibres are rich in
(a) golgi bodies (b) mitochondria
(c) lysosomes (d) ribosomes

17. During fatigue
(a) muscles cannot relax.
(b) muscles fail to be stimulated.
(c) blood supply to muscles stops.
(d) nerve supply to muscles become inactive.

18. The axon terminals of a nerve cell and the sarcolemma of a skeletal muscle cell join at the_____
(a) motor unit (b) synaptic cleft
(c) action potential (d) neuromuscular junction

19. In mammals the lower jaw is made of
(a) maxilla (b) dentary
(c) mandible (d) ethmoid

20. Hyoid bone is located
(a) at the top of the buccal cavity.
(b) at the floor of the buccal cavity.
(c) in front of the skull.
(d) behind the skull.

21. Which of the following is a single U shaped bone, present at the base of the buccal cavity and it is also included in the skull?
(a) Hyoid (b) Malleus
(c) Sacrum (d) Scapula

22. Which of the following is not part of axial skeleton?
(a) Sacrum (b) Sternum
(c) Mandible (d) Humerus

23. The vertebral formula of human adult is
(a) $C_7T_{12}L_5S_5Cd_1$ (b) $C_7T_{12}L_5S_5Cd_5$
(c) $C_7T_{12}L_5S_5Cd_4$ (d) $C_7T_{12}L_5S_4Cd_4$

24. Part of the body having a single pair of bones is called
(a) pelvic girdle (b) external ear
(c) wrist (d) lower jaw

25. Which of the following vertebrae are fused?
(a) Cervical (b) Sacral
(c) Lumber (d) Thoracic

26. Glenoid cavity is found in
(a) pelvic girdle (b) skull
(c) pectoral girdle (d) sternum

27. Function of long bones in adult mammals is to provide
(a) support only.
(b) support and produce RBCs only.
(c) support and produce WBCs only.
(d) support and produce RBCs and WBCs.

28. Number of floating ribs in human body is
(a) two pairs (b) three pairs
(c) five pairs (d) six pairs

29. A cup shaped cavity for articulation of femur head is
(a) acetabulum (b) glenoid cavity
(c) sigmoid notch (d) obturator foramen

30. Elbow joint is an example of
(a) hinge joint
(b) gliding joint
(c) ball and socket joint
(d) pivot joint

31. In humans, coccyx is formed by the fusion of
(a) 3 vertebra (b) 4 vertebra
(c) 5 vertebra (d) 6 vertebra

32. An example of gliding joint is
(a) humerus and glenoid cavity
(b) femur and tibio-fibula
(c) occipital condyle and odontoid process
(d) zygapophyses of adjacent vertebrae

33. Identify the joint between sternum and the ribs in humans.
(a) Fibrous joint (b) Gliding joint
(c) Cartilaginous joint (d) Angular joint

34. The joint in our neck which allows us to rotate our head left to right is
(a) pivot joint (b) hinge joint
(c) saddle joint (d) ellipsoid joint

35. Accumulation of uric acid crystals in the synovial joint causes
(a) rheumatoidal arthritis
(b) gout
(c) osteoarthritis
(d) muscular dystrophy

36. Which of the following is an autoimmune disorder ?
(a) Myasthenia gravis
(b) Osteoporosis
(c) Muscular dystrophy
(d) Gout

STATEMENT TYPE QUESTIONS

37. Which of the following statement is incorrect ?
(a) All movements lead to locomotion.
(b) Ciliary movement help in passage of ova through female reproductive tract.
(c) Microfilaments are involved in amoeboid movement.
(d) In *Paramecium*, the cilia help in movement of food through cytopharynx and in locomotion as well.

38. Which of the following is not the feature of red muscle fibres?
(a) They have plenty of mitochondria.
(b) They have high content of myoglobin.
(c) They have high amount of sarcoplasmic reticulum.
(d) They are called aerobic muscles.

39. What is not true about human skull?
(a) It is dicondylic.
(b) It includes 6 ear ossicles.
(c) It includes 14 facial bones.
(d) Hyoid is not included in skull bones.

40. Which of the following statement is correct?
(a) All striated muscles are voluntary.
(b) Visceral muscles are faintly striated.
(c) Cardiac muscles are not striated.
(d) All non-striated muscles are involuntary.

41. Read the following statements (A to D) and select the one option that contains both correct statements.
A. Z-line is present in the centre of the light band.
B. Thin filaments are firmly attached to the M-line.
C. The central part of thick filaments, not overlapped by thin filaments is called Z-band.
D. Light band contains only thin filaments.
(a) A and D (b) B and C
(c) A and C (d) B and D

42. During muscle contraction.
(a) chemical energy is changed to electrical energy.
(b) mechanical energy is changed to chemical energy.
(c) chemical energy is changed to physical energy.
(d) chemical energy is changed to mechanical energy.

43. Contractile tissues have the following features.
(i) They are mesodermal in origin.
(ii) They contain stretch receptors.
(iii) Rhythmic contractions are seen in them.
(iv) They do not fatigue during the life of the animal.
Which of the above are characteristics of sphincters?
(a) Only (i), (iii) and (iv)
(b) Only (i), (ii) and (iii)
(c) Only (i), (ii) and (iv)
(d) All of these

44. Which one of the following is the correct description of certain part of a normal human skeleton?
(a) Parietal bone and the temporal bone of the skull are joined by fibrous joint.
(b) First vertebra is axis which articulates with the occipital condyles.
(c) The 9^{th} and 10^{th} pairs of ribs are called the floating ribs.
(d) Glenoid cavity is a depression to which the thigh bone articulates.

45. Select the correct statement regarding the specific disorder of muscular or skeletal system.
(a) Myasthenia gravis – Autoimmune disorder which inhibits sliding of myosin filaments.
(b) Gout – Inflammation of joints due to extra deposition of calcium.
(c) Muscular dystrophy – Age related shortening of muscles.
(d) Osteoporosis – Decrease in bone mass and higher chances of fractures with advancing age.

46. Select the correct statement with respect to locomotion in humans.
(a) Accumulation of uric acid crystals in joints causes their inflammation.
(b) The vertebral column has 10 thoracic vertebrae.
(c) The joint between adjacent vertebrae is a fibrous joint.
(d) The decreased level of progesterone causes osteoporosis in old people.

47. Which of the following statements is/are correct?
(i) During muscle contraction, isotropic band gets elongated.
(ii). Acetylcholine is released when the neural signal reaches the motor end plate.
(iii) Muscle contraction is initiated by the signal sent by CNS *via* a sensory neuron.
(iv) Repeated activation of muscle can lead to lactic acid accumulation.
(a) (i) and (iii) (b) (ii) and (iv)
(c) (i), (ii) and (iii) (d) (ii), (iii) and (iv)

48. According to the sliding filament theory of muscle contraction,
(a) actin binds ATP and breaks it apart as actin pulls against myosin.
(b) calcium ions are released from myosin as the filaments slide by.
(c) the thick and thin filaments do not change length during this process.
(d) all of the above

49. Read the following 4-statements (i – iv) and accordingly mark the option that has both correct statements.
(i) Cardiac fibres are branched with one or more nuclei.
(ii) Smooth muscles are unbranched and cylindrical.
(iii) Striated muscles can be branched or unbranched.
(iv) Involuntary muscles are non-striated.
(a) (i) and (iv) (b) (ii) and (iii)
(c) (iii) and (iv) (d) (i) and (iii)

ASSERTION/REASON TYPE QUESTIONS

In the following questions, a statement of Assertion is followed by a statement of Reason.
(a) If both Assertion and Reason are true and the Reason is the correct explanation of the Assertion.
(b) If both Assertion and Reason are true but the Reason is not the correct explanation of the Assertion.
(c) If Assertion is true but Reason is false.
(d) If both Assertion and Reason are false.

50. **Assertion-:** Knee joint is an example of hinge joint.
Reason : Femur, patella and fibula are associated with knee joint.

51. **Assertion :** The phase of muscle contraction occurs when myosin binds and releases actin.
Reason : Muscle contraction is initiated by a signal sent by the peripheral nervous system via a motor neuron.

52. **Assertion :** Recurrent activation of the muscles will become fatigue.
Reason : Anaerobic breakdown of glycogen in the muscles can lead to the accumulation of lactic acid.

53. **Assertion :** Inflammation of a skeletal joint may immobilize the movements of the joint.
Reason : Uric acid crystals in the joint cavity and ossification of articular cartilage lead to this.

54. **Assertion :** Ball and socket joints are the most mobile joints.
Reason : Synovial fluid is present here.

55. **Assertion :** Arthritis or inflammation of a joint makes the joint painful.
Reason : Some toxic substances are deposited at the joint.

MATCHING TYPE QUESTIONS

56. Three of the following pairs of the human skeletal parts are correctly matched with their respective inclusive skeletal category and one pair is not matched. Identify the non-matching pair.

	Pairs of skeletal parts		**Category**
(a)	Sternum and ribs	–	Axial skeleton
(b)	Clavicle and glenoid	–	Pelvic girdle cavity
(c)	Humerus and ulna	–	Appendicular skeleton
(d)	Malleus and stapes	–	Ear ossicles

57. Which of the following pair shows the correct characteristics with an example of a synovial joint in humans?

	Characteristics		**Examples**
(a)	Fluid filled between two joints, provides cushion	–	Skull bones
(b)	Fluid filled synovial cavity between two bones	–	Joint between atlas and axis
(c)	Lymph filled between two bones, limited movement	–	Gliding joint between carpals
(d)	Fluid cartilage between two bones, limited movements	–	Knee joint

58. Which of the following pairs of joints and its location is correctly matched?

(a)	Hinge joint	–	Between vertebrae
(b)	Gliding joint	–	Between zygapophyses of the successive vertebrae
(c)	Cartilaginous joint	–	Skull bones
(d)	Fibrous joint	–	Between phalanges

59. Which of the following human skeletal parts are correctly matched with their respective category?

	Pairs of skeletal parts		**Category**
A.	Humerus and ulna	–	Appendicular skeleton
B.	Malleus and stapes	–	Ear ossicles
C.	Sternum and ribs	–	Axial skeleton
D.	Clavicle and glenoid cavity	–	Pelvic girdle

(a) A and B only (b) A, B and C only
(c) A, B, and D only (d) All of the above

60. Match column I (types of synovial joints) with column II (bones involved) and choose the correct option.

	Column I (Type of synovial joint)		**Column II (Bone involved)**
A.	Ball and Socket joint	I.	Carpal and metacarpal of thumb
B.	Hinge joint	II.	Humerus and pectoral girdle
C.	Pivot joint	III.	Knee
D.	Saddle joint	IV.	Atlas and axis

(a) A – I; B – II; C – III; D – IV
(b) A – II; B – III; C – IV; D – I
(c) A – III; B – I; C – IV; D – II
(d) A – IV; B – III; C – II; D – I

61. Which of the following option shows the correctly matched bones (given in column I) with its pair (given in column II)?

	Column-I		**Column-II**
A.	Carpals	I.	Bones that form the fingers and toes
B.	Tarsals	II.	Bones that form wrist
C.	Phalanges	III.	Bones that form the palms of the hands
D.	Metatarsals	IV.	Bones that form the ankles

(a) A – II, B – IV, C – I, D – III
(b) A – I, B – II, C – III, D – IV
(c) A – III, B – II, C – IV, D – I
(d) A – IV, B – I, C – III, D – II

62. Which of the following functional characteristics of muscle is correctly matched with its appropriate descriptive term?

I. Elasticity- Ability of a muscle fibre to recoil and resume its resting length after being stretched.
II. Excitability- Ability to respond to any change in the environment (inside or outside the body)
III. Extensibility- Ability to be stretched
IV. Contractility- Ability to shorten forcibly when adequately stimulated

(a) I and III only (b) II and IV only
(c) I, II, and III only (d) All of these

63. Match the name of bone given in column I with their numbers given in column II.

	Column-I	**Column-II**
A.	Thoracic	I. 8
B.	Wrist bones	II. 2 pairs
C.	False ribs	III. 12
D.	Metatarsal	IV. 3 pairs

E. Skull (cranial & facial) V. 26
VI. 5
VII. 22

	A	B	C	D	E
(a)	I	VI	II	V	III
(b)	III	I	IV	VI	VII
(c)	I	VII	III	V	II
(d)	II	V	VII	I	IV

64. Match the column I with column II and select the correct option.

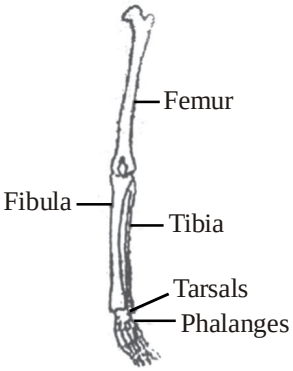
	Column-I		**Column-II**
A.	Striated appearance of myofibril	I.	Distribution pattern of actin and myosin
B.	Store house of calcium ions	II.	Sarcoplasmic reticulum
C.	Energy released from ATP hydrolysis	III.	Helps myosin head to bind to exposed active sites on actin to form a cross bridge
D.	Globular head of meromyosin	IV.	Active ATPase enzyme and has binding sites for ATP and active sites for actin.

	A	B	C	D
(a)	I	II	III	IV
(b)	III	I	IV	II
(c)	II	I	III	IV
(d)	III	IV	II	I

65. Which of the following match is incorrect?
(a) 8^{th}, 9^{th} and 10^{th} pairs of ribs - do not articulate directly with the sternum but join the sixth rib with the help of hyaline cartilage.
(b) Glenoid cavity - articulates with the head of the humerus to form the shoulder joint.
(c) Fibrous joint - flat skull bones which fuse end-to-end with the help of dense fibrous connective tissues in the form of sutures, to form the cranium.
(d) Increase in Ca^{++} level - leads to the binding of calcium with a subunit of troponin on actin filaments and thereby remove the masking of active sites for myosin.

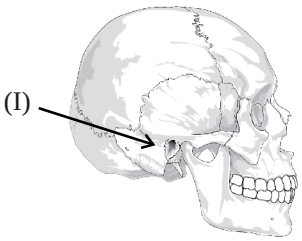
DIAGRAM TYPE QUESTIONS

66. Given below is a diagram of the bones of the left human hindlimb as seen from the front. It has certain mistakes in labelling. Identify the two bones which are not correctly labelled.

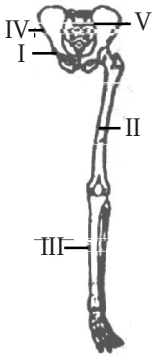


(a) Tibia and Tarsals
(b) Femur and Fibula
(c) Fibula and Phalanges
(d) Tarsals and Femur

67. In the given diagram of skull, what does "I" represent?
(a) Frontal bone (b) Temporal bone
(c) Occipital bone (d) Parietal bone

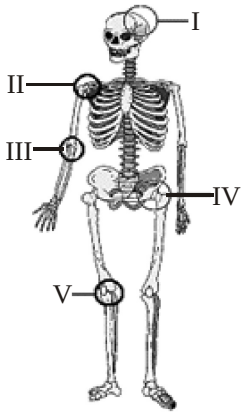


68. The diagram given below shows the pelvic girdle and lower limb.



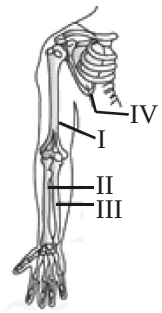
Parts labelled as 'I', 'II', 'III', 'IV' and 'V' respectively indicate
(a) Ilium, Femur, Tibia, Pubis and Sacrum
(b) Pubis, Tibia, Femur, Ilium and Sacrum
(c) Ilium, Femur, Tibia, Pubis and Sacrum
(d) Pubis, Femur, Tibia, Ilium and Sacrum

69. The given diagram of human skeleton system shows types of ball and socket joint. Identify the joints which are marked as I, II, III, IV and V



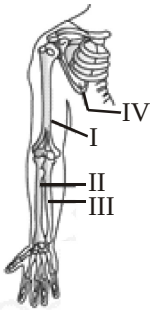
(a) I and II (b) II and IV
(c) III and IV (d) IV and V

70. The given diagram represents the bones of human arm. Identify the bones marked as I, II, III & IV.



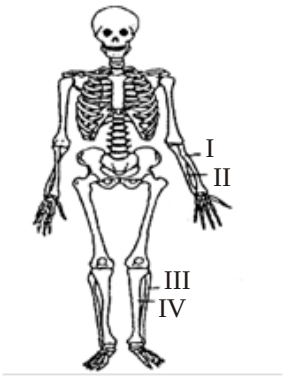
	I	II	III	IV
(a)	Clavicle	Ulna	Radius	Humerus
(b)	Humerus	Radius	Ulna	Scapula
(c)	Scapula	Radius	Ulna	Clavicle
(d)	Humerus	Ulna	Radius	Scapula

71. Which two bones in the given figure form a hinge joint?



(a) I and II (b) I and III
(c) I and IV (d) II and III

72. The given diagram shows a human skeleton. Which of the following correctly identifies the bones marked as I, II, III & IV?

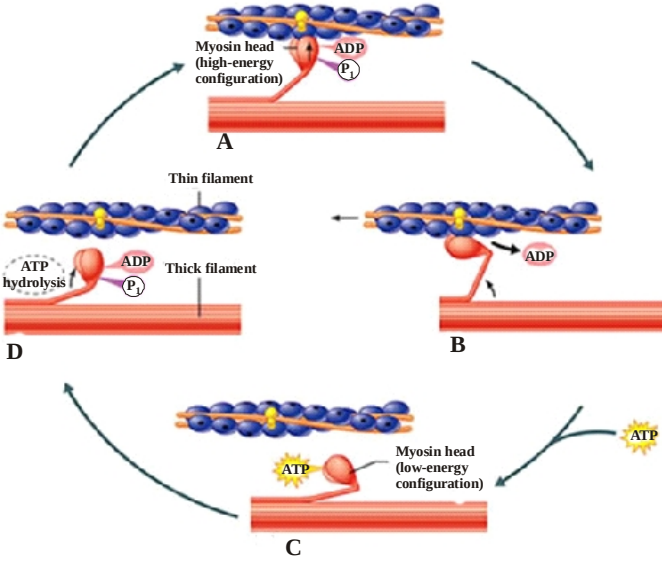


	I	II	III	IV
(a)	Tibia	Fibula	Radius	Ulna
(b)	Radius	Ulna	Tibia	Fibula
(c)	Ulna	Radius	Tibia	Fibula
(d)	Fibula	Tibia	Radius	Ulna

73. The label X in the given figure of an act in filament represents

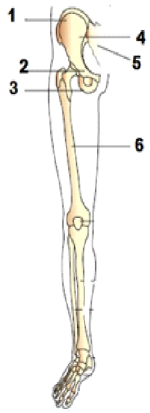
(a) actin (b) myosin
(c) tropomyosin (d) troponin

74. The given figure represents the cross bridge cycle in skeletal muscle. What does the step B in the figure represents?



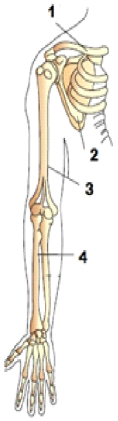
(a) Attachment of myosin head to actin forming cross bridge.
(b) Release of phosphate. Myosin changes shape to pull actin.
(c) Attachment of new ATP to myosin head. The cross bridge detaches.
(d) Splitting of ATP into ADP and Pi. Myosin cocks into its high energy conformation.

75. Refer the following figure and answer the question. Fusion of which of the following marked bones (1- 6) are responsible for the formation of coxal bones?



(a) 1, 2, 3 (b) 4, 5, 6
(c) 1, 2, 5 (d) 3, 5, 6

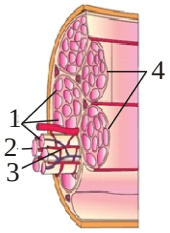
76. The given figure shows right pectoral girdle and upper arm. Few parts are marked as 1, 2, 3 and 4.



Which of the following options shows the correct labelling of marked parts?

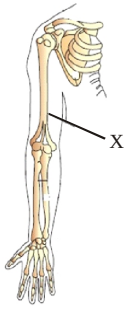
	1	2	3	4
(a)	Clavicle	Scapula	Humerus	Radius
(b)	Scapula	Clavicle	Radius	Humerus
(c)	Sacrum	Scapula	Ulna	Tibia
(d)	Radius	Clavicle	Scapula	Humerus

77. The given figure shows the diagrammatic cross sectional view of a muscle with their parts marked as 1, 2, 3 and 4. Which part is held together by a common collagenous connective tissue layer?



(a) 1 (b) 2
(c) 3 (d) 4

78. The given figure shows the structure of pectoral girdle and upper arm. Identify the structure marked as "X" and its feature.



(a) Humerus: Longest bone of upper extremity and is characterized by presence of deltoid tuberosity for the attachment of muscles.
(b) Radius: It is a smaller bone and formed by sesamoid bone.
(c) Ulna: The bone extending from the elbow to the wrist on the side opposite to the thumb in humans.
(d) Femur: Longest and largest bone of body.

CRITICAL THINKING TYPE QUESTIONS

79. Which of the following represents the correct order of vertebral regions from superior to inferior?

I. Sacrum II. Thoracic
III. Cervical IV. Lumbar
V. Coccyx

(a) I – II – III – IV – V (b) II – IV – I – III – V
(c) IV – I – II – V – I (d) III – II – IV – I – V

80. What is the correct order that a motor nerve impulse travels when triggering a muscle contraction?

(a) Motor nerve→synaptic cleft→sarcolemma→ sarcoplasmic reticulum→troponin.
(b) Motor nerve→synaptic cleft→sarcolemma→troponin →sarcoplasmic reticulum.
(c) Motor nerve→sarcoplasmic reticulum→synaptic cleft→sarcolemma→troponin.
(d) Motor nerve→sarcolemma→sarcoplasmic reticulum→ synaptic cleft→troponin.

81. There are three blanks in the following statement. Mark the correct option having suitable words for filling the blanks.

The thin filaments of myofibril contain ..... 'A'.....actin and two filaments of ..... 'B'.....protein along with ..... 'C'.....protein for masking binding site for myosin.

	'A'	**'B'**	**'C'**
(a)	1F	troponin	tropomyosin
(b)	1F	tropomyosin	troponin
(c)	2F	troponin	tropomyosin
(d)	2F	tropomyosin	troponin

82. In which option the number of bones of two corresponding parts are not the same?

(a) Thigh and upper arm
(b) Sole and palm
(c) Ankle and wrist
(d) Leg and arm

83. The intercalated discs of_____ muscle_____.

(a) smooth; provide strong mechanical adhesion and rapid electrical communication

(b) skeletal; are the basis for all voluntary muscle action
(c) skeletal; make possible both fast twitches and slow twitches
(d) cardiac; provide strong mechanical adhesion and rapid electrical communication

84. Convexity of one bone articulate with concavity of other bone in
(a) pivot joint (b) hinge joint
(c) gliding joint (d) ball and socket joint

85. All or None law is associated with
(a) skeletal muscle fibre
(b) neuron
(c) cardiac muscle fibres
(d) all of the above

86. Long uninucleate muscles are found in
(a) diaphragm (b) alimentary canal
(c) tongue (d) eye

87. Which of the following is not exclusively supplied with involuntary muscles?
(a) Muscles of iris
(b) Muscles of the ducts of gland
(c) Muscles of urethra
(d) Muscular coats of blood vessel

88. Muscles of alimentary canal are mainly
(a) striated and myogenic
(b) striated and neurogenic
(c) unstriated and neurogenic
(d) unstriated and myogenic

89. Muscle A and muscle B are of the same size, but muscle A is capable of much finer control than muscle B. Which one of the following is likely to be true for muscle A?
(a) It contains fewer motor units than muscle B.
(b) It has larger sarcomeres than muscle B.
(c) It is controlled by more neurons than muscle B.
(d) It is controlled by fewer neurons than muscle B.

90. A cricket player is fast chasing a ball in the field. Which one of the following groups of bones are directly contributing in this movement?
(a) Femur, malleus, tibia, metatarsals
(b) Pelvis, ulna, patella, tarsals
(c) Sternum, femur, tibia, fibula
(d) Tarsals, femur, metatarsals, tibia

91. The H-zone in the skeletal muscle fibre is due to
(a) The central gap between myosin filaments in the A-band.
(b) The central gap between actin filaments extending through myosin filaments in the A-band.
(c) Extension of myosin filaments in the central portion of the A-band.
(d) The absence of myofibrils in the central portion of A-band.

92. Eye-lid muscles have
(a) thick fibres with abundant mitochondria.
(b) thick fibres without myoglobin.
(c) thin fibres with myoglobin.
(d) thin fibres with lesser mitochondria.

93. Which of the following structures is correctly organized from large to small?
(a) Muscle, Muscle cell, Myofibril, Sarcomeres, Filaments.
(b) Muscle, Muscle fibres, Sarcomeres, Filaments, Myofibrils.
(c) Muscle, Sarcolemma, Myofibrils, Actin filaments, Myosin filaments.
(d) Muscle cells, Myofibrils, Filaments, Sarcoplasm.

94. Muscle contraction is triggered
(a) when high levels of oxygen and sugar are released by the sarcolemma.
(b) when a surplus of ATP is released by a nerve motor unit.
(c) by release of a neurotransmitter at a synapse that directly causes actin and myosin to slide.
(d) by the nerve releasing a neurotransmitter, which triggers a flow of calcium that attaches to actin filaments and exposes the myosin binding sites.

95. The joint between _____(i)____ and _____(ii)_____ forms ball and socket joint.
(a) (i) - Humerus, (ii) - Ulna
(b) (i) - Humerus, (ii) - Scapula
(c) (i) - Ulna, (ii) - Radius
(d) (i) - Ulna, (ii) - Scapula

96. Given below are some events which occur during muscle contraction.
i. ATP is hydrolyzed.
ii. Myosin heads bind to actin.
iii. Hemoglobin concentration in muscle fibers increases.
iv. Calcium concentration in the sarcomere increase.
v. I bands shorten and H zones disappear.
Select the correct events which occur during muscle contraction.
(a) i only (b) ii, iii & iv only
(c) i, ii, iv & v only (d) All of these.

97. The striations that give skeletal muscle its characteristic striped appearance are produced by
(a) the T tubules.
(b) sarcoplasmic reticulum.
(c) arrangements of myofilaments.
(d) a difference in the thickness of sarcolemma.

98. What will happen if the sarcoplasmic reticulum of the muscle fibres is damaged?

(a) Binding of ATP to actin will be affected.

(b) Release of inhibition on Z discs will stop.

(c) Exposure of myosin binding sites on the actin will be affected.

(d) Transmission of action potential along the sarcolemma will increase.

99. Lubrication occurs at hinge joints which need to be able to move without friction. Which one of the following substances aids lubrication?

(a) Cartilage (b) Ligament

(c) Synovial fluid (d) Connective tissue

100. Which of the following is not the function of skeleton?

(a) It allows movement.

(b) It supports the body.

(c) It connects muscle to joints.

(d) It protects the internal part of the body.

101. "X" is a large triangular flat bone situated in the dorsal part of the thorax between the "Y" and the seventh ribs. Identify "X" and "Y".

(a) X - Patella ; Y - Third

(b) X - Clavicle ; Y -Eight

(c) X - Scapula ; Y - Sixth

(d) X - Scapula ; Y - Second

102. A person is suffering from an age related disorder "X". X is characterized by decreased bone mass and increased chances of fractures. Identify X and its common cause.

(a) Tetany, Increased levels of estrogen

(b) Osteoporosis, Decreased levels of estrogen

(c) Myasthenia gravis, Decreased levels of estrogen

(d) Muscular dystrophy, Increased levels of estrogen

103. A student was given sample of two muscles marked as 1 and 2. When he compared the muscles he found that muscle 1 contains large amount of myoglobin and utilize large amount of stored oxygen for ATP production whereas muscle 2 contains few myoglobin, mitochondria and high sarcoplasmic reticulum.

Identify the correct conclusion regarding the muscle 1 and 2 from the option given below.

(a) Both the muscles are called aerobic muscles.

(b) Both the muscles are called red fibers and depend on aerobic process for energy.

(c) Muscle 1 is called white fibers and whereas muscle 2 depends on aerobic process for energy.

(d) Muscle 1 is called red fibers and aerobic muscles whereas muscle 2 is called white fibers and depend on anaerobic process for energy.