26 Locomotion and Movement

Types of movement and Muscular tissue and its types :

- **Simple type of movement** : In amoeba, cytosis
- **Movement in Paramoecium** : By cilia
- **Movement in Hydra** : By the tantacles
- **Movement of locomotion** : in man - By hind limbs
- **Locomotion / Movement** : The act of changing place or position by the entire body or by one part or more of its part is called movement.

Three main basic types of movements :

(1) Amoeboid : Amoeba, WBCs and macrophages in human blood, slime mold

(2) Ciliary : Paramoecium, Human trachea, in oviduct and in vasa efferentia.

(3) Muscular : Appendages of human, jaws, tongue etc.

Muscular tissue and its types :

- Origin of muscle tissue : From mesoderm
- In adult human body 40-50% muscle of total body weight.
- **Typical properties of muscle** : Ability to conduct (impulses), excitability contractibility, extensibility and elasticity.
- Three types of muscles : (1) Skeletal muscle (2) Visceral muscle and (3) Cardiac muscle.
- **Skeleton muscle :** It found as red and white muscle.
- **Location :** Head, trunk and found in appandageal region.
- In it light and dark bands are found, so it is also called striated muscle.
- Their activities are under the voluntary control of the nervous system, they are also known as voluntary muscle.
- **Visceral muscle :** In the inner walls of hollow visceral organs of the body such as alimentary canal, reproductive track and respiratory organs.
- There are involuntary and are innervated by autonomous nervous system.
- Cardiac muscle : It is only found in wall of heart.
- Every cordiac muscles are connected to each other known as intercalated disc by zigzy junctions regulated by ANS is indefatigable fibres.

(1) Living animals differ by very important characteristic from plants, is ..... .

(A) transport (B) locomotion (C) osmosis (D) respiration

(2) Which components of human body show, amoeboid locomotion ?

(A) Macrophage (B) Erythrocytes (C) Leucocytes (D) Both A and C

(3) What is true for amoeboid locomotion ?

(A) It occurs in oviduct and vasa efferentia. (B) It is for obtaining food/change of place.

(C) It occurs with the help of tentacles. (D) It is induced by circular movement.

(4) In human being ciliary movement is observed in which parts ?

(A) Digestive tract (B) Urinogenital passage

(C) Blood vessel (D) Oviduct and vasa deferens.

(5) Which characteristic of muscle helps in locomotion ?

(A) Pulsation (B) Contractility (C) Non-elasticity (D) All

(6) Coordination between which system is essential for muscular movement in higher organisms ?

(A) Skeletal system (B) Nervous system (C) A and B both (D) Digestive system

(7) Which characteristics are not observed in muscles ?

(A) Electricity (B) Durability (C) Contractility (D) Elasticity

(8) Skeletal muscles are responsible for ..... .

(A) movement (B) change in body posture

(C) locomotion of internal organs (D) A and B Both

(9) Which substances are transported in tubule of organs with the help of muscles ?

(A) striated muscle (B) cardiac muscle (C) visceral muscle (D) skeletal muscle

(10) Which muscles obtain large amount of blood supply ?

(A) visceral muscle (B) skeletal muscle (C) cardiac muslce (D) Non-striated muscles

Answers : (1-B), (2-D), (3-B), (4-D), (5-B), (6-C), (7-B), (8-D), (9-C), (10-C)

Structure of skeletal muscle, strucure of contractile proteins and Mechanism of muscle contraction.

- **Skeletal muscle :**
- It is multinucleated, cytoplasm called as sarcoplasma which have mitochondria.
- The light bands are isotropic (having same refractive index in all planes) and are known as isotropic or I-band.
- The dark bands are anisotropic (refract light differently in different plane) and are known as anisotropic or Abands.
- **Sarcomere** : The part of the myofibric between two successive Z-lines in called sarcomere. It is structural and functional unit of skeletal muscle.
- **Controctile protein :** Two types (1) Actin (2) Myosin.
- **Actin :** It is in two form (1) Monomer G-actin and polymeric F actin.
- **Tropomyosin :** Rod shaped fibrous protein. It forms two helical strands, which are wrapped around F actin.
- **Traponin :** It is a complex small globular protein which distributed at regular intervals on the tropomyosin. They are three type : TpC, TpI, TpT
- **Myosin :** Each myosin molecule has two parts.

  (1) A globular head with heavy meromyosin (HMM), which act as a atpase.

  (2) Tail - It consist of light meromysin (LMM).
- Region which is form by myosin only it is called H-region / H-line.
- Region which is form by actin only, it is called I- region / H band.
- A band - having Actin and myosin both present in this region.

Mechanism of muscle contraction :

- Initiation of muscle contraction → CNS → Motor nerve → neuromusculo junction → Acetyl choline → Potential → Ca^{+2} release in sarcoplasma → Head of myosin active open location of actin bridge formation between them → Attached actin fibers pulled toward the middle part of A band → pulled inner side z line which is also attached with the actin so → Sarcomere becomes shorten → muscle contraction by myosin release the ADP and P_i → muscle relaxation a enlargement can occur.
- **Bridge formation** : Only in absence of ATP, Break in presence of ATP.

(11) Which myofibrils are observed in I band ?

(A) Thick (B) Thin (C) A and B both (D) None

(12) Which is structural and functional unit of muscle fibre ?

(A) Myofibrils (B) sarcomere (C) sarcolemma (D) muscle fibre

(13) Thin filaments are of ..... structure.

(A) Monomer G-actin (B) Tropomyosin

(C) polymericfactin (D) A and C both

(14) Which is complex, small and globular protein ?

(A) Tropomyosin (B) Troponin (C) Meromyosin (D) F-actin

(15) Of the following, which one is globular protein ?

(A) Troponin (B) Monomer G-actin (C) A and B both (D) None

(16) Who forms bridge at the open, activated site of actin filament ?

(A) Troponin (B) Tropomyosin (C) Head of myosin (D) Tail of myosin

(17) Where is location of troponin in actin filament of striated muscle ?

(A) On Tropomyosin (B) F-actin (C) G-actin (D) all of above

(18) Which substance is secreted at neuromuscular junction when nerve impulses reach there ?

(A) Acetyl esterase (B) Acetyl choline (C) Acetic acid (D) Oxytocin

(19) Sarcomere shortens when (P) linked wiht actin is also pulled toward ..... inner side.

(A) M-line (B) H-line (C) A-line (D) Z-line

(20) Relaxation of sarcoplasm is due to decrease in concentration of ..... .

(A) Ca^{+2} (B) Mg^{+2} (C) $C1^{-}$ (D) Na^{+}

(21) Accumulation of Lactic acid in muscle fibre is due to ..... .

(A) Less activity of muscles (B) More activity of muscles

(C) Inactivation of muscles (D) Non-elasticity of muscle fibre

(22) Which action is important during muscle contraction ?

(A) Bridge formation (B) Bridge is not formed

(C) Bridge formed and stabilizes (D) Bridge formed and break-down

(23) What is improper for red muscles ?

(A) It stores more amount of CO_2 (B) It has large number of mitochondria

(C) It has more amount of myoglobin (D) Stores more O_2 and ATP formation

Answers : (11-B), (12-B), (13-D), (14-B), (15-C), (16-A), (17-C), (18-B), (19-D), (20-A), (21-B), (22-D), (23-A)

Skeleton system :

- Study of skeletal system is called Osteology.
- In human beings this system is made up of 206 bones and a few cartilages.

Skeleton System of Human being (206)

- **Axial skeleton system (80)**
  - **Skull (29)**
    - **Cranial bones (8)**
      (1) Frontal bone-1
      (2) Parietal bones-2
      (3) Temporal bones-2
      (4) Occipital condyle bone-1
      (5) Ethmoid bone-1
      (6) Sphenoid bone-1
    - **Facial bones (14)**
      (1) Nasal bones-2
      (2) Maxillae bones-2
      (3) Palatine bones-2
      (4) Zygomatic bones-2
      (5) Lacrimal bones-2
      (6) Interior nasal conchae-2
      (7) Vomer bone-1
      (8) Mandible bone-1
    - **Bones of middle ear (6)**
      Malleus-2
      Incus- 2
      Stapes - 2
    - **Floor bone of lower jaw**
      Hyoid bone - 1
  - **Vertebral column (26)**
    - Cervical vertebrae(7)
    - Thoracic vertebrae-12
    - Lumbar vertebrae-5
    - Sacral (5 part join-1) vertabrae-1
    - Coccygeal (4 partsjoin-1) vertabrae
  - **Ribs (24)**
    - 1 to 7 ribs (1 pair) -True ribs
    - 8 to 10 ribs - False ribs
    - 11, 12 ribs - Floating ribs
- **Appendicular skeleton system (126)**
  - **Sternum (1)**

(24) Mention the number of bones sequentially of skull, pectoral girdle, one fore limb and verebral column.
(A) 29, 2, 30, 33 (B) 29, 4, 60, 33 (C) 29, 4, 30, 26 (D) 29, 2, 30, 31

(25) Which of the following is function of vertebral column ?
(A) Induces head movement (B) Prevents movement of ribs
(C) Inhibits head movement (D) Connects the femur bone

(26) Bone and cartilage are which type of tissue ?
(A) Liquid connective tissue (B) Connective tissue proper
(C) Skeletal connective tissue (D) Simple epithelial tissue

(27) Which are paired bone in cranium ?

(A) Temporal and Ethemoid (B) Parietal and sphenoid

(C) Frontal and occipital (D) Temporal and parietal

(28) Which bones can not be seen externally on face ?

(A) Vomer (B) Nasal (C) Zygomatic (D) Lacrymal

(29) Which is only bone 'U' shaped ?

(A) Vomer (B) Maxillae (C) Mandible (D) Hyoid bone

(30) Which is pair of false ribs, sequentially in human ?

(A) 7, 8 and 9^{th} pair (B) 8, 9, 10^{th} pair (C) 10, 11, 12^{th} pair (D) 11, 12^{th} pair

(31) In the formation of ribcage which of the following are linked sequentially ?

(A) Clavicle, sternum, scapulla (B) Thoracic vertebral, femur and ribs

(C) Clavicle, sternum, ribs (D) Thoracic vertebral, sternum and ribs

(32) Which vertebrae are located on the post most part of vertebral column ?

(A) Cervical, coccyx (B) Cervical, sacrum

(C) Sacrum, coccyx (D) Sacrum, thoracic

(33) Vertebral column is connected with which part ?

(A) Skull and pelvic girdle (B) Only skull (C) Ribs (D) Both A and C

(34) Sacrum is present in which structure in human ?

(A) Pelvic girdle (B) Vertebral column (C) Pectoral girdle (D) Fore limb

(35) Cumber curve of vertebral column is between ..... vertebrae.

(A) 20 to 24 (B) 8 to 19 (C) 1 to 7 (D) 25 to 29

(36) Thoracic curve of vertebral column is between ..... vertebrae.

(A) 1 to 7 (B) 8 to 19 (C) 20 to 24 (D) 25 to 29

37) Which cells are formed in the bone marrow of hollow bone ?

(A) Muscle cells (B) Stem cells (C) Nerve cells (D) Collar cells

(38) Smallest bone, in human is located at ..... .

(A) Vertebral column (B) Carpals (C) Phalanges (D) Middle ear

(39) Smallest bone in human - ..... .

(A) Incus (B) Malleus (C) Stapes (D) Patella

(40) What is number of bones in axial skeleton of trunk region ?

(A) 50 (B) 80 (C) 29 (D) 51

(41) Which of the following is connected with ribs ?

(A) T_2 (B) S_4 (C) L_5 (D) L_4

(42) Which bone is unpaired in face ?

(A) Nasal (B) Palatine (C) Vomerbone (D) Lacrimal

(43) What is the number of floating ribs in human ?

(A) 2 pair (B) 5 pair (C) 6 pair (D) 3 pair

(44) What is total no. of vertebrae in human ?

(A) 35 (B) 40 (C) 30 (D) 33

(45) Spinal cord is connected with brain by ..... .

(A) Fovea ovalis (B) Foramen of magnum

(C) Large aperture (D) Magendils aperture

(46) Which is helpful in human for neck movement ?

(A) Atlas vertebrae (B) sacral vertebrae (C) lumbar vertebrae (D) Axis

(47) Who possess 7 pairs of true ribs ?

(A) Frog (B) Human (C) Both A and B (D) None

Answers : (24-C), (25-A), (26-C), (27-D), (28-A), (29-D), (30-B), (31-D), (32-C), (33-D), (34-B), (35-A), (36-B), (37-B), (38-D), (39-A), (40-D), (41-A), (42-C), (43-A), (44-D), (45-B), (46-D), (47-B)

Appendicular Skeleton System : Joints and its types :

- Appendicular skeleton system consists of girdles and bones of fore and hind limbs.
- Girdles are attached with axial and appendicular skeleton systems.

Appendicular Skeleton System (126)

↓

Girdles (06) | Bones of limbs (120)

↓ | ↓

Pectoral girdle (4) → Scapula (2) → Clavicle (2) **(4)**

Pelvic girdle (2) → Coxal bones (2) **(02)**

Bones of Fore limbs (60) (In two hand) → Humreus-2, Radio Ulna-4, Car pals-16, Metcarpals-10, phalanges-28 **(60)**

Bones of Hind limbs (60) → Femur-2, Patella-2, Tibia-2, Fibula-2, Tarsals-14, Metatarsals-10, Phalanges-28 **(60)**

All types of joins are essential for locomotion / movement.

(1) Fibrous - Fixed - immovable joints :- Occur between the bones of the cranium.

(2) **Cartilaginous of Slightly movable joints:** Found between the centre of vertebrae, at the pubic symphysis. Joint (cartilage and other) of ribs.

(3) **Freely movable joint / synovial joints :** It is full of fluid in cavity (Synovial).

Disorders of Skeleton system :

(1) Myasthenia gravis : It is an auto immune disorder that affects neuromuscular junction leading to fatigue, weakening and paralysis of skeletal muscle.

(2) Tetany : It is a muscular disorder in which rapid spasms in muscle occur due to lesser Ca^{+2} in the body fluid.

(48) Which is the longest bone in human skeletal system ?

(A) Humerus (B) Femur (C) Tibia (D) Axial bone

(49) Metatarsal of ankle is present in ..... .

(A) Hind limb of Frog (B) Fore limb of rabbit

(C) Fore limb of human (D) Hind limb of human

(50) Scapula is part of ..... .

(A) Pelvic girdle (B) Skull (C) Vertebral column (D) Pectoral girdle

(51) In each hind limb of human, what are the number of tarsals ?

(A) 6 (B) 8 (C) 7 (D) 2

(52) Number of scapula in pectoral girdle ..... .

(A) 1 (B) 2 (C) 3 (D) 4

(53) Wrist joint is of ..... type.

(A) pivotal joint (B) synovide joint (C) hinge joint (D) ball and socket joint

(54) Synovial fluid is secreted by ..... .

(A) bone (B) blood (C) cartilage (D) synovial membrane

(55) Which type of joint is found between numerous and radio-ulna bone ?

(A) Synovial joint (B) Hinge joint (C) Pivotal joint (D) Cartelagenous joint

(56) Which type of joint is found in cranium ?

(A) Movable (B) Partially movable (C) Suture (D) None

(57) What is hinge joint ?

(A) Wrist (B) Between metacarpals (C) Ankle (D) All of above

(58) What is pivotal joint ?

(A) Shoulder joint (B) Atlas - Axis Joint (C) Pelvic joint (D) Thumb joint

(59) Number of Ischium bone in pelvic girdle.

(A) 2 (B) 1 (C) 4 (D) 3

Answers : (48-B), (49-D), (50-D), (51-C), (52-B), (53-C), (54-D), (55-B), (56-C), (57-D), (58-B), (59-A)

A = statement R = Reason, type questions :

Select answers of following questions from options given below.

(A) A and R both correct. R is explanation of A.

(B) A and R both correct but R is not explanation of A.

(C) A is correct, R false.

(D) A is false, R correct.

(60) Statement A : Change of place and obtaining food is through pseudopodia in Amoeba.

Reason R : Pseudopodia is formed due to activation of cilia.

(A) (B) (C) (D)

(61) Statement A : Innervation by nerves in cardiac muscle is by autonomous nervous system.
Reason R : Cardiac muscles are present in the wall of the heart.
(A) (B) (C) (D)

(62) Statement A : H region has only thin filaments.
Reason R : A band has thick and thin Filaments on both side.
(A) (B) (C) (D)

(63) Statement A : Double hellicle chains of tropomyosin is innervated surrounding to G-actin.
Reason R : In myosin filament Head is formed of heavy meromysin and tail is light meromyosin.
(A) (B) (C) (D)

(64) Statement A : Calcium activates inter effect of actin and myosin.
Reason R : Sarcomere, is shortened as Z line is pulled in side, attached with myosin.
(A) (B) (C) (D)

(65) Statement A : Striated muscles get fatigued due to long time activation.
Reason R : Due to anaerobic decomposition of glycogen, adds lactic acid in muscles.
(A) (B) (C) (D)

(66) Statement A : In voluntary muscles, dark and light transverse lines are seen.
Reason R : Voluntary muscles are also known as skeletal muscles.
(A) (B) (C) (D)

(67) Statement A : Active electric potential is generated in sarcomere.
Reason R : Head of myosin, forms bridge with open active place of actin.
(A) (B) (C) (D)

(68) Statement A : Coccyx is formed by 4 tail vertebrae.
Reason R : It is found in vestigeal spinal cord.
(A) (B) (C) (D)

(69) Statement A : Dark band of sarcomere is A disc.
Reason R : A band, reflects light at various angles, in different plane.
(A) (B) (C) (D)

(70) Statement A : Hinge joint is found between first and second vertebrae.
Reason R : Synovial joint is found between vertebrae.
(A) (B) (C) (D)

(71) Statement A : Frontal, parietal and occipital bones are joined by suture joint.
Reason R : Bones of skull are joined by cortilagenous joint.
(A) (B) (C) (D)

(72) Statement A : During muscle contraction I band shortens.
Reason R : During muscle contraction myosin fibre contracts.
(A) (B) (C) (D)

(73) Statement A : In skull only upper jaw is movable.

Reason R : Lower jaw is attached by muscles with head region.

(A) (B) (C) (D)

Answers : (60-C), (61-B), (62-D), (63-D), (64-C), (65-A), (66-B), (67-D), (68-C), (69-A), (70-B), (71-C), (72-C), (73-B)

True / False type questions

In the given sentences, select correct option for true / false.

(74) For human skeletal system select proper option for true/ false sentence.

(1) Human skull is formed of 22 bones.

(2) Human skeletal system is formed of 206 bones.

(3) In adult human vertebral column is formed by 31 vertebrae.

(4) Appendicular skeletal, in human is formed of 120 bones.

(A) TTFF (B) TFTF (C) FFTT (D) FTFT

(75) Select proper option, for the given statement, whether T / F.

(1) All organisms show movement.

(2) All movements are locomotion.

(3) Cardiac muscle are innervated by nerves of voluntary nervous system.

(4) All organisms show locomotion.

(A) TTFF (B) FTFT (C) FTTF (D) TFTF

(76) Select proper option, for the given statement, whether T / F.

(1) In the middle of I disc, line present is called M line.

(2) Myosin fibres are thick muscle fibres.

(3) I disc, shortens during muscle contraction.

(4) Actin, acts as ATpase in muscle contraction.

(A) TFFT (B) FTFT (C) FTTF (D) FFTT

(77) Which option is correct in human skeletal system for number of Axial skeletal system.

(1) Human skull is formed of 29 bones.

(2) Pectoral girdle and pelvic girdle are included in skeletal system.

(3) Sternum, thoracic vertebrae and ribs form ribcage.

(4) Humerus, nasal, vomer and palatine are bones of face.

(A) TFTF (B) TTFF (C) FTFT (D) FFTT

(78) Given statements are (T) or (F), select proper option for it.

(1) In cardiac muscles, specific structure intercalated disc is present.

2) 8, 9, 10 ribs are called false ribs.

(3) Palatine forms the floor of mouth.

(4) 11th and 12th ribs are joined with sternum bone.

(A) TTTT (B) TTFF (C) FTTF (D) TFTF

(79) Given statements are (T) or (F), select proper option for it.

(1) Ball and socket joints are most movable joint.

(2) Bones of skulls are joined by cartilagenous joint.

(3) Fore limbs are connected with axial skeletal system by pelvic girdle.

(4) Muscle contraction is reaction between actin and myosin.

(A) TTFF (B) FFTT (C) FTFT (D) TFFT

80) Select proper option for (T) or (F) for the given statements.

(1) Paramoecium shows amoeboid movement.

2) Clavicle is bone of pelvic girdle, which has two curves.

(3) Sternum is longest bone of hind limb.

(4) Cardiac fluid is present in synovial joint.

(A) FTFT (B) TTTT (C) FFFF (D) TFTF

(81) Given Statements are T or F, select proper option for it.

(1) In skull, cranium has 2 paired and 4 unpaired bones.

(2) In appendicular skeletal system, 126 bones are present.

(3) Between Atlas and Axis, hinge joint is observed.

(4) Between Humerus and glenoid cavity suture type of joint is present.

(A) TTFF (B) TFTF (C) FFTT (D) TFFT

Answers : (74-D), (75-B), (76-C), (77-A), (78-B), (79-D), (80-C), (81-A)

(82) Select proper option for column-I and column-II.

Column - I	**Column - II**	
(I) WBC	(P) Intercalated disc	(A) I-R, II-Q, III- P, IV-S
(II) Visceral muscles	(Q) disc/band	(B) I-R, II-S, III- P, IV- Q
(III) Cardiac muscles	(R) Amoeboid movement	(C) I-R, II-S, III- Q, IV-P
(IV) Striated muscles	(S) Non-striated muscles	(D) I-P, II-S, III- Q, IV- R

(83) Select proper option for column-I and column-II

Column - I	**Column - II**	
(I) Troponin	(P) Rod shaped fibrillar protein	(A) I-Q, II- S, III- P, IV-R
(II) G- actin	(Q) Globular protein	(B) I-Q, II-P, III- S, IV- R
(III) Tropo myosin	(R) Polymeric protein	(C) I-Q, II-S, III- R, IV-P
(IV) F-actin	(S) Monomeric protein	(D) I-P, II-Q, III- S, IV- R

(84) Match column-I with column-II. Select proper options.

Column - I	**Column - II**	
(I) Hyoid bone	(P) Bone of cranium	(A) I-P, II-Q, III- S, IV-R
(II) Ethemoid	(Q) Bone of floor of buccal cavity	(B) I-Q, II-P, III- R, IV- S
(III) Lacrimal	(R) Bone of pectoral girdle	(C) I-R, II-P, III- Q, IV-S
(IV) Clavicle	(S) Bone of Face	(D) I-Q, II-P, III- S, IV- R

(85) Match column-I with column-II. Select proper options.

Column - I	**Column - II**	
(I) Tarsals	(P) 8	(A) I-R, II-P, III- Q, IV-S
(II) Carpals	(Q) 24	(B) I-P, II-Q, III- R, IV- S
(III) Vertebrae	(R) 7	(C) I-R, II-P, III- S, IV-Q
(IV) Ribs	(S) 26	(D) I-R, II-Q, III- S, IV- P

86 Match column-I with column-II. Select proper options.

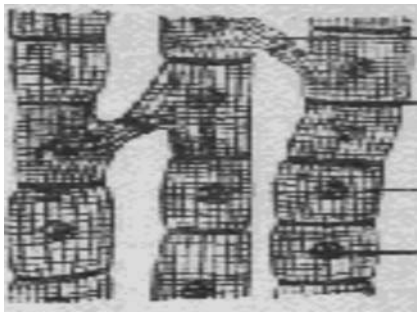
Column - I	**Column - II**	
(I) Pectoral girdle	(P) Coxal bone	(A) I-R, II-S, III- P, IV-Q
(II) Clavicle	(Q) Four curves	(B) I-P, II-S, III- R, IV- Q
(III) Pelvic girdle	(R) Acromion process	(C) I-R, II-S, III- Q, IV-P
(IV) Vertebral column	(S) Two curves	(D) I-Q, II-R, III- S, IV- P

87 Match column-I with column-II. Select proper options.

Column - I	**Column - II**	
(I) Cranium	(P) 37 bones	(A) I-S, II-P, III- R, IV-T, V-Q
(II) Calcium	(Q) 5 metacarpals	(B) I-S, II-T, III- R, IV- P, V-Q
(III) Ribcage	(R) require for muscle contraction	(C) I-S, II-R, III- P, IV-T, V-Q
(IV) Vertebral column	(S) 8 Bones	(D) I-S, II-R, III- T, IV- Q, V-P
(V) Palm	(T) 26 vertebrae	

Answers : (82-B), (83-A), (84-D), (85-C), (86-A), (87-C)

(88) Which is given Figure I ?



(A) Visceral muscle

(B) Unstriated muscle

(C) Cardiac muscle

(D) Striated muscle

(89) What is true for muscle shown in Fig. I

(A) They do not fatigue

(B) They function slowly

(C) They fatigued speedily

(D) None of these

(90) Which is Diagram 2 ?

(A) Ball and socket joint

(B) Pivot joint

(C) Hinge joint

(D) None

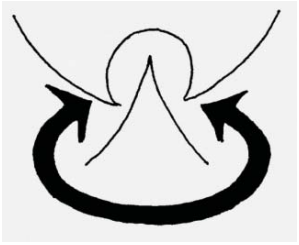


Figure 2

(91) Joint shown in Fig. 2 is seen in ..... .

(A) Forearm and wrist (B) Atals and axis

(C) Sternum and ribs (C) Humerus and glenoid cavity

(92) In the given Fig 3. P indicates ?

(A) Structure of H region

(B) Arrangement of myosin.

(C) Arrangement of actin

(D) B and C Both

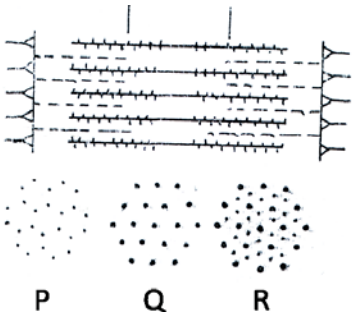


Figure 3

(93) In the given Fig.3 Q indicates which part ?

(A) Arrangement of myosin (B) Arrangement of actin

(C) A and C Both (D) Structure of I disc

(94) What is shown in Fig. 4 ?

(A) Pivot joint (B) Hinge joint (C) Ball and socket joint (D) Cartilagenous joint

(95) Joint shown in Fig. 4 is seen between ..... .

(A) Femur and Acetabulum

(B) Humerus and Radio-ulna

(C) Humerus and glenoid cavity

(D) A and C Both

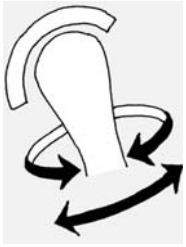


Figure 4

(96) N Part indicated in Fig. 5 suggests ..... .

(A) Linkage of Actin

(B) ATP linkage

(C) Ca^{+} linkage

(D) Mg^{+2} linkage

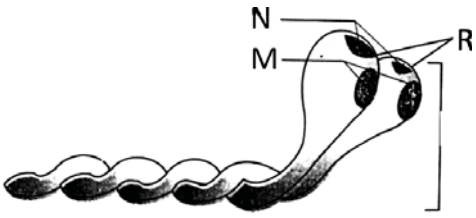


Figure 5

(97) M part shown in Fig.5 indicates ..... .

(A) ADP linkage (B) Ca^{+2} linkage (C) Actin linkage (D) ATP linkage

(98) R part shown in Fig.5 indicates ..... .

(A) LMM (B) HMM (C) ATPase (D) MHH

(99) P indicates what in Fig. 6

(A) TpT

(B) TpL

(C) TpC

(D) All of above

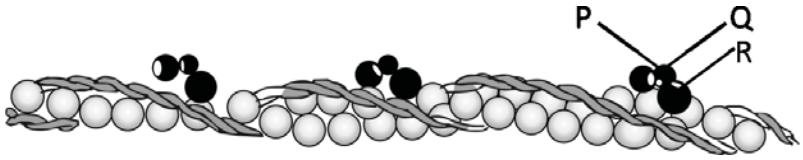


Figure 6

(100) In the given fig. 6 what is indicated by 'Q' ?

(A) TpT (B) Tpl (C) TpM (D) TpC

(101) In the given Fig. 6 what is indicated by 'R' ?

(A) TpT (B) TpC (C) TpI (D) TpM

Answer : (88-C), (89-A), (90-C), (91-B), (92-C), (93-A), (94-C), (95-D), (96-A), (97-D) (98-B), (99-C), (100-B), (101-A)

Questions for NEET :

(102) In muscle fibre Ca^{+2} is stored in ..... .

(A) sarcoplasm (B) sarcosome (C) sarcomere (D) sarcolemma

(103) Cardiac muscle is ..... .

(A) striated, voluntary (B) striated, involuntary

(C) non-striated, voluntary (D) involuntary, non striated

(104) During resting phase, middle of thick filament not innervated by thin filament is ..... .

(A) A - disc (B) M-line (C) H-zone (D) I-disc

(105) Where is ciliary movement observed ?

(A) Macrophage and WBC (B) Oviduct and blood capillary

(C) Oviduct and Trachae (D) Tongue and appandages

(106) Where is amoeboid movement observed ?

(A) Appandages and jaws (B) Macrophage and WBC

(C) Trachae, oviduct (D) RBC, WBC

(107) During muscle contraction ..... .

(A) thin filaments slide over thick filament (B) thick Filaments slide over thin filament

(C) both filaments slide over each other (D) filaments do not slide during contraction

(108) Which character is not linked with white muscle fibre ?

(A) Less amount of myoglobin (B) Less amount of mitochondria

(C) Less amount of sarcoplasmic fibres (D) Depend on anaerobic process for energy

(109) Which point is correct for process of visceral muscle ?

(A) They form the wall of hollow visceral organs. (B) They do not show any bands.

(C) Their contraction is under control of involuntary nervous system. (D) All of above

(110) Which muscle, during activation is coenocytic ?

(A) Cardiac muscle (B) Smooth muscle (C) Voluntary muscle (D) All of above

(111) Elastic fiber in the middle of I disc, divides it into two parts, is ..... .

(A) H-zone (B) M-line (C) Z-line (D) A-band

(112) Motor neuron with nerve fibre forming ..... connects it.
(A) Neuro mucular junction (B) Motor and disc
(C) Motor unit (D) A and B Both

(113) Which type of joints are found in bones of cranium ?
(A) Fibrillar (B) Hinge (C) Synovial (D) None

(114) Coxal bone is formed by ..... .
(A) Ilium (B) Ischium (C) Pubis (D) All of above

(115) Which is contractile protein of muscle ?
(A) Myosin (B) Tropomyosin (C) Tropoin (D) Tubulin

(116) Which of the following pair is proper ?
(A) Hinge joint - Between vertebrae
(B) Sliding joint - Zygapophysis of sequential vertebrae
(C) Cartilagenous joint - Bones of skull
(D) Fibrillar joint - Between phalanges

(117) Which is correct, in human body, anatonically ?
(A) Collar Bone - 3 pair (B) Salivary gland - 1 pair
(C) Cranial nerves - 10 pair (D) Floating ribs - 2 pair

(118) Of the following, one shows its correct number.
(A) Floating ribs - 4 (B) Amino acid obtained from protein - 16
(C) Types of Diabetes - 3 (D) Cervical vertebral in human-8

(119) Wrist joint is example of ..... .
(A) Hinge (B) Sliding (C) Ball and socket (D) Pivotal

(120) For human skeletal system, Find the mismatch.
(A) Sternum and ribs - axial skeleton (B) Clavicle and glenoid cavity - pectoral girdle
(C) Humerus - ulna hind - limb (D) Malleus and stape - ear

(121) During muscle contraction, energy is provided by ..... .
(A) AMP (B) Glucose (C) ATP (D) Acetyl Co-A

(122) Which of the following structure is formed of single bone, in human ?
(A) Upper jaw (B) Zygomatic process (C) Lower jaw (D) Rib cage

(123) What is the form of actin and myosin during muscle contraction ?
(A) Myoplasm (B) Sarcoplasm (C) Plastocine (D) Ectoplasm

(124) What is called part of cyloplasm in striated muscle ?
(A) Sarcomere (B) Sarcoplasm (C) Neuron (D) Large segment

(125) In striated muscle, contractile substance present between two successive z disc is ..... .
(A) sarcomere (B) sarcoplasm (C) myofilament (D) all

(126) Shoudler blade is formed of ..... .
(A) ilium (B) humerus (C) clavicle (D) scapula

(127) Player follows speedily ball in the game of cricket. Which of the following bonegroup participate in it ?
(A) Femur, incus, tibio, metacarpals (B) Tarsals, femur, metatarsals, tibia
(C) Sternum, femur, tibia, fibula (D) Tarsal, pelvic girdle, ulna, tibia

(128) Which is the bone of forelimb ?

(A) Humerus (B) Femur (C) Tibia (D) Fibula

(129) Which is cup shaped cavity on the head of femur bone, for articulation ?

(A) Glenoid cavity (B) Acetabulum (C) Sigmoid notch (D) Femur aperture

(130) What is present in ball and socket joint to reduce friction ?

(A) Coelomic fluid (B) Synovial fluid (C) Pericardial fluid (D) Mucous

(131) Contractile protein of striated muscle, which links with ATPase action process.

(A) Troponin (B) Tropomysin (C) Myosin (D) Actin

(132) Which is largest synovial joint ?

(A) Thigh (B) Knee (C) Shoulder (D) Ankle

(133) Where is neuromotor connection observed ?

(A) Between nerve cell and sarcolemma of muscle (B) Between two nerve cells

(C) Between two muscles (D) B and C Both

(134) Where does synovial fluid is formed ?

(A) Blood (B) Cartilage (C) Bones (D) Synovial membrane

(135) Patella is linked with ..... .

(A) wrist (B) knee (C) neck (D) ankle

(136) Which of the following is associated with appendicular skeleton ?

(A) Bones of cranium (B) Bones of vertebral column

(C) Ribs (D) Bones of fore limb and hind limb

(137) By which vertebral column is linked with pelvic girdle ?

(A) Coccyx (B) Sacrum (C) Lumbar vertebral (D) Cervical vertebrae

(138) Shoulder joint is example of ..... .

(A) Pivotal joint (B) Hinge joint (C) Sliding joint (D) Ball and socket joint

(139) ..... is joint between ribs and sternum.

(A) Cartilagenous joint (B) Curved joint (C) Fibrillar joint (D) Sliding joint

(140) Terminal end of long bones are covered by ..... .

(A) Ligament (B) Bony joint (C) Cartilage (D) Muscle joint

(141) Sarcomere is region between ..... .

(A) two I - disc (B) A and I disc (C) Two Z-disc (D) Z and A disc

(142) Lumbar vertebrae are situated ..... .

(A) neck region (B) abdominal region (C) hip region (D) thoracic region

Answers :(102-A), (103-D), (104-C), (105-C), (106-B), (107-A), (108-C), (109-D), (110-C), (111-C), (112-C), (113-A), (114-D), (115-A), (116-B), (117-D), (118-A), (119-A), (120-C), (121-C), (122-C), (123-B), (124-B), (125-C), (126-D), (127-B), (128-A), (129-B), (130-B), (131-C), (132-B), (133-A), (134-D), (135-B), (136-D), (137-B), (138-D), (139-A), (140-C), (141-C), (142-C)

Locomotion and movement

Skelatal Muscle
- Attached to bones, voluntary, exhibit transverse strips hence called striated.

Sarcomere
- Functional unit of contraction. They are delivered by a very thin and comparitively dense Z-line.

Primary Myofilament
- It is formed of myosin protein
- Myosin (thick) filament is a polymerized protein of many monomers.
- Myosin monomer has head and short arm which project outwords at regular distance and angle from myosin filament.
- Head has ATPase and binding site for actin.

Secondary Myofilament
- It is composed of actin and regulatory proteins tropomyosin and tronin.
- In resting state, subunit of troponin masks the active binding sites for myosin on the actin (thin) filament.

Sliding filament theory of muscle contraction

Neural Signal → Ach released → Action potentinal generated → Ca^{+2} released → Binds to troponin → Change in shape exposes active sites → Myosin - actin cross bridges are formed → Myosin ATPase in presence of Ca^{2+} and Mg^{2+} breaks ATP to ADP → Energized myosin cross bridges bind to actin and move → Thin myofilament slide along the thick myofilament

Skeletal System

Each limb contains 30 bones
- Fore limb : 1 humerus
  1 radius, 1 ulna, 8 carpals
  5 metacarpals, 14 Phalanges
- Hind limb : 1 femur,
  1 tibia, 1 fibula, 1 patella,
  7 tarsals, 5 metatarsals
  and 14 Phalanges

Girdles
- Pectoral girdles (4 bones)
- Pelvic girdle (2 bones)
  articulation between axial and appendicular skeletal components

Joints
- Fibrous / immovable joint
  Eq : Joints of skill bones
- Cartilagenous / partially movable joints
  Eq : Joints between vertabrae
- Synovial / freely movable joints
  Eq : Ball and socket joints hinge joints

Skeletal System
Out of total 206 bones of human, 6 bones are present in ears 3 bones in each ear as ear ossicles and remaining are distributed into axial and appendicular skeleton

Axial Skeleton - 80 bones

Skull
- Skull consists of cranium and facial bones
- 22 total bones ; out of these 8 are bones of cranium and 14 are facial bones

Foramen Magnum
- Skull possesses a posterior aperture called foramen magnum.
- Through which the brain communication with spinal cord.

Ribs
- Ribs joins with strenum and form a rib-cage 12 pairs of ribs 1 to 7 pairs are true ribs; 8, 9, 10 pairs are false ribs 11, 12 pairs are floating ribs.

Sternum
- Single flat bone located at mid- ventral region of theracic cavity

Vertabral column
- formed by union of 26 small bones called vertabrae

7 - Cervical vertabrae
12 - Thoracic vertabrae
5 - Lumbar vertabrae
1 - Sacral vertabrae (5 bones join to from 1 bones)
1 - Coccygeal bone (4 bones join to from 1 bone)