

Topic :- Locomotion & Movement

- 1 (a)
Joints have been classified into three major structural forms
(i) **Fibrous joints** don't allow any movement. This type of joint is shown by flat skull bones, which fuse end to end by fibrous connective tissue to form sutures of the cranium
(ii) **Cartilaginous joints** allows only limited movements. Bones are joint together with the help of cartilages. The joint between the adjacent vertebrae in the vertebral column is a cartilaginous joints
(iii) **Synovial joints** are characterized by the presence of fluid filled synovial cavity between the articulating surfaces of the two bones. Such an arrangement allows considerable movement
- 2 (d)
A-ilium B- acetabulum
C-Pubic D-ischium
E- Pubic symphysis
- 3 (b)
Acetylcholine.
The junction between a motor neuron and the sarcolemma of the muscle fibre is called the neuromuscular junction or motor end plate. A neural signal reaching this junction releases a neurotransmitter, acetycholine which generates an action potential in the sarcolemma
- 5 (b)
Cartilage is a vertebrate skeletal connective tissue. It is an amorphous matrix and contains glycoproteins, basophilic chondroitin and fine collagen fibres. Cartilage helps in bone to bone ligation.
- 6 (a)
Ligament has a high proportion of elastic fibres and white collagen fibres. This connects bone to bone.
- 7 (c)
Actin is thin filament and made up of f-actin.
Each myosin (thick filament) is a polymerized protein. Many monomeric proteins called meromyosin constitutes one thick filament. Each meromyosin has two important parts, a globular head with a short arm and a tail, the former being called heavy meromyosin and the later is called light meromyosin.
The HMM component, i.e., the head and short arm projects outwards at regular distance

and angle from each other from the surface of polymerized myosin filament and is called cross arm. The globular head is an active ATPase enzyme and has binding sites for ATP and active sites for actin

Each actin (thin) filament is made up of two 'F' (filamentous) actins which are helically wound to each other. Each F-actin is a polymer of monomeric G (globular) actins. Two filaments of another protein, tropomyosin also run close to the 'F' actins throughout its length.

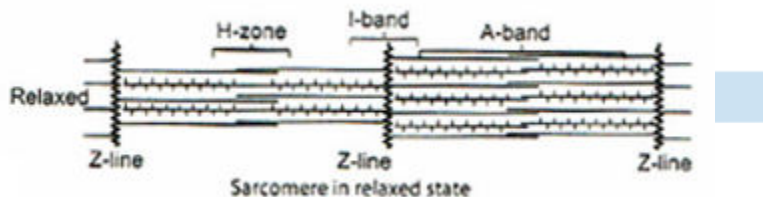
A, complex protein troponin is distributed at regular intervals on the tropomyosin. In the resting state, a sub-unit of troponin masks the active binding sites for myosin on the actin filaments

8

(b)

Folding and unfolding of actin and myosin leads to amoeboid movement. This is hypothesized by Goldacre and Larch.

9 (b)



The thick filaments lie parallel to one another and thin filaments are present in an orderly array between the thick filaments. In the center of the I-band, there is a band of amorphous material called Z-line. In the middle of the A-band, a comparatively less dark zone called H-zone of band is present. The area between the two Z-lines is called sarcomere. M-line is present in the middle of H-zone

10

(c)

Fibrous Joints These are the immovable or fixed joints. These joints don't allow any movement due to the presence of strong white and tough cartilaginous fibres, *e.g.*, joints in tooth socket and between skull bone

11

(c)

Ribs number 6-10 show bucket handle type of movement.

12

(a)

Intercalated disc is found in cardiac muscle. It is an irregular transverse thickening of sarcolemma that contains desmosomes and holds cardiac muscle fibres together and gap junctions that aid in conduction of muscle action potentials.

13

(b)

The first vertebrae of vertebrates is generally called **atlas**. It is **acoelous** in frog, *i.e.*, the centrum of atlas is convex at both ends. It is the smallest vertebra and looks more ring-like.

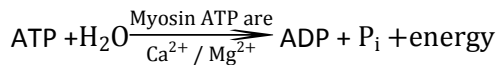
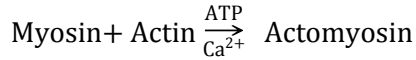
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(d)

Elium

15 **(d)**
Knee joint, elbow, ankle and interphalangeal joint are example of hinge joint (a type of **synovial joint**). A hinge joint allows movement primarily in one plane.

16 **(a)**
 Ca^{2+} and Mg^{2+} are necessary for muscle contraction.



17 **(b)**
 Gout is associated with purine metabolism resulting in over production of uric acid crystals in the region of joints.

18 **(b)**
 In rabbit, at the elbow joints, ulna projects beyond the radius as an olecranon process, which has a deep sub-terminal sigmoid notch for articulation with the distal end of humerus.

19 **(d)**
 In humans, femur or the thigh bone is the longest bone of the body. It articulates with the acetabulum to form hip joint.

20 **(c)**
 Axis is the second cervical vertebra, which is identified by a prominent odontoid process. The odontoid process of axis vertebra fits in the odontoid fossa of first cervical vertebra (i.e., atlas) forming the actual pivot joint at which the skull rotates around together with the atlas.

ANSWER-KEY										
Q.	1	2	3	4	5	6	7	8	9	10
A.	A	D	B	C	B	A	C	B	B	C
Q.	11	12	13	14	15	16	17	18	19	20
A.	C	A	B	D	D	A	B	D	D	C