CBSE TEST PAPER-03

CLASS - XI BIOLOGY

(Locomotion and Movement)

1. What is a tendon?

2. Which type of movable joint makes the hip joint?

3. Name the heaviest and longest bone in the human body?

4. Why can a red muscle fiber work for a prolonged period, while a white muscle fibre suffers from fatigue soon?

5. What is the function of girdles?

6. What makes the synovial joints freely movable? List any four types of synovial joints.

7. Differentiate between Endoskeleton and Exoskeleton.

8. Explain the following –

a) Antagonistic muscles

b) Tetanus

c) Threshed stimulus

9. Explain sliding filament theory of muscle contraction.

CBSE TEST PAPER-3

CLASS - XI BIOLOGY (Locomotion and Movement)

[ANSWERS]

Ans 01. The tendon is a tough non – elastic connective tissue, made up of collagen that joins muscle to a bone.

Ans 02. Ball & socket joint (synovial).

Ans 03. Femur is the the heaviest and longest bone in the human body.

Ans 04. Red muscle fibers contain myoglobin that stores oxygen in the form of oxymyoglobin. There are abundant mitochondria in red muscle fibres and aerobic respiration occurs in these fibres. Hence after oxidation of food materials occurs and release energy and the red muscle fibres do not become fatigued and work for long periods. White muscle fibers lack myoglobin. They have few mitochiondria and carry out they anaerobic respiration and become fatigued easily after short period of contraction, due to accumulation of lactic acid.

Ans 05. There are two girdles in the body, pectoral girdle & pelvic girdle.

1) Pectoral girdle – It provides surface (glenoid cavity) for the articulation of bones of forelimbs. In the glenoid cavity fits the head of the humerous bone. In humans, the bones of the pectoral girdle are highly mobile to enhance the range of upper limb movements.

2) Pelvic girdle – It provides surface (acetabulum) for the articulation of the hind limbs. It also protects the organs of pelvic region. In humans, the bones of the pelvic girdle are strongly united to each other to form a largely immobile, weight-bearing structure.

Ans 06. Synovial Joints – The synovial joints have, a space called synovial cavity, present between the two articulating bones.This cavity is filled with synovial fluid, that reduces the friction between the articulating surface of bones and also act as lubricant for the joint. Hence, the synovial joints are freely movable.

Synovial joints are of the following types: (i) Ball and socket joint (ii) Hinge joint (iii) Pivot joint.

Ans 07.

	Exoskeleton	Endoskeleton
	Exoskeleton is a complex rigid outer covering of an	Endoskeleton is the internal

1.	organism which protects the muscles and soft tissues inside	support of the structure of an organism.
2.	Examples include the scales, feathers, hair, claws, hooves, Examples include the	Examples include the cartilage and bones in vertebrates.
3.	Formed by ectoderm.	Formed by mesoderm and endoderm.

Ans 08. a) Antagonistic muscles – When the Contraction of a muscle results in the opposite movements of another muscle at the same joint, the two muscles involved are called antagonistic muscle e. g biceps is a flexor for the elbow joint and triceps is its antagonistic muscle. During flexion at the elbow biceps contracts and triceps relaxes; during extension triceps contracts and biceps relaxes.

b) Tetnus – If a muscle fiber is stimulated by many nerve impulses or electric shocks it will remain in the state of contraction till the stimulation is continued. This condition of a muscle fibre is known as tetnus.

c) Threshold stimulus – Each skeletal muscle is made of many muscle fibers and each muscle fiber is supplied by the nerve endings. These nerves sends nerve impulse to the muscle fibers. As a result of this stimulation and contraction of the muscle fibre takes place. But for contraction muscle fibres requires a minimum strength of the nerve impulse. This is called threshold stimulus.Below this threshold limit the impulse will not be able to stimulate the muscle fibre.

Ans 09. Sarcomeres are small units of myofibrils: the sarcomere consists of A – band in the centre with halves of two I – bands on its two sides i. e. the distance between two z – membranes. When stimulus is given to muscles, the thin (actin or I – band) filaments slide in the space between the thick (myosin or A – bond), without any change in ts length. Due to sliding of I filaments, there is breakage and rearrangement of the cross – linkage between actin and myosin filaments. The ATP is broken by the enzyme ATPase myosin which provides energy for interaction between actin and myosin filaments. Consequently, the thin action filaments slide deeper into the A bands and z – lines are drawn closer with each other by the disappearance of H – zone finally the sarcomeres becomes shortened due to shortening of its I–band.

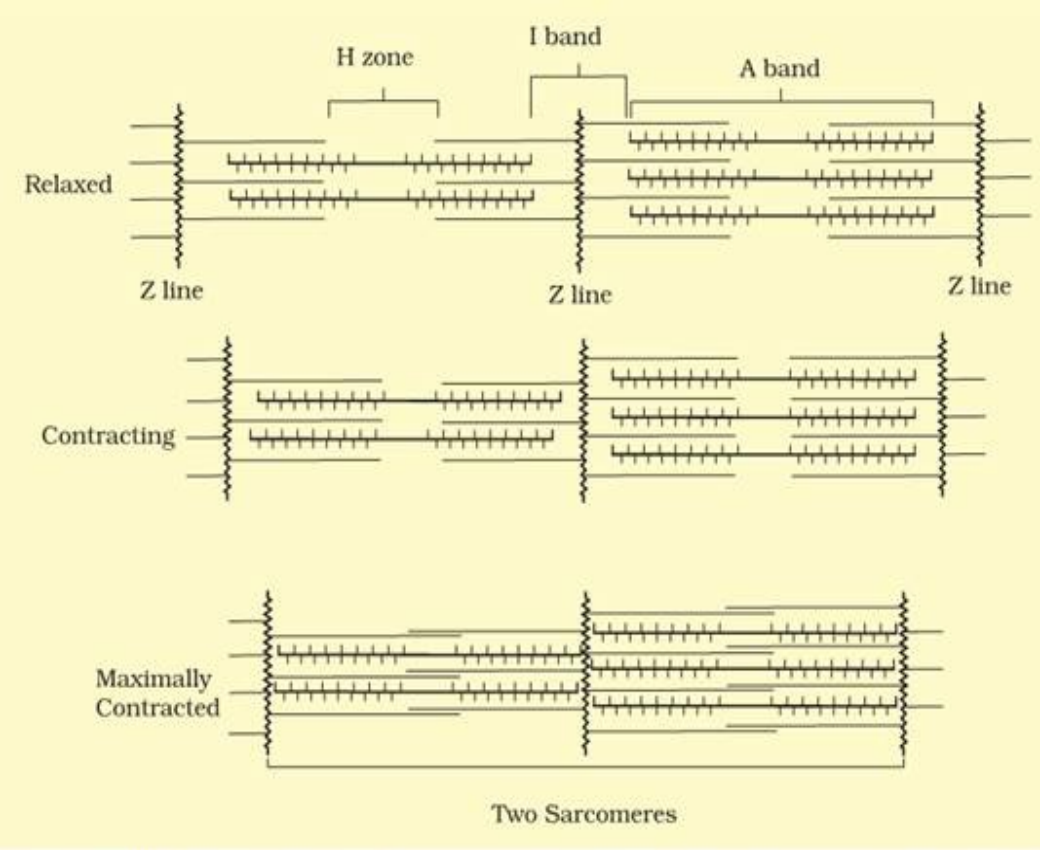

Figure 20.5 Sliding-filament theory of muscle contraction (movement of the thin filaments and the relative size of the I band and H zones)

During muscle relaxation, the cross linkage between the filaments are rearranged. The cross–bridges disappear due to the pulling of the filaments by the active sites on the actin filaments. The actin filaments are slide out from the A – band. Consequently, this elongates I – band, pushing the z – line away form each other. Thus contrition and relaxation of muscles occurs due to repetitive formation and breakage of cross bridges between thick filament of A – band and thin filament of I–band.