BIOLOGY

Important Questions

➢ Multiple Choice Questions:

Question 1. Human skull is

(a) Tricondylic

(b) Acondvlic

(c) Dicondylic

(d) Monocondylic

Question 2. Cranium of man is formed of bones

(a) 8

(b) 6

(c) 2

(d) 4

Question 3. Face of skull is formed of bones

(a) 28

(b) 10

(c) 8

(d) 14

Question 4. Curves in the vertebral column are

(a) 8

(b) 4

(c) 2

(d) 1

Question 5. Which vertebra is commonly called yesbone?

(a) Thoracic

(b) Axis

(c) Atlas

(d) Typical carvical.

Question 6. Axis vertebra is characterised by the presence of

(a) Transverse

(b) Odontoid process

(c) Neural spine

(d) Pre and post zygapophysis.

Question 7. Total number of cervical vertebrae in human vertebral column are

(a) 3

(b) 12

(c) 7

(d) 5.

Question 8. Total number of thoracic vertebrae in human vertebral column are

(a) 3

(b) 12

(c) 5

(d) 7

Question 9. Total number of lambar vertebrae in human vertebral column are

(a) 3

(b) 12

(c) 5

(d) 7

Question 10. Xiphoid process is the lowest part of

(a) Pectoral girdle

(b) Pelvic girdle

(c) Lumbar vertebrae

(d) Sternum.

Question 11. Trochlea is a part of

(a) Pectoral girdle

(b) Pelvic girdle

(c) Femur

(d) Humerus bone.

Question 12. Sigmoid notch is a part of

(a) Ulna bone

(b) Humerus bone

(c) Tibia bone

(d) Radius bone.

Question 13. Innominate bone is also known as

(a) Pelvic girdle

(b) Pectoral girdle

(c) Clavicle

(d) Sternum

Question 14. Acetabulum is a part of

(a) Humerus bone

(b) Pelvic girdle

(c) Femur bone

(d) Pectoral girdle

Question 15. The obturator foramen is a part of

(a) Skull

(b) Spinal cord

(c) Pelvic girdle

(d)Vertebral column.

➢ Fill In the Blanks:

1. Human beings can move ....., ..., ..., ... etc. Such voluntary movements are called locomotion.
2. Cells of the human body exhibit three main types of movements, namely, ..., ... and .....
3. Based on their location, three types of muscles are identified, (i) ..... (ii) ..... and (iii) .....
4. ..... are the muscles of heart. Based on appearance, cardiac muscles are .....
5. Muscle fibre is a ..... as the sarcoplasm contains many nuclei.
6. Each myofibril has alternate ..... and ..... bands on it.

➢ True or False:

1. First seven pairs of ribs are called true ribs.
2. The 8th, 9th and 10th pairs of ribs do not articulate directly with the help of hyaline cartilage. These are called vertebrochondral ribs.
3. The bones of the limbs along with their girdles constitute the appendicular skeletion. Each limb is made of 30 bones.

4. The fore limb (hand) bones are humerus, radius and ulna, carpals (wrist bones-8 in number), meta carpals (palm bones – 5 in number) and phalanges (digits- 14 in number).
5. A cup shaped bone called patella cover the knee ventrally (knee cap).
6. Joints are essential for all types of movements involving the bony parts of the body.

➢ Very Short Question:

1. What is a tendon?
2. What are antagonistic muscles?
3. What is tetanus?
4. What is threshold stimulus?
5. What is a muscle twitch?
6. What is sarcomere?
7. How many bones are present in the human skeleton?
8. What are synovial joints?
9. What is locomotion?
10. What is rigour mortis?

➢ Short Questions:

1. List the mechanical function of the skeleton.
2. List some biological function of the skeleton.
3. List different modes of locomotion and movement in hydra.
4. What are the different molecules present in muscles?
5. A red muscles fibre works for a prolonged period, whereas a white muscle fibre gets fatigued, why?
6. What are the advantages of the movement of body parts?
7. What are the advantages of locomotion?
8. Draw a labelled diagram of the joint found between the pelvic girdle and femur. Also, write the type of this joint.

➢ Long Questions:

1. (a) During muscular contraction what are the chemical changes that take place. Describe in a listed form.

   (b) What are the main groups of vertebrae in the vertebral column of man?
2. (a) What purposes does movement of external body parts in relation to body axis serve in

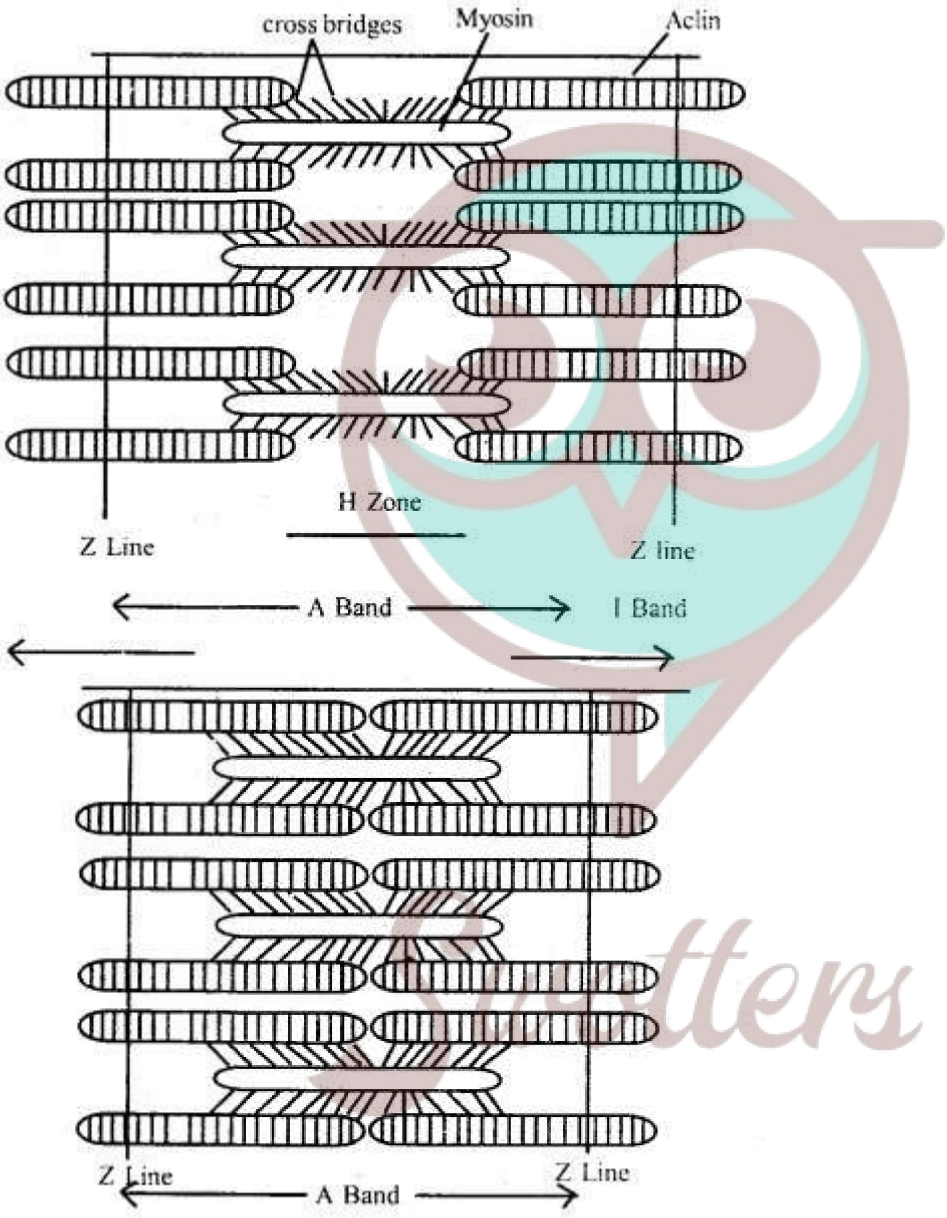
animals?

(b) What are fibrous joint and cartilaginous joints and their biological function?

(c) Explain Antagonistic muscles.

(d) Distinguish between muscles twitch and tetanus or explain muscle twitch and tetanus.

3. How thick and thin filaments are arranged in a muscle fibre?



relationship between actin and myosin filaments in stretched and contracted states

Assertion Reason Question-

1. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

Assertion: There are similarities between the locomotion of unicellular organisms and multicellular animals.

Reason: Ciliary, flagellar and amoeboid movements occur in unicellular organisms.

2. In these questions, a statement of assertion followed by a statement of reason is given. Choose the correct answer out of the following choices.

(a) If both Assertion and Reason are true and Reason is the correct explanation of Assertion.

(b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

(c) If Assertion is true but Reason is false.

(d) If both Assertion and Reason are false.

Assertion: Muscle fibre is a syncitium.

Reason: Muscle fibre has a large number of parallelly arranged myofilaments in the sarcoplasm

✓ Answer Key-

➢ Multiple Choice Answers:

1. (c) Dicondylic.
2. (a) 8.
3. (d) 14.
4. (b) 4.
5. (c) Atlas.
6. (b) Odontoid process.
7. (c) 7.
8. (b) 12.
9. (c) 5.
10. (d) Sternum.
11. (d) Humerus bone.
12. (d) Radius bone.
13. (a) Pelvic girdle.
14. (b) Pelvic girdle.
15. (c) Pelvic girdle.

➢ Fill In the Blanks:

1. limbs, jaws, eyelids, tongue
2. amoeboid, ciliary, muscular
3. Skeletal, Visceral, Cardiac
4. Cardiac muscles, striated
5. syncitium
6. dark, light

➢ True or False:

1. True
2. True
3. True
4. True
5. True
6. True

➢ Very Short Answers:

1. Answer: The dense connective tissue joins bone and skeletal muscle.
2. Answer: The. pair of muscles which at a joint produce opposite movements.
3. Answer: The continued state of muscular contraction is called tetanus.
4. Answer: The stimulus of minimum strength which is required to bring about muscular contraction is called the threshold stimulus.
5. Answer: The single contraction of muscle upon receiving the stimulus is called muscle twitch. (Contraction is followed by relaxation).
6. Answer: The functional unit of myofibril contracts and causes the shortening of muscle fibre.
7. Answer: The human skeleton contains 206 bones.
8. Answer: These are freely movable joints due to the presence of synovial fluid in the synovial cavity.
9. Answer: The bodily movement in animals from one place to the other is called locomotion.
10. Answer: Stiffening of muscle after death.

➢ Short Answer:

1. Answer:

   i. It provides a rigid framework of the body and definite shape to organs.

   ii. It supports the weight of the body.

iii. It protects the internal organs.

iv. Its long bones function as a lever.

v. Skeletal muscles with flexible connective tissue bands called tendons in association with endoskeleton and joints give locomotion and movements to different body parts.

2. Answer:

i. Provides attachment surface to muscles.

ii. Serves as storage depot of calcium and phosphate minerals.

iii. Act in erythropoiesis.

iv. Ear ossicles help in sound wave propagation.

v. Redbone marrow present inside the marrow cavity of long bones such as femur, humerus and in interstices of spongy bones of vertebrae, sternum, scapula etc. help in the formation of RBCs, WBCs and platelets of the blood. This process is known as Haemopoiesis.

3. Answer:

i. Contraction and expansion

ii. Bending and swaying

iii. Looping

iv. Somersaulting.

v. Floating

vi. Gliding

vii. Swimming

viii. Walking.

4. Answer:

i. Contractile proteins viz. actin, myosin and tropomyosin.

ii. Enzymes and other proteins like troponin.

iii. Carbohydrate as a substrate for energy.

iv. Energy carries viz. ATP, ADP, AMP and CP.

v. Ions viz. Na^+, K^+, Mg^{++}, Ca^+, Cl^+.

5. Answer: Red muscle fibres contain oxygen storing pigment myoglobin and a large number of mitochondria, so they can have O_2 supply for aerobic respiration and release of energy for a longer period.

White muscles fibres do not have myoglobin pigment. They face a short supply of O_2 and much depends on anaerobic respiration, so they get fatigued soon.

6. Answer: The movement has the following advantages:

   i. With change in body posture and limb movement, equilibrium of the body is maintained.

   ii. Limb movement causes locomotion.

   iii. Food is captured by movement of tentacles, limbs, jaw, tongue etc. in different animals.

   iv. Changes in environment surrounding can be sensed by the movement of the eyeball, pinna etc.

   v. Blood circulation is possible by heart movement.

   vii. Movement of the diaphragm causes inhales and exhale (breathing).

7. Answer: The bodily movements or locomotion has the following advantages:

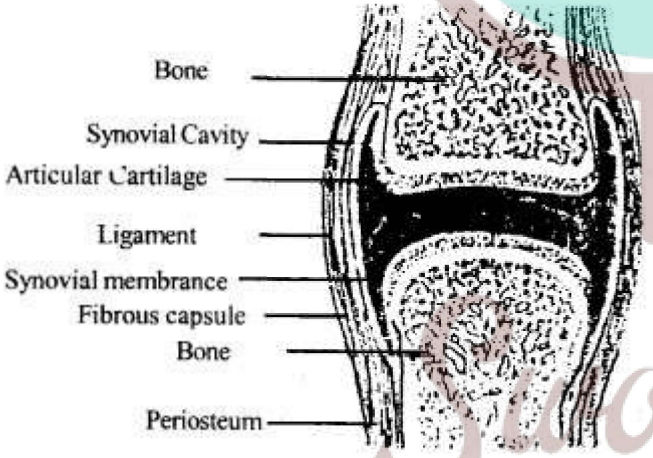
   i. It enables the body to shift it entirely from one place to the other.

   ii. It protects the organism from predation.

   iii. It helps the animals to make the search for their food and other nutritional requirements.

   iv. It helps the animal to seek a mate for reproduction.

8. Answer: Type of the joint: The joint between pelvic and femur bones is a ball and socket synovial joint.



Synovial ball and socket joint between pelvic and femur

➢ Long Answer:

1. (a) Answer: The main chemical events that happen during muscular contraction described by Albert Szent Gyorgi are

   i. Acetylcholine is released from vesicles at the neuromuscular junction. It stimulates the muscle

   ii. Hydrolysis of ATP in the presence of Ca++ and Mg++ Energy used up in muscle contraction.

   iii. ADP is charged again by taking phosphate from creatine phosphate (CP).

ADP+CP ⟶ ATP +C
Creating Creating
Phosphate

iv. During relaxation, creatine is phosphorylated, energy being provided by anaerobic conversio of muscle glycogen into lactic acid.

Creatine + ATP— Creating-phosphate + ADP

v. Energy released by hydrolysis of ATP causes rotation of myosin heads and bring near the acti filaments, actomyosin complex is formed, eventually, sarcomere shortens.

vi. Ca++ are actively transported to the sarcoplasmic reticulum, no more Ca++ available for ATP breakdown, no further energy available for further contraction of the sarcomere.

vii. Part of the energy is utilized by breaking of cross-bridges and the muscle relaxes.

(b) Answer: There are 5 groups of vertebrae namely cervical, thoracic, lumbar, sacral and coccygeal vertebral.

(The vertebral formula is C7, T12, L5, C3-5 = 32 – 34).

2. Answer:

i. The movement of limbs, appendages, head and trunk serves to change the body posture to maintain equilibrium against gravity.

ii. Limb movements are prerequisites for carrying out locomotion.

iii. Prehension of food involves movement of tongue, jaws, snout, tentacles, limbs and appendages in different animals.

iv. Movement of eyeballs and pinna of ear help to collect information from the external environment.

(b) Answer:

i. Fibrous joint: The articulating bones are firmly held together by the dense bands of tough, inextensible white fibrous tissues. They provide strength and support for the body or protection of delicate structures which cannot withstand any kind of deformation.

ii. Cartilaginous joints: In cartilaginous joints, a dense disc of white fibrocartilage joins the opposing surfaces of the articulating bones to each other. This allows a limited movement at the joints.

(c) Answer: Antagonistic muscles: Antagonistic muscles are those which contract to produce opposite movements at the same joint. When a muscle contract to produce a movement, its antagonistic must relax to allow that movement to take place, e.g., the bicep is a FLEXER for the elbow joint and the tricep is it's antagonistic and an EXTENSOR for that joint.

During flexion at the elbow, the biceps contract and the tricep relax, during extension at the sa joint the tricep contracts and the biceps relaxes.

(d) Answer: A single isolated contraction caused by a single nerve impulse or electric shock is called a muscle twitch. Immediately after the brief twitch, the muscle fibres relax.

Tetanus is a continued state of concentration caused by many repeated stimuli. Much higher tension is developed in tetanus than in an isolated twitch. Almost all our daily activities are carried out by tetanic contractions of muscles.

3. Answer: Each striated muscle contains thin actin and thick myosin filaments. These filaments ar longitudinally arranged inside light I bands and dark A bands respectively. The actin and myosin filaments remain cross-linked with each other in the myofibril. Sarcomeres are the rows of functional unit in each myofibril, each extending from the dark Z- line of the next I band. Each sarcomere thus comprises of A band in the middle with 2 half I band on its two sides.

   From each Z line, the actin filaments through half of the I band intermingles with the ends of myosin filaments in the A band. The myofibril is surrounded at each I band by the tubules and cisternae of sarcoplasmic reticulum and at each junction of A and I bands by a TI tubule communicating with the cell exterior, which is shown in the figure. The relationship between ac (thin filament) and myosin (thick filament).

Assertion Reason Answer-

1. (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

   Explanation: Main movement found in unicellular organisms are ciliary, flagellar and amoeboid movements. In multicellular animals also, phagocytes migrate through tissues by amoeboid movements. Ciliary movement of cells lining the upper respiratory tract, fallopian tubes and vas efferentia of testes transport, respectively dust particles, ova and sperms in specific direction ir those organs. Mammalian sperms move into the female reproductive tract by flagellar movements.

2. (b) If both Assertion and Reason are true but Reason is not the correct explanation of Assertion

   Explanation: Muscle fibre is a syncitium as the sarcoplasm contains many nuclei. A characteristic feature of the muscle fibre is the presence of a large number of parallelly arranged filaments in the sarcoplasm called myofilaments or myofibrils. Each myofibril has alternate dark and light bands on it.