

BIOLOGY (EM) NOTES FOR CLASS 10TH (FOR SINDH)

Chapter

4

Support and Movement

Section
A

Multiple Choice Questions (M.C.Qs)

Choose the correct answer:

01. Irritation caused by the stimulus is the main cause of:
(a) tropism (b) movement (c) locomotion (d) arthritis
02. The frame work which gives shape to any structure called:
(a) architecture (b) bone (c) cartilage (d) skeleton
03. The cartilage is made up of cells called:
(a) Osteoclast (b) Osteocytis (c) Chondrocytes (d) Chaonocytes
04. The head of femur attached with:
(a) pelvic girdles (b) pectoral girdle
(c) scapula (d) acetabulum of pelvic girdles
05. The large muscle of the arm is:
(a) bicep (b) tricep (c) tetracep (d) pentacep
06. The band of tough, fibrous, connective tissues which are attached to bone at joints called:
(a) ligament (b) tendon (c) bicep (d) tricep
07. Softening and weakening of bone in children due to deficiency of vitamin D called:
(a) osteoporosis (b) osteoarthritis (c) rickets (d) rheumatic fever
08. The muscle which is responsible to straighten the limb is:
(a) ligament (b) skeleton muscle (c) flexor (d) extensor
09. The pair of muscle where both work in opposite direction:
(a) Antagonist (b) Cardiac (c) Smooth (d) Abductor
10. The living material of the cells of an organism is:
(a) protoplasm (b) cytoplasm (c) DNA (d) RNA
11. The living organism take some action to reduce its irritation, these actions are called:
(a) stimulus (b) locomotion (c) movement (d) tropism
12. The change in the environment takes place due to some factors which are called:
(a) stimulus (b) locomotion (c) movement (d) tropism
13. It is due to internal stimuli.
(a) Autonomic movement (b) Spontaneous movement
(c) Both 'a' & 'b' (d) None of these

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14. **Reflex action is an example of:**
 (a) Autonomic movement (b) Paratonic movement
 (c) Spontaneous movement (d) Both 'a' & 'c'
15. **In this type of movement, an organism changes its place either towards or away from a stimulus.**
 (a) Locomotory movement (b) Taxis movement
 (c) Tactic movement (d) All of these
16. **Growth of root towards water and mineral and growth of stem toward light are examples of:**
 (a) Tactic Movement (b) Nastic Movement (c) Trophic Movement (d) Taxis Movement
17. **In this type of movement where a change in osmotic water occurs due to stimuli.**
 (a) Tactic Movement (b) Nastic Movement (c) Trophic Movement (d) Taxis Movement
18. **Jellyfish have:**
 (a) hydrostatic skeleton (b) exoskeleton
 (c) endoskeleton (d) None of these
19. **It is a non-living skeleton deposit outside the body or organ:**
 (a) Hydrostatic Skeleton (b) Exoskeleton
 (c) Endoskeleton (d) None of these
20. **Skeleton develops inside the body is called:**
 (a) Hydrostatic Skeleton (b) Exoskeleton
 (c) Endoskeleton (d) None of these
21. **Bone dissolving cells are called:**
 (a) chaonocytes (b) osteoblast (c) osteocyte (d) osteoclast
22. **Bone remodeling is the result of coordinated activity of:**
 (a) osteoclast and osteoblast (b) osteoclast and osteocyte
 (c) osteoclast and choanocytes (d) osteoblast and osteocyte
23. **In humans, there are :**
 (a) 203 bones (b) 206 bones (c) 209 bones (d) 213 bones
24. **Human skull has:**
 (a) 22 bones (b) 26 bones (c) 27 bones (d) 29 bones
25. **In human vertebral column, there are:**
 (a) 21 vertebrae (b) 23 vertebrae (c) 24 vertebrae (d) 26 vertebrae
26. **Scapula and clavicle bones are found in:**
 (a) pectoral girdle (b) pelvic girdle (c) hind limb (d) forelimb
27. **Knee joint is an example of:**
 (a) gliding joint (b) pivot joint (c) ball & socket joint (d) hinge joint
28. **Which one of the following is the example of a ball & socket joint?**
 (a) Elbow joint (b) Wrist joint (c) Hip joint (d) vertebrae
29. **The band of fibrous connective tissues by which bones are joined to one another at joints called:**
 (a) ligament (b) tendon (c) bicep (d) tricep
30. **This joint allows movements in one plane only.**
 (a) Gliding joint (b) Pivot joint (c) Ball & socket joint (d) Hinge joint

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31. The ball of humerus fit into the socket of:
 (a) pelvic girdles (b) pectoral girdle
 (c) acetabulum of pelvic girdles (d) None of these
32. The vertebrate possess:
 (a) five kinds of muscles (b) four kinds of muscles
 (c) three kinds of muscles (d) two kinds of muscles
33. Bones move due to the contraction and relaxation of:
 (a) skeletal muscles (b) cardiac muscles (c) smooth muscles (d) All of these
34. These muscles are found in blood vessels, the digestive tract and many other internal organs.
 (a) Skeletal muscles (b) Cardiac muscles (c) Smooth muscles (d) All of these
35. The action of biceps and triceps muscles of the arm is a good example of a/an:
 (a) smooth muscles (b) sino auricular node (c) cardiac muscles (d) antagonistic pair
36. Biceps is the:
 (a) extensor muscle (b) flexor muscle (c) ligament (d) tendons
37. The hardening of bones occurs due to deposition of:
 (a) calcium phosphate (b) calcium carbonate
 (c) calcium bicarbonate (d) calcium
38. Calcification is the process of the:
 (a) softening and weakening of bones (b) swelling and tenderness of joint
 (c) restricted movement of joint (d) the hardening of bones
39. It is a disorder related to the ageing process.
 (a) Osteoporosis (b) Osteoarthritis (c) Rickets (d) Arthritis
40. In this condition the bones become porous or more spongy, thinner and weaker.
 (a) Arthritis (b) Rickets (c) Osteoporosis (d) Osteoarthritis
41. Deficiency of this leads to deficiency of Ca^{++} in bones.
 (a) Vitamin A (b) Vitamin B (c) Vitamin C (d) Vitamin D
42. It is the painful condition of joints due to swelling and tenderness of joints.
 (a) Osteoporosis (b) Osteoarthritis (c) Rickets (d) Arthritis
43. In this disorder immune system attacks on joints.
 (a) Osteoarthritis (b) Rheumatoid Arthritis
 (c) Psoriatic Arthritis (d) Rickets
44. In this disorder joints and skin affects.
 (a) Osteoarthritis (b) Rheumatoid Arthritis
 (c) Psoriatic Arthritis (d) Rickets

Answers

1. (b)	2. (d)	3. (c)	4. (d)	5. (a)	6. (b)	7. (c)
8. (d)	9. (a)	10. (a)	11. (c)	12. (a)	13. (c)	14. (b)
15. (d)	16. (c)	17. (b)	18. (a)	19. (b)	20. (c)	21. (d)
22. (a)	23. (b)	24. (a)	25. (d)	26. (a)	27. (d)	28. (c)
29. (a)	30. (d)	31. (b)	32. (c)	33. (a)	34. (c)	35. (d)
36. (b)	37. (a)	38. (d)	39. (a)	40. (c)	41. (d)	42. (d)
43. (b)	44. (c)					

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Section
B & C

Short & Detailed Answer Questions

Q.1 Define: (i) irritability (ii) movement (iii) stimulus

Ans: **Irritability:** The cells of an organism have a living material, protoplasm, which is sensitive, due to the sensitive nature it possesses a special property called irritability. It means it irritates when there is a change in its environment.

Movement: Due to irritability the living organism take some action to reduce its irritation these actions are called movement. We can say that movement is a response shown by living organisms toward stimuli.

Stimulus: The change in the environment takes place due to some factors these factors are called stimulus (stimuli: p).

Q.2 How do plants respond to stimuli?

Ans: All living organisms have the property of locomotion due to nutrients, shelter and reproduction mainly plants are sessile while animals are usually motile therefore they respond to stimuli in different ways. The plant responds to stimuli by adjusting the rate of growth and osmotic condition while responding to these stimuli by changing their position either towards or away from stimuli.

Q.3 Give an example of the movement at the cellular level.

Ans: The movement can also occur at the cellular level; like cyclosis in a cell or the movement of chromosomes towards their respective poles during cell division etc.

Q.4 Define the types of movement on the basis of stimuli.

Ans: On the basis of stimuli there are two types of movement:

- (i) **Autonomic or Spontaneous Movement:** It is due to internal stimuli.
Example: Cramps due to Involuntarily release of Ca^{++} ions.
- (ii) **Paratonic or Induce Movement:** It is due to external stimuli,
Example: Reflex action.

Q.5 Describe the types of movement on the basis of responses.

Ans: **Types of Movement on the Basis of Responses**

- (i) **Locomotory or Taxis or Tactic Movement:** In this type of movement, an organism changes its place either towards or away from a stimulus. This type of movement is usually found in animals, bacteria and protozoa.
- (ii) **Trophic Movement:** In this type of movement, an organism moves toward or away by growing its organs. It is usually found in plants, fungi or bacterial colonies. Growth of root towards water and mineral and growth of stem toward light are few examples.

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- (iii) **Nastic Movement:** The non-directional movement (of plants) in response to a stimulus (e.g. humidity, temperature, light irradiance, nutrients, gravity, etc.) This is a type of movement where a change in osmotic water occurs due to stimuli. It is purely found in plants like touch-me-not plants, which close leaves when touched.

Q.6 What is the difference between movement and locomotion?

Ans: Difference Between Movement and Locomotion: It is a misconception that locomotion and movement are the same phenomena. Movement is a broad term where an organism responds to stimuli in any way whereas locomotion is one of the types of movement, where an organism changes its place either towards stimuli or away from stimuli. If an organism shows response towards stimuli but does not change its place it may be any type of movement but not locomotion.

Q.7 Define skeleton. What are its functions?

Ans: Skeleton: For locomotion animal bodies want support to change their place in a balanced and well-coordinated manner. For support, animals have a skeletal system. Skeletons are the framework that gives shape to any structure.

Functions of the Skeleton: The skeleton performs three main functions.

- (i) It provides shape to organs
- (ii) It provides support to organs during movement
- (iii) It protects soft, vital organs.

Q.8 Describe the types of skeleton.

Ans: Types of Skeleton: There are three main types of skeletons.

- (i) **Hydrostatic Skeleton:** A hydrostatic skeleton is a skeleton formed by a fluid-filled compartment within the body, called the coelom. The organs of the coelom are supported by the aqueous fluid, which also resists external compression. This compartment is under hydrostatic pressure because of the fluid and supports the other organs of the organism.

This type of skeletal system is found in soft-bodied animals such as sea anemones, earthworms, Cnidaria, and other invertebrates.



- (ii) **Exoskeleton:** An exoskeleton is an external skeleton that consists of a hard encasement on the surface of an organism. For example, the shells of crabs and insects are exoskeletons.

This skeleton-type provides defence against predators, supports the body, and allows for movement through the contraction of attached muscles. As with vertebrates, muscles must cross a joint inside the exoskeleton.



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(iii) **Endoskeleton:** An endoskeleton is a skeleton that consists of hard, mineralized structures located within the soft tissue of organisms. The bones of vertebrates are composed of tissues.

Endoskeletons provide support for the body, protect internal organs, and allow for movement through the contraction of muscles attached to the skeleton.



Q.9 Differentiate between hydrostatic skeleton, exoskeleton and endoskeleton.

Ans:

	Hydrostatic Skeleton	Exoskeleton	Endoskeleton
1.	It is made up of fluid.	It deposits outside the body or organ.	It develops inside the body.
2.	It is found in soft-bodied animals.	It is found in Arthropod, Mollusca and higher animals.	It is found in high animals.
3.	It is the simplest type of skeleton.	It provides support and protection.	It provides shape, support and protection.
4.	It helps in the extension or withdrawal of the body or its organs.	Non-living in nature, in arthropods made up of chitin, in Mollusca made up of CaCO_3 .	Living in nature is made up of cells.
5.	In jellyfish, help in propulsion by water. In earthworm, coelomic fluid work as a hydrostatic skeleton.	In high animals, it is made up of proteins.	Two types of endoskeleton cartilage are made p of chondrocyte bones made up of osteocytes.

Q.10 What is the human skeleton made of?

Ans: **Human Skeleton:** The skeletal system of humans is made up of two types of skeletons:

- (i) Cartilage (ii) Bones

Both are rigid, cellular structures and types of the endoskeleton.

Q.11 Differentiate between cartilage and bones.

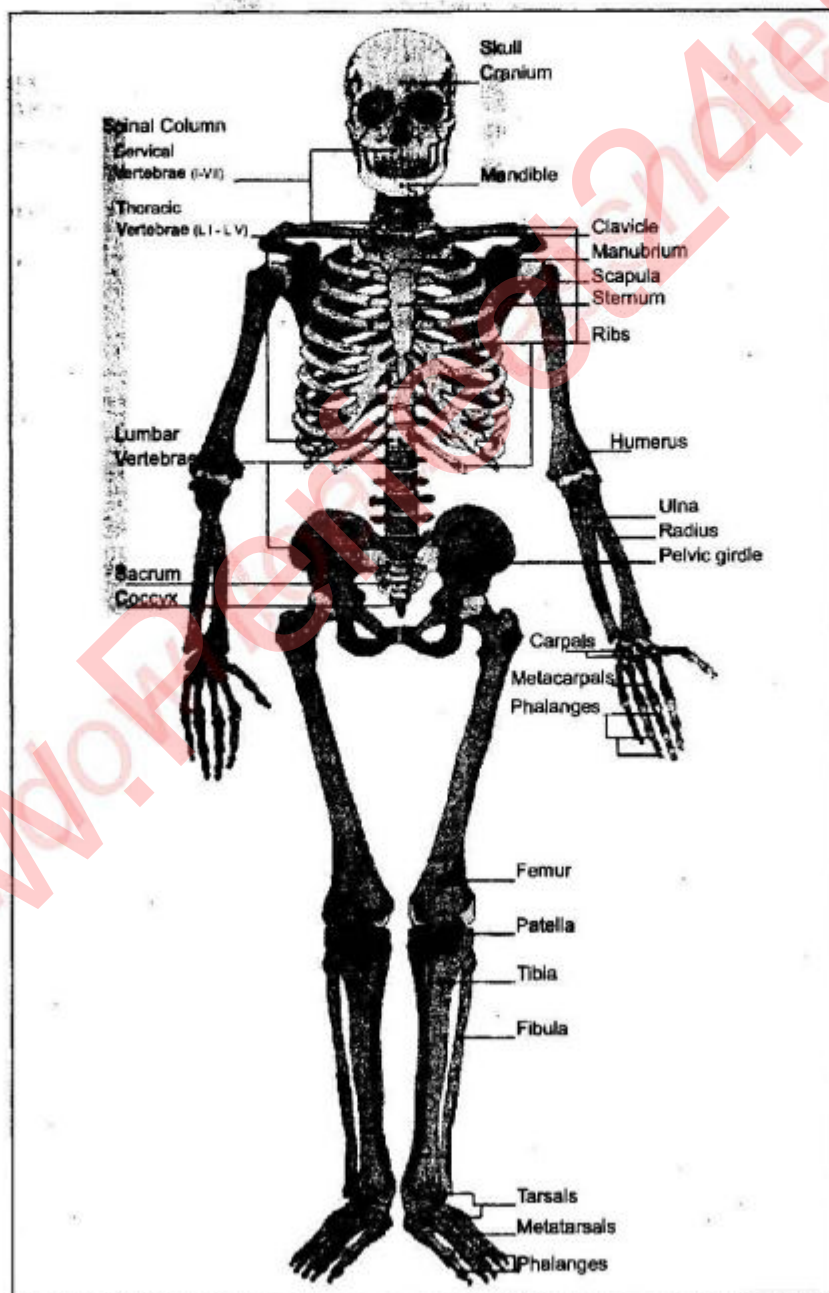
Ans: **Difference Between Cartilage and Bones:**

	Cartilage	Bones
1.	A flexible type of skeleton.	Harder type of skeleton.
2.	It is made up of cells called chondrocytes embedded in a matrix of a protein called collagen.	It is made up of cells called osteocytes embedded in a matrix of a protein called collagen.
3.	It is much softer than bones as well as flexible.	It is harder due to the deposition of calcium phosphate, the process is called calcification.
4.	Calcification does not take place.	Calcification takes place.
5.	It covers the ends of the bones and joints.	It supports the organ consists of an outer shell of compact bone.
6.	No blood vessel penetrates cartilage.	Blood vessels can penetrate bone, especially spongy bones.

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Q.12 Write a few lines on the support and movement provided by the skeleton.

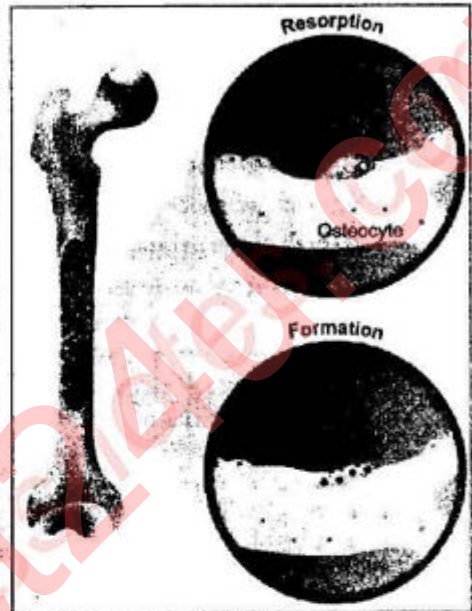
Ans: **Skeleton Provide Support and Movement:** Skeleton provides support to the body, especially limbs. i.e. hind limbs and pelvic girdle provide support to the human body to be a bipedal animal, with these limbs the complete vertebrae of the vertebral column provide support to stand straight. The cartilage of the external pinna and nose support the organs to make their proper shape. Cartilage also supports the larynx, trachea and bronchi of the respiratory system. It forms tough pads which act as shock absorbers found in knee joints and also arm intervertebral discs between vertebrae of the backbone.



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Q.13 *Skeletal system is a dynamic system. Discuss.*

Ans: **Skeletal System is a Dynamic System:** The dynamic property of the skeletal system means that it is made up of living tissues; it is capable of quick growth. It can adapt to stress and can repair itself after damage (injury). 5% to 10% of our bones dissolve away annually and are replaced by a new one this process is called remodelling while in the growing age our bones enlarge with the growth of the body. The remodelling system allows a skeleton to alter the shape and size of the skeleton in response to demands, e.g. the bones carry a heavy load or are subjected to extreme stress become thicker to provide more strength and support. Normal stresses are major factors in maintaining bone strength. There are three types of cells associated with bones i.e. bones forming cells (osteoblast), mature bone cell (osteocyte) and bone dissolving cells (osteoclast). Bone remodelling is the result of the coordinated activity of osteoclast and osteoblast. This coordination can be seen clearly at the time of repair of a broken bone.

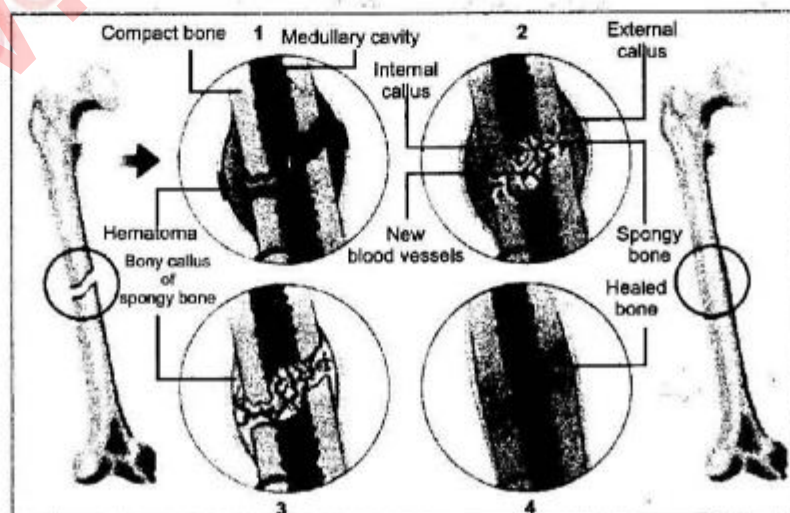


Q.14 *Describe the model of bone healing that occurs during 6 weeks.*

Ans: **Model of Bone Healing Occurs During 6 Weeks:** A bone is broken. Let's see the sequence of events that occur during 6 weeks of bone healing.

Step 1: Blood from ruptured blood vessels forms a large clot around the fracture. Phagocytic cells and osteoclast in the blood ingest, dissolved the cellular debris and bone fragments.

Bones are normally covered with a thin layer of connective tissues i.e. periosteum, rich in capillaries, osteoblast and osteoblast forming cells.



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Step 2: A fracture ruptures the periosteum and stimulates the production and release of numerous osteoblasts, which secrete a porous mass of bone and cartilage called callus, around the break. Callus replaces the original blood clot and holds the end of the bones together, the remodelling process reform the original shape of the bone.

Step 3: Osteoclast, osteoblast and capillaries invade the callus. Blood nourished the cells, osteoclast breakdown the cartilage while osteoblast replaces it with bone.

Step 4: The healing of bone completed.

Q.15 How many groups are human bones categorized into?

Ans: In humans, 206 bones are present which can be categorized into two groups.

- (a) The axial skeleton (b) The appendicular skeleton

(a) The Axial Skeleton: The axial skeleton forms the main axis of the human body, includes the bone of the head (skull 22 bones), vertebral column (26 Vertebrae) and rib cage (ribs 12 pairs and sternum 1 bone).

(b) The Appendicular Skeleton: The appendicular skeleton forms the appendages (limbs) and their attachment to the axial skeleton includes pectoral (shoulder) and pelvis (hip) girdles.

Pectoral Girdle: Pectoral girdle is consist of two bones i.e. scapula and clavicle. The forelimb consists of humerus, radius and ulna, carpal (8), metacarpal (5), and phalanges (14).

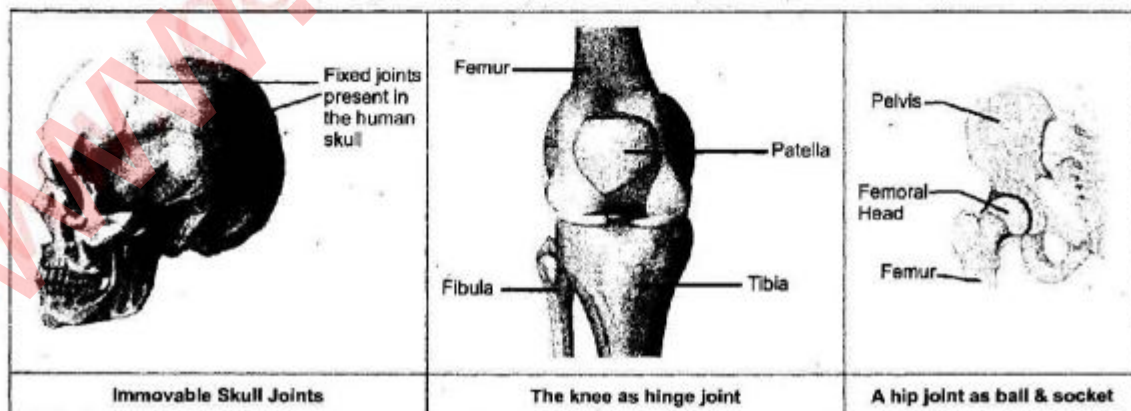
Pelvic Girdle: Pelvic girdle consists of three bones ileum, ischium and pubis. The hind limb consists of the femur, patella, tibia, fibula, tarsals (7), metatarsals (15) and phalanges (14).

Q.16 Define a joint. How many types of joints are there?

Ans: **Joint:** The junction of two bones is called a joint.

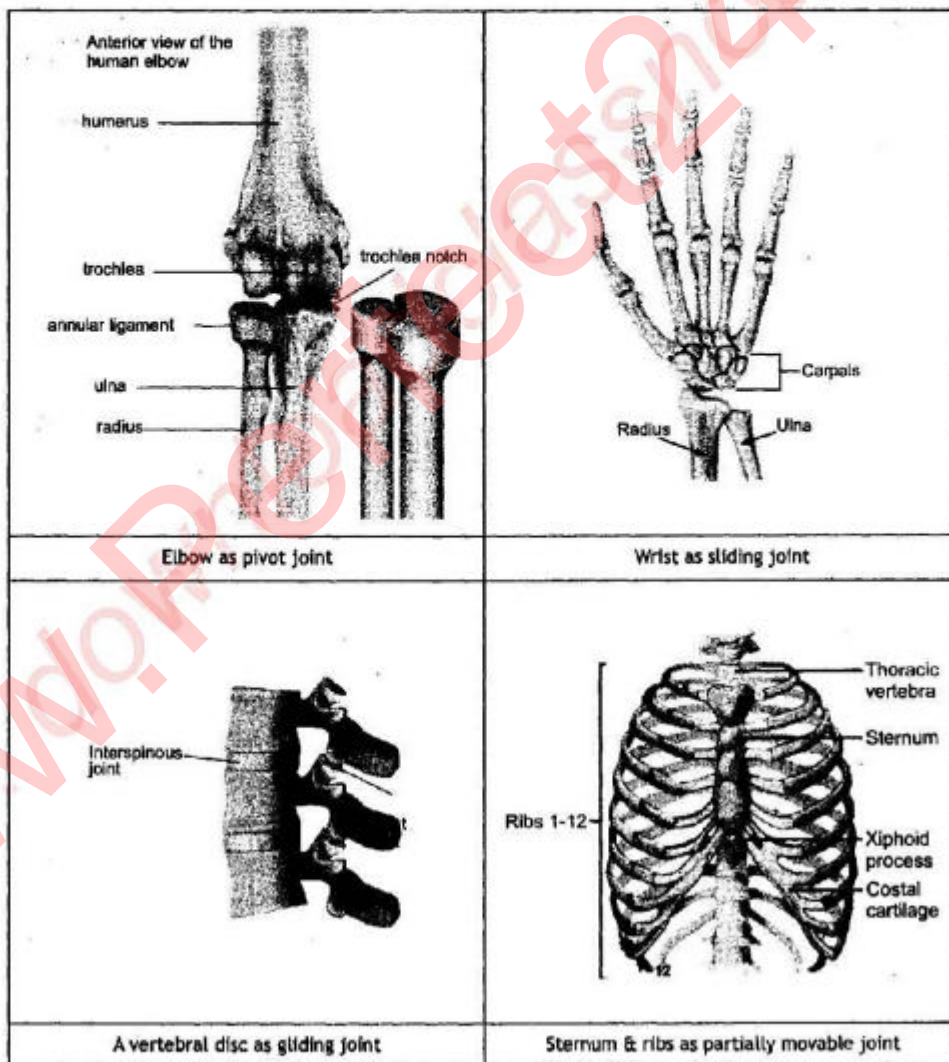
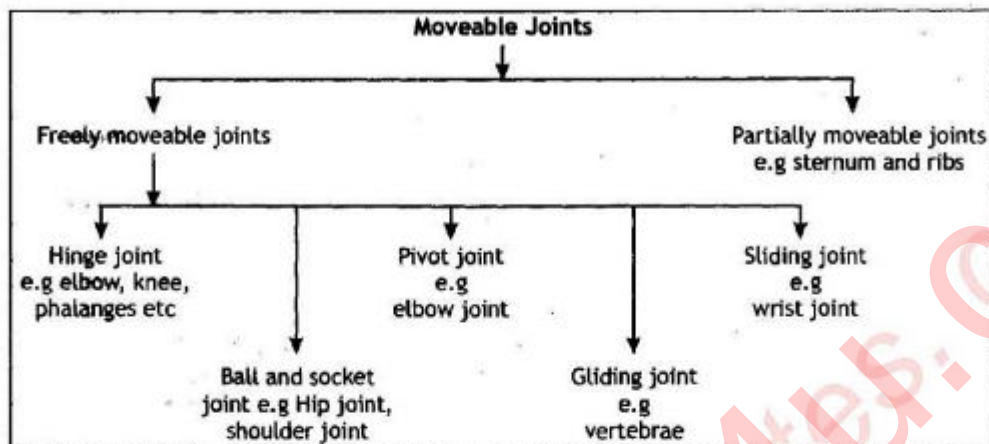
Types of Joints: There are two types of joints:

- (i) **Immovable or Fixed joint:** Joint where bones are fixed like puzzle pieces and do not allow to move, like 8 bones of skull or 3 bones of pelvic girdles.



- (ii) **Moveable Joints:** Moveable joints where bones are allowed to move freely or partially, so there are two types of moveable joints i.e. freely moveable and partially moveable.

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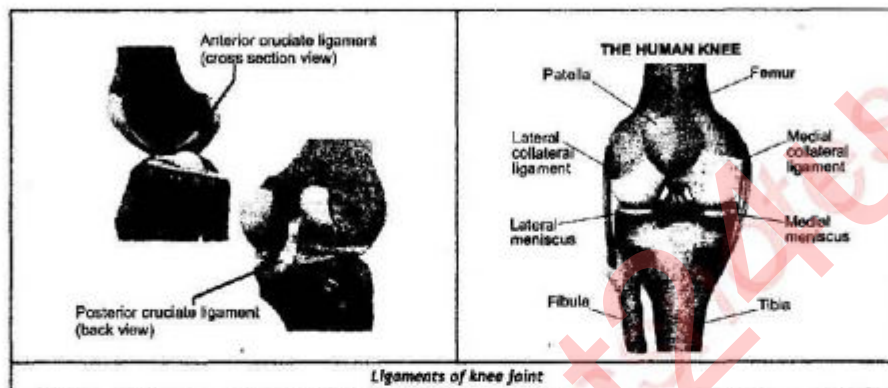


Hinge Joints (e.g. knee joint) allow movement in one plane only whereas ball and socket (shoulder joint) allows movement in many planes such as forward, backward and sideways. Both hinge joints and ball socket joints have the same basic structure.

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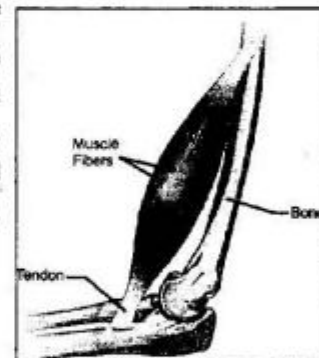
Q.17 What is a ligament?

Ans: Ligament: The band of fibrous connective tissues by which bones are joined to one another at joints called a ligament. It works as strong firmly attached ropes; it stabilizes the joint or holds the ends of two bones together. The strong connective tissue in the ligaments protects these structures and prevents them or bending twisting or tearing.



Q.18 What do you know about tendons and their function?

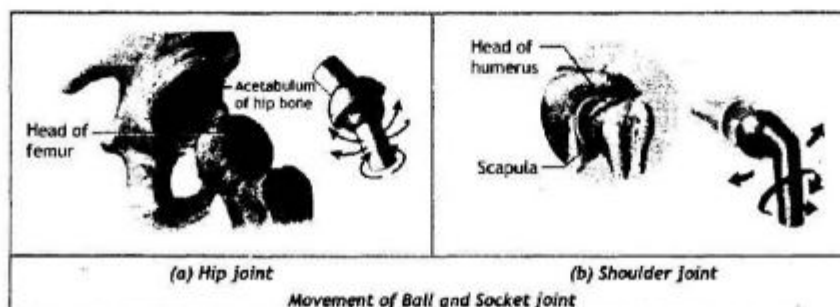
Ans: Tendons: Skeletal muscles are attached to bones on either side of the joint by bands of tough, fibrous connective tissues called tendons. They are tougher and less elastic than ligaments. Tendon transfers the mechanical force of muscle contraction to the bones. It is strongly connected to muscles fibre at one end and components of the bones at its other end. They are very strong, highly tensile.



Q.19 Describe location and movement of a hinge joint and ball & socket joints.

Ans: Location and Movement of Hinge Joint: Hinge joints move back and forth like the hinge on a door and allow movements in one plane only. The knee and elbow are hinge joints.

Location and Movement of Ball and Socket Joints: This joint allows movement in all directions. The ball of the humerus and femur fits into the socket of the pectoral and pelvic girdle respectively. The hip and shoulder joints are ball and socket joints.



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Q.20 Describe muscles and their kinds.

Ans: **Muscles:** Movements of arms and legs are brought about by the contraction of muscles attached to bones. Muscles are connective tissues that consist of fibrous cells. These tissues have a tendency to contract and relax.

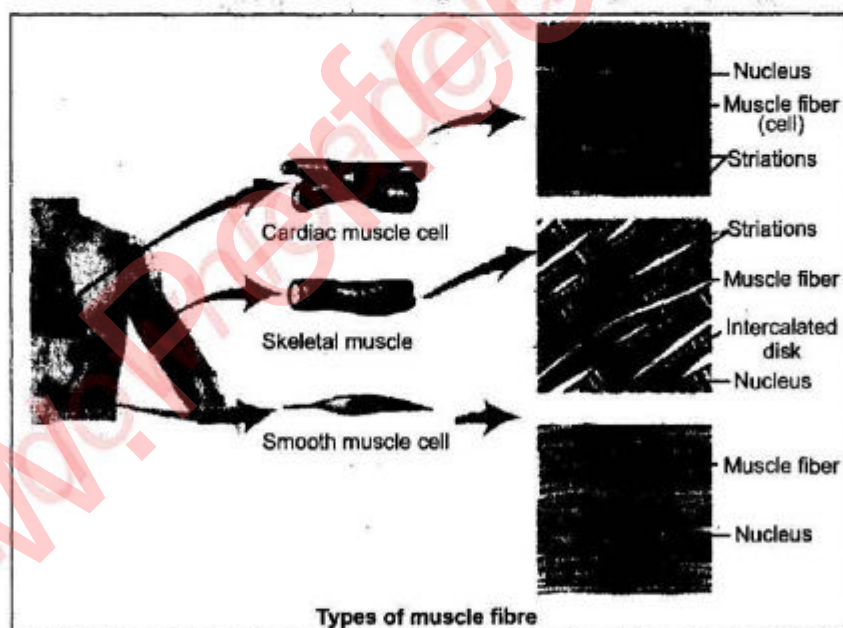
Kinds of Muscles: The vertebrate possess three kinds of muscles.

(i) Skeletal muscles (ii) Cardiac muscles (iii) Smooth muscles

(i) **Skeletal Muscles:** The muscles which are attached to the skeleton are called skeletal muscles. They are associated with the movement of bones. These muscles are voluntary in nature. They are also called striped or stride muscles because they have alternate thick and thin means dark and light bands.

(ii) **Cardiac Muscles:** These are the muscles that build the walls of the heart. They are also striated muscles but unlike skeletal muscles, they are branched in nature and arranging mesh work. They are involuntary in nature, work under the control of SAN (Sino auricular node).

(iii) **Smooth Muscles:** Smooth muscles are the earliest form of muscles from an evolutionary point of view. They are made up of long and spindle-shaped cells, each cell contains a single nucleus. They have no striations or stripes. They are involuntary in nature. These muscles are found in blood vessels, the digestive tract and many other internal organs.



Q.21

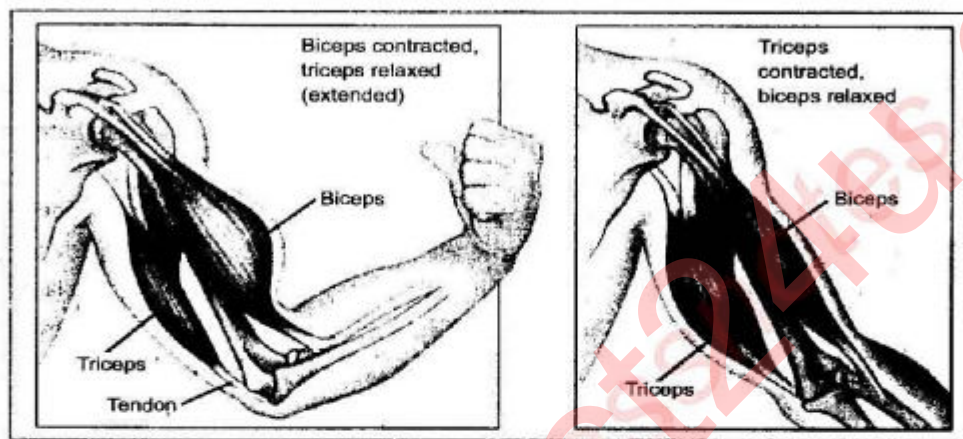
Explain that support and locomotion are mainly due to the skeletal system and skeletal muscles system.

Ans: Support and locomotion are mainly due to the skeletal system and skeletal muscles system. The contraction and relaxation of skeletal muscles allow the bones to move. The muscles which are attached to bones are called skeletal muscles. These muscles only exert a pulling force. When skeletal muscles relax, they are stretched by the contraction of another muscle. It shows that muscles are always found in pairs. The one muscle of this pair when contracted other muscles will

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relax. This type of working of two muscles against each other is called *antagonism*. The pair of skeletal muscles which work against each other is called an *antagonistic pair*. The action of the biceps and triceps muscles of the arm is a good example of an antagonistic pair.

The bicep muscle is a large muscle that lies on the front of the upper arm between the shoulder and elbow. It has two heads or origins. The tricep is also a large muscle on the back of the arm. It is three-headed or origins.

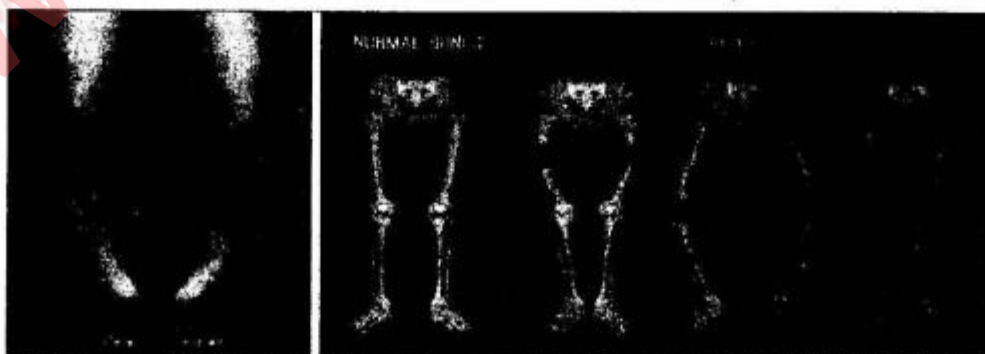


When the biceps muscle contracts it pulls upon the radius bone of the lower arm, which bend the arm at the elbow, this bending process is called flexion. On the other side when the triceps muscle contracts it pulls on the ulna which straightens or extends the arm. The straightening process is called extension. It shows that when the biceps contract the triceps relaxes and vice versa. It means that in the arm the biceps is the flexor muscle and the tricep is the extensor muscle.

Q.22 What is the effect of calcium deficiency on bones?

Ans: **Effect of Calcium Deficiency on Bone:** The hardening of bones occurs due to deposition of calcium phosphate, this process is called calcification. If Ca^{++} deficiency occurs in the body or blood, ultimately it occurs in bones. This deficiency of Ca^{++} in bone is called hypocalcemia is known as a calcium deficiency disease. A long term calcium deficiency can lead to dental weakness, osteoporosis, in childhood rickets.

Osteoporosis: Osteoporosis is a disorder related to the ageing process. In this condition, the bones become porous or more spongy, thinner and weaker so that they become fragile, in this condition a slight injury break the bone. Osteoporosis is more common in females than males.



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Rickets: Rickets is the softening and weakening of bones in children, usually because of an extreme and prolonged vitamin D deficiency. Vitamin D plays a vital role in the absorption of Ca^{++} , deficiency of vitamin D leads to deficiency of Ca^{++} in bone.

Q.23 What is arthritis?

Ans: **Arthritis:** It is the painful condition of joints due to swelling and tenderness of joints. The main symptoms of arthritis are:

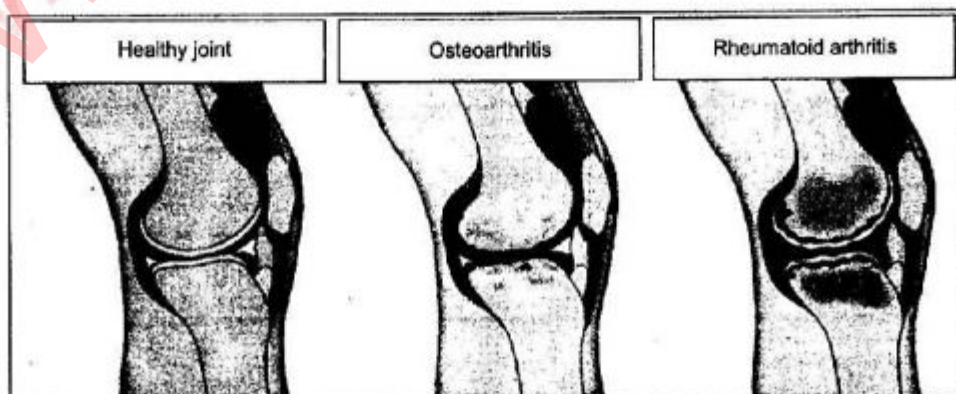
- ♦ joint pain
- ♦ inflammation in and around the joint
- ♦ warm red skin over the affected joint
- ♦ trouble dressing, combing, gripping, bending over squatty or climbing stairs.
- ♦ tenderness and stiffness
- ♦ restricted movement of joint



Q.24 What are the common types of arthritis?

Ans: **Common Types of Arthritis:**

- (i) **Osteoarthritis:** It is a "wear and tear",
Causes: Overuse of joints, age, joint injury, obesity. Joints that bear weight, like knees, hips, feet and spine.
- (ii) **Rheumatoid Arthritis:** It is due to the immune system i.e. autoimmune disorder. In this disorder, the immune system attacks joints.
- (iii) **Psoriatic Arthritis:** In this disorder joints and skin affects.



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Q.25 Describe the causes of arthritis.

Ans: **Causes of Arthritis:** The following factors are the causes of arthritis:

- | | | |
|--|--------------------------|-----------------|
| (i) Injury | (ii) Abnormal metabolism | (iii) Infection |
| (iv) Autoimmune system | (v) Genetic makeup | |
| (vi) Reduction in the normal amount of cartilage or synovial fluid | | |

Q.26 Explain the role of obesity in arthritis.

Ans: **Role of Obesity In Arthritis:** Obesity puts stress on joints, especially on knees, causing pain and develops worse condition in arthritis damage. The rheumatologist states that just 10 pounds overweight increases force of 20 to 40 pounds on knees at each step during a walk.

The excessive fats tissues release high levels of cytokines proteins that can cause inflammation throughout the body. The same protein is produced by joints during rheumatoid arthritis. It makes existing joint inflammation worse.



Q.27 Locate the cartilages in different organs.

Ans: Cartilage is an important structural component of the body. It is a firm tissue but is softer and much more flexible than bone. Cartilage is a connective tissue found in many areas of the body including:

- joints between bones e.g. the elbows, knees and ankles
- ends of the ribs
- ears and nose
- in parts of the larynx
- smaller respiratory tubes
- between the vertebrae in the spine
- bronchial tubes or airways
- trachea

Q.28 Enlist the name and number of bones present in the hind limb.

Ans: The hind-limb contains the following bones:

The femur (the longest bone), Tibia, Fibula, Tarsal, Metatarsal, Patella and Phalanges.

Counting the number of bones, these are

Femur →→ 1	Fibula →→ 1	Tibia →→ 1
Patella →→ 1	Tarsals →→ 7	Metatarsals →→ 5
Phalanges →→ 14		

Thus, the hind-limb of humans consists of a total of 30 bones.

Q.29 Locate the immovable joints in the human body.

Ans: Immovable joints (called synarthroses) include skull sutures, the articulations between the teeth and the mandible, and the joint found between the first pair of ribs and the sternum.

BIOLOGY (EM) NOTES FOR CLASS 10TH (FOR SINDH)

Q.30 Differentiate between ligaments and tendons.

Ans: Difference between Ligaments and Tendons

Parameter	Ligaments	Tendons
Description	They connect one bone to another in the body. Consequently, they exist in the joints. Moreover, they are flexible and help in the movements of bones	They connect muscle to the bone and they exist at the end of skeletal muscles. Also, these are fibrous connective tissues
Nature	They are strong and elastic	They are tough and inelastic
Fibroblasts	There is a scattering of fibroblasts in ligaments	Fibroblasts exist in continuous rows in tendons
Fibres	There is a compact packing of fibres and their arrangement is not in parallel bundles	The arrangement of fibres is in compact parallel bundles
Joining	They connect bones at joints	They connect the end of muscles to the bone
Colour	The ligament is formed of fibrous connective tissue that is of yellow colour	Tendon is formed of fibrous connective tissue that is white.
Classification	Their division takes place into categories- articular ligaments, peritoneal ligaments, and fetal remnant ligaments	They have no classification within them

Q.31 Locate hinge joint in the body of a human.

Ans: The best examples of hinge joints are the Interphalangeal joints of the hand and those of the foot and the joint between the humerus and ulna. The knee joints and ankle joints are less typical, as they allow a slight degree of rotation or side-to-side movement in certain positions of the limb. The knee is the largest hinge joint in the human body.

Summary

- Movement is the action taken by a living organism to reduce its irritation.
- Locomotory movement requires a skeletal system, a muscular system.
- Skeleton can be defined as a framework that gives shape to any structure.
- Skeleton provides support to the body, especially limbs, i.e. hind limbs and pelvic girdle.
- Cartilages also support the larynx, trachea and bronchi of the respiratory system.
- There are three types of cells associated with bones i.e. bones forming cells (*osteoblast*), mature bone cell (*osteocyte*) and bone dissolving cells (*osteoclast*).
- In humans, 206 bones are present which can be categorized into two groups.
- The junction of two bones is called a joint.
- There are two types of joints. Immovable or fixed joint. Joint where bones are fixed like puzzle pieces.
- Hinge Joints (e.g. knee joint) allow movement in one plane only whereas ball and socket allow movement in many planes.
- The band of fibrous connective tissues by which bones are joined to one another at joints is called a ligament.

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- ◆ The strong connective tissue in the ligaments protects these structures and prevents them from bending twisting or tearing.
- ◆ Skeletal muscles are attached to bones on either side of the joint by bands of tough, fibrous connective tissues called tendons.
- ◆ This type of working of two muscles against each other is called antagonism. This pair of skeletal muscles that work against each other is called an antagonistic pair.
- ◆ This bending process is called flexion. Straighten process is called extension.
- ◆ A long term calcium deficiency can lead to dental weakness, osteoporosis, in childhood rickets.
- ◆ Osteoporosis is a disorder related to the ageing process.
- ◆ Rickets is the softening and weakening of bones in children, usually because of an extreme and prolonged vitamin D deficiency.
- ◆ Arthritis is the painful condition of joints due to swelling and tenderness of joints.
- ◆ Obesity puts stress on joints, especially on knees, causing pain and develops worse conditions in arthritis damage.

Textbook Exercise with Solution

A Multiple Choice Questions

Choose the correct answer:

See "Multiple Choice Questions (M.C.Qs)" – Q.1 to 9

B Short Questions

(i) **What are the main functions of skeleton?**

Ans: See 'Short & Detailed Answer Questions' – Q.7

(ii) **Distinguish between bone and cartilage.**

Ans: See 'Short & Detailed Answer Questions' – Q.11

(iii) **Locate the cartilages in different organs.**

Ans: See 'Short & Detailed Answer Questions' – Q.27

(iv) **Enlist the name and number of bones present in the hind limb.**

Ans: See 'Short & Detailed Answer Questions' – Q.28

(v) **Locate the immovable joints in the human body.**

Ans: See 'Short & Detailed Answer Questions' – Q.29

(vi) **Draw a neat and labelled diagram of the hinge joint and ball and socket joint.**

Ans: See 'Short & Detailed Answer Questions' – Q.16 (Diagrams of hinge joint and ball and socket joint)

(vii) **What is rickets? Give its causes.**

Ans: See 'Short & Detailed Answer Questions' – Q.22 (Rickets)

(viii) **Distinguish between ligament and tendon.**

Ans: See 'Short & Detailed Answer Questions' – Q.30

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(ix) Locate the hinge joint in the body of a human.

Ans: See 'Short & Detailed Answer Questions' – Q.31

(x) What do you mean by bicep and tricep muscles?

Ans: See 'Short & Detailed Answer Questions' – Q.21 (Last two paragraphs)

C Extensive Response Questions

(i) Prove that the skeletal system is a dynamic system.

Ans: See 'Short & Detailed Answer Questions' – Q.13

(ii) Describe the flexion and extension in a human arm.

Ans: See 'Short & Detailed Answer Questions' – Q.21 (Last two paragraphs)

(iii) Explain disorders of bones and their causes.

Ans: See 'Short & Detailed Answer Questions' – Q.22 to 26

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