Chapter	12 Human Skeleton and Muscular System	Class	1st Year	Subject	Biology

Give Short Answers of the Following Questions

1. Name three types of cells associated with bone and write their functions.

Ans. Three types of cells associated with bone:

- **Osteoblasts:** Bone-forming cells that synthesize and secrete bone matrix.
- **Osteocytes:** Mature bone cells that maintain bone tissue and regulate mineral balance.
- **Osteoclasts:** Bone-resorbing cells that break down bone tissue for remodeling and calcium release.

2. Name the bones of cranium.

Ans. Bones of cranium:

Paired Bones (2)	Unpaired Bones (4)
• Parietal bones(2) • Temporal bone (2)	• Frontal bone • Occipital bone • Sphenoid bone • Ethmoid bone

3. Enlist the bones in the five groups of vertebrae.

Ans. Five Groups of Vertebrae:

- **Cervical vertebrae (7):** support the neck (e.g., C1: Altas, 2: Axis).
- **Thoracic vertebrae (12):** Articulate with ribs.
- **Lumbar vertebrae (5):** Support the lower back.
- **Sacrum (5 fused):** Forms the posterior pelvic wall.
- **Coccyx (4 fused):** Tailbone, remnant of vestigial tail.

4. What bones make the rib cage?

Ans. Bones Make the Rib Cage:

- **Sternum:** (breastbone)
- **12 pairs or ribs:** (attached to thoracic vertebrae)
- **Costal cartilage:** (connect ribs to sternum)

5. Name the bones of the pectoral girdle and pelvic girdle?

Ans. Bones of the Pectoral Girdle and Pelvic Girdle:

- **Pectoral Girdle:** Scapula (shoulder blade) and clavicle (collarbone).
- **Pelvic Girdle:** Ilium, ischium, and pubis (fused as hip bone).

6. Name the bones of forelimbs and hindlimbs.

Ans. Bones of Forelimbs and Hindlimbs:

- **Forelimbs**: Humerus, radius, ulna, carpals, metacarpals, phalanges.
- **Hindlimb:** Femur, patella, tibia, fibula, tarsals, metatarsals, phalanges.

7. What is fibrous joint? Give example.

Ans. Fibrous Joint:

- **Definition**: Immovable joints held by dense connective tissue.
- **Examples:** Sutures (skull), syndesmosis (between tibia-fibula), gomphosis (teeth in sockets).

8. Name the steps involved in bone repair?

Ans. Steps Involved in Bone Repair:

- **Hematoma formation:** Blood clot at fracture site.
- **Fibercortilaginous callus:** Soft callus formation.
- **Bony callus:** Hard callus replaces soft tissue.
- **Remodeling:** Bone restored to original shape.

9. What skeletal structures are affected from the osteoarthritis?

Ans. Osteoarthritis:

- It is the most common type.
- It occurs when the articular cartilage at the ends of bone in joint gradually softens and disintegrates.
- It affects knee, hip and intervertebral joints.

10. List the major part of skeletal muscle fiber.

Ans. Major Part of skeletal muscle Fiber:

- **Sarcolemma:** (cell membrane).
- **Sarcoplasm**: (cytoplasm).
- **Myofibrils:** (contractile units).
- **Sarcoplasmic reticulum:** (stores Ca^{2+})
- **T-tubules:** (conduct electrical signals).

11. What do you mean by I-band, A-band and H-zone?

Ans. • **I-band:** light region with only actin filaments.

- **A-band:** Dark region with overlapping actin and myosin.
- **H-zone:** Central region of A-band with only myosin.

12. Describe the antagonistic arrangements of skeletal muscles.

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Ans. Antagonistic arrangements of skeletal muscle:

- In the antagonistic pairs, one muscle reverses the effect of the other and they do not contract simultaneously.
- If one muscle contracts, other relaxes and vice versa.
- This action of muscle is called antagonistic action of muscle.

Examples:

- **Biceps (flexor):** Contracts to bend the elbow.
- **Triceps (extensor):** Contracts to straighten the elbow.

13. Ligaments are elastic while tendons are hard. Justify?

Ans. Here are the three logical points explaining why ligaments are elastic but tendons are hard:

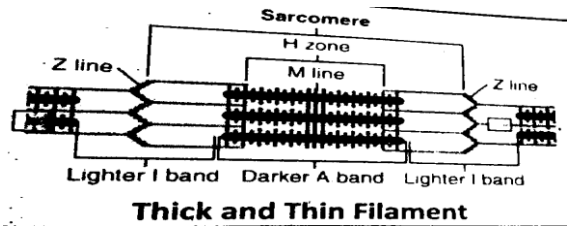
I. Different function:
- Ligaments connect bone to bone and need to allow slight movement at joints, so they are elastic.
- Tendons connect muscle to bone and must transmit force during muscle contraction, so they are strong and stiff.

II. Fiber composition:
- Ligaments are contains more elastin fibers, giving them stretchability.
- Tendons are made mostly of collagen fibers arranged in parallel, making the less flexible but very strong.

III. Structural arrangements:
- The loser fiber arrangement in ligaments allow for some elasticity.
- The dense and tightly packed fibers in tendons make them hard and resistant to stretching.

14. Draw a diagram of sarcomere and label its parts.

Ans.



15. Differentiate between compact and spongy bone.

Ans. **i. Compact and Spongy Bone:**

- **Compact:** Dense, strong, forms outer layer.
- **Spongy:** Porous, lightweight, found in epiphyses

16. Differentiate between axial skeleton and appendicular skeleton.

Ans. Axial vs. Appendicular Skeleton:

- **Axial:** Skull, vertebrate, ribs (central support).

- **Appendicular:** Limbw and girdles (movement).

17. Differentiate between true ribs, false ribs floating ribs.

Ans. True Ribs (1-7), False Ribs (8-10), Floating Ribs (11-12):

- **True:** Directly attach to sternum.
- **False:** Indirectly attach via cartilage.
- **Floating:** No sterna attachment.

18. Differentiate between rheumatoid arthritis and osteoarthritis.

Ans. Rheumatoid Arthritis (RA) vs. Osteoarthritis (OA):

- **RA:** Autoimmune, affects synovium.
- **OA:** Degenerative, affects cartilage.

19. Differentiate between fibrous and cartilaginous joints.

Ans. Fibrous vs. Cartilaginous Joints:

- **Fibrous:** Immovable (e.g., sutures).
- **Cartilaginous:** Slightly movable (e.g., intervertebral discs).

20. Differentiate between cartilaginous and synovial joint.

Ans. Cartilaginous vs. Synovial Joints:

- **Cartilaginous:** Hyaline/fibrocartilge, limited movement.
- **Synovial:** Fluid-filled cavity, free movement (e.g., knee).

21. Differentiate between osteoblasts and osteocytes.

Ans. Osteoblasts vs. Osteocytes:

- **Osteoblasts: Build bone.**
- **Osteocytes**: Maintain bone.

22. Differentiate between tropomyosin and troponin.

Ans. Tropomyosin vs. Troponin:

- **Tropomyosin:** Blocks actin-myosin binding at rest.
- **Troponin**: Binds Ca^{2+} to shift tropomyosin.

23. Differentiate between ligament and tendon.

Ans. Ligament vs. Tendon:

- **Ligaments**: Ligaments are tough but elastic bands of connective tissues that hold the bones together at a joint.
- **Example:** ligaments holding ulna and radius with the humorous.

- **Tendons:** Tendons are bundle of collagen, non-elastic fibers.
- **Example:** Each end of the entire muscle is attached to bones by these tendons.

24. Differentiate between tetany and tetanus.

Ans. Tetany vs. Tetanus:

- **Tetany:** Muscle spasms (low Ca^{2+}).
- **Tetanus**: Sustained contraction (high-frequency stimuli).