



Attempt questions first; check the separate key afterward. Use labelled diagrams where asked. Give scientific reasons; answer key covers closed questions.

A. Very short answers - 1 mark each

1. Name the contractile unit of a myofibril.
2. Name the main thick-filament protein.
3. Name the main thin-filament protein.
4. Which ion triggers contraction by binding to troponin?
5. Which sarcomeric band remains nearly constant in length during contraction?
6. Name the joint type at the human shoulder.
7. How many bones are usually present in an adult human skeleton?
8. Name the first cervical vertebra.

B. Short answers / practice - 2 marks each

9. Distinguish movement and locomotion.
10. Compare ciliary, flagellar and muscular movements.
11. Compare skeletal, smooth and cardiac muscles.
12. Describe the hierarchy from muscle to myofilament.
13. Explain the arrangement of thick and thin filaments in a sarcomere.
14. Describe actin, tropomyosin and troponin functions.
15. Explain ATP binding and hydrolysis in the cross-bridge cycle.
16. Why is calcium release from sarcoplasmic reticulum essential?
17. Describe the neuromuscular junction's role in initiating contraction.
18. Explain how muscle relaxation occurs.

19. Compare red and white muscle fibres.
20. Distinguish axial and appendicular skeletons.

C. Application / reasoning - 3 marks each

21. State the adult human vertebral formula.
22. How many pairs of human ribs are present?
23. Compare true, false and floating ribs.
24. Describe pectoral and pelvic girdles.
25. Distinguish fibrous, cartilaginous and synovial joints.
26. Give examples of hinge, pivot and gliding joints.
27. A sarcomere shortens. What happens to I band and H zone?
28. Do actin and myosin filaments themselves shorten substantially during contraction?
29. Compare osteoporosis and arthritis.
30. Distinguish myasthenia gravis, tetany and muscular dystrophy.
31. Explain why ATP shortage prevents normal cross-bridge detachment.

D. Extended practice - 5 marks each

32. Draw a sarcomere and explain the sliding-filament mechanism.
33. Trace events from motor-neuron impulse to muscle relaxation.
34. Describe the human skeleton's major divisions and their functions.
35. Compare joint types and explain four musculoskeletal disorders in biological terms.

ANSWER KEY - Numerical / closed questions

1) Sarcomere. 2) Myosin. 3) Actin. 4) Ca^{2+} . 5) A band. 6) Ball-and-socket. 7) 206. 8) Atlas. 21) 7 cervical, 12 thoracic, 5 lumbar, 5 fused sacral, 3-5 fused coccygeal, usually 4. 22) Twelve. 27) Both narrow; H zone may disappear. 28) No; they slide.