1.1 Musculoskeletal System: Bones, Joints and Muscles: 10-minute Pack

AQA 8582 · Calculators not allowed · about 10 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A footballer points their toes downward to strike a ball (plantarflexion of the ankle). Name the agonist muscle responsible for this movement.

(Total for Question 1 is 1 mark)

2 Using named examples from at least two different joints, explain the role of antagonistic muscle action in producing controlled movement during sporting performance.

(Total for Question 2 is 6 marks)

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3 Vertebrae are irregular bones that make up the spinal column.

(a) State one function of the vertebrae. **(1)**

(b) Explain how the shape of irregular bones, such as the vertebrae, allows them to perform their functions. **(2)**

(Total for Question 3 is 3 marks)

4 The vertebral column is divided into regions.

(a) Name the region of the vertebral column made up of the seven vertebrae of the neck. **(1)**

(b) Name the region of the vertebral column made up of the vertebrae that the ribs are attached to. **(1)**

(c) Name the region of the vertebral column made up of the five vertebrae of the lower back, between the thoracic vertebrae and the sacrum. **(1)**

(Total for Question 4 is 3 marks)

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Mark scheme · 1.1 Musculoskeletal System: Bones, Joints and Muscles: 10-minute Pack

Question 1

gastrocnemius (calf muscle) **B1**

Answer: Gastrocnemius

Question 2

definition: one muscle, the agonist (prime mover), contracts to cause a movement, while the antagonist relaxes/lengthens to allow it, oe **B1**

correct named example 1 with correct roles, e.g. biceps brachii (agonist) and triceps brachii (antagonist) at the elbow during flexion, oe **B1**

correct named example 2 from a different joint, with correct roles, e.g. quadriceps (agonist) and hamstrings (antagonist) at the knee during extension, oe **B1**

explanation that muscles can only pull (not push), so a pair of muscles working in opposite roles is needed to produce movement in both directions at a joint, oe **B1**

the same muscle swaps from agonist to antagonist depending on the direction of movement required, oe **B1**

link to controlled movement: the antagonist relaxes gradually (rather than suddenly) or can contract eccentrically, controlling the speed/smoothness of the movement rather than letting it happen suddenly or with excess force, oe **B1**

Answer: Antagonistic muscle action is where the agonist contracts to cause a movement while the antagonist relaxes to allow it, for example the biceps brachii and triceps brachii at the elbow, or the quadriceps and hamstrings at the knee; because muscles can only pull, this paired arrangement (with each muscle able to swap roles) is needed to produce and smoothly control movement in both directions at a joint.

Question 3

(a) any one of: protect the spinal cord / support the head and trunk / allow flexibility of movement in the trunk **B1**

(a) Answer: For example, protecting the spinal cord.

(b) their complex, non-uniform shape provides several surfaces/projections for muscle and ligament attachment, oe **B1**

(b) a central hole/canal through each bone allows the spinal cord to pass through and be protected, while the stacked, individually-jointed vertebrae still allow some flexibility of movement along the spine, oe **B1**

(b) Answer: The complex shape of irregular bones like the vertebrae gives several surfaces for muscle and ligament attachment, and a central canal that protects the spinal cord while the stack of individual bones still allows the spine some flexibility.

Question 4

(a) cervical (accept cervical vertebrae) **B1**

(a) Answer: Cervical

(b) thoracic (accept thoracic vertebrae) **B1**

(b) Answer: Thoracic

(c) lumbar (accept lumbar vertebrae) **B1**

(c) Answer: Lumbar

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