1.1 Musculoskeletal System: Bones, Joints and Muscles: 30-minute Pack

AQA 8582 · Calculators not allowed · about 30 minutes

Total Marks

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A weightlifter performs a shoulder press, pushing a barbell from shoulder height to a fully extended overhead position, then slowly lowers it back down under control.

(a) Name the joint action occurring at the shoulder as the barbell is pushed overhead. **(1)**

(b) Name the agonist muscle primarily responsible for this joint action. **(1)**

(c) Name the antagonist muscle at the shoulder joint, and explain what it does as the barbell is pushed overhead. **(2)**

(Total for Question 1 is 4 marks)

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2 Which bone carries most of the body's weight in the lower leg?

- ☐ A) Fibula
- ☐ B) Femur
- ☐ C) Tibia
- ☐ D) Patella

(Total for Question 2 is 1 mark)

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3 Which of the following joints is a ball and socket joint?

- ☐ A) Shoulder
- ☐ B) Knee
- ☐ C) Elbow
- ☐ D) Ankle

(Total for Question 3 is 1 mark)

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4 Which muscle is found across the upper back and the back of the neck?

- ☐ A) Deltoid
- ☐ B) Latissimus dorsi
- ☐ C) Pectoralis major
- ☐ D) Trapezius

(Total for Question 4 is 1 mark)

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5 One function of the skeleton is the storage of minerals. Name one mineral that is stored in the bones.

(Total for Question 5 is 1 mark)

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6 Long bones, such as the humerus and the femur, are important in producing movement. Explain why the shape of a long bone makes it suited to this function.

(Total for Question 6 is 2 marks)

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7 Bones can be classified by shape.

(a) State the class of bone that the femur belongs to. **(1)**

(b) State the class of bone that the cranium belongs to. **(1)**

(Total for Question 7 is 2 marks)

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8 Explain why the shape of a flat bone such as the cranium is suited to its function of protection.

(Total for Question 8 is 2 marks)

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9 Joints allow different types and ranges of movement depending on their shape.

(a) Name the type of joint found at the hip. **(1)**

(b) Name the type of joint found at the elbow. **(1)**

(Total for Question 9 is 2 marks)

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10 State one movement that is possible at a ball and socket joint but is NOT possible at a hinge joint.

(Total for Question 10 is 1 mark)

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11 Table 1 gives descriptions of different types of movement possible at joints, with the movement name missing.

Table 1

Part	Description of movement
(a)	Decreasing the angle at a joint
(b)	Increasing the angle at a joint
(c)	Moving a body part away from the midline of the body
(d)	Moving a body part towards the midline of the body
(e)	Moving a body part in a continuous circular motion
(f)	Turning a body part around its own long axis
(g)	Pointing the toes downward, away from the shin
(h)	Pulling the toes upward, towards the shin

(a) Name the movement described in row (a) of Table 1. **(1)**

(b) Name the movement described in row (b) of Table 1. **(1)**

(c) Name the movement described in row (c) of Table 1. **(1)**

(d) Name the movement described in row (d) of Table 1. **(1)**

(e) Name the movement described in row (e) of Table 1. **(1)**

(f) Name the movement described in row (f) of Table 1. **(1)**

(g) Name the movement described in row (g) of Table 1. **(1)**

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(h) Name the movement described in row (h) of Table 1. **(1)**

(Total for Question 11 is 8 marks)

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12 Explain the antagonistic pair of muscles at the ankle joint, naming both muscles and the movement each one produces.

(Total for Question 12 is 2 marks)

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13 Explain how the skeletal system and the muscular system work together to produce movement at a joint.

(Total for Question 13 is 3 marks)

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Mark scheme · 1.1 Musculoskeletal System: Bones, Joints and Muscles: 30-minute Pack

Question 1

(a) flexion (accept abduction for a wide-grip press with the elbows out to the sides) **B1**

(a) Answer: Flexion (or abduction)

(b) deltoid (accept anterior deltoid / middle deltoid) **B1**

(b) Answer: Deltoid

(c) antagonist: latissimus dorsi **B1**

(c) as the deltoid contracts to push the bar up, the latissimus dorsi relaxes and lengthens so that the movement can take place, oe **B1**

(c) Answer: The antagonist is the latissimus dorsi, which relaxes and lengthens as the deltoid contracts, allowing the bar to be pushed overhead.

Question 2

C (Tibia) **B1**

Answer: C (Tibia)

Question 3

A (Shoulder) **B1**

Answer: A (Shoulder)

Question 4

D (Trapezius) **B1**

Answer: D (Trapezius)

Question 5

calcium / phosphorus (accept calcium phosphate / phosphate / magnesium) **B1**

Answer: Calcium (or phosphorus)

Question 6

a long, rigid shaft, so it can act as a lever (that is moved when muscles pull on it), oe **B1**

any one of: the length gives a large range/speed of movement at the end of the limb / the long shape gives a large surface area for muscle (tendon) attachment / the ends provide a large area for muscle and ligament attachment and for forming a joint / the hollow shaft makes it strong yet light, so the limb can be moved quickly, oe **B1**

Answer: A long bone has a long, rigid shaft, so it acts as a lever that muscles can pull on; its length and light, hollow shaft let the limb move over a large range and quickly.

Question 7

(a) long bone **B1**

(a) Answer: Long bone

(b) flat bone **B1**

(b) Answer: Flat bone

Question 8

a flat bone has a broad, wide surface area, oe **B1**

this spreads out/absorbs an impact force over a large area (rather than concentrating it at one point), helping to protect the organ underneath (e.g. the brain), oe **B1**

Answer: A flat bone has a broad surface area, which spreads an impact force out over a wide area rather than concentrating it at one point, helping to protect the organ underneath.

Question 9

(a) ball and socket joint **B1**

(a) Answer: Ball and socket joint

(b) hinge joint **B1**

(b) Answer: Hinge joint

Question 10

any one of: rotation / abduction / adduction / circumduction **B1**

Answer: For example, rotation.

Question 11

(a) flexion **B1**

(a) Answer: Flexion

(b) extension **B1**

(b) Answer: Extension

(c) abduction **B1**

(c) Answer: Abduction

(d) adduction **B1**

(d) Answer: Adduction

(e) circumduction **B1**

(e) Answer: Circumduction

(f) rotation **B1**

(f) Answer: Rotation

(g) plantarflexion **B1**

(g) Answer: Plantarflexion

(h) dorsiflexion **B1**

(h) Answer: Dorsiflexion

Question 12

gastrocnemius produces plantarflexion (pointing the toes down), oe **B1**

tibialis anterior produces dorsiflexion (pulling the toes up towards the shin), oe **B1**

Answer: The gastrocnemius (calf muscle) produces plantarflexion, and the tibialis anterior (shin muscle) produces dorsiflexion; the two work as an antagonistic pair, each relaxing while the other contracts.

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Question 13

bones act as rigid levers, oe **B1**

a joint is the point where two bones meet, allowing movement between them, oe **B1**

muscles are attached to bones (via tendons) either side of the joint, and pull on the bone (by contracting) to move it around the joint, oe **B1**

Answer: Bones act as rigid levers, joints are the points where bones meet and allow movement, and muscles attach to the bones via tendons and pull on them to move the bones around the joint.

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