2.6 Movement Analysis: Applying Levers, Planes, Joint Actions and Muscles to Sporting Movements: Test Pack

Total Marks

AQA 8582 · Calculators not allowed · about 15 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 A gymnast performs a cartwheel. Which row correctly gives the plane the movement takes place in and the axis it rotates about?

- ☐ A) Sagittal plane, frontal axis
- ☐ B) Transverse plane, longitudinal axis
- ☐ C) Frontal plane, sagittal axis
- ☐ D) Frontal plane, longitudinal axis

(Total for Question 1 is 1 mark)

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2 During a cricket bowling action, a bowler's whole bowling arm rotates rapidly around its own long axis as the ball is released. Identify the plane and axis of movement.

(Total for Question 2 is 2 marks)

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3 As a hurdler's lead leg clears a hurdle, the toes are pulled up towards the shin.

(a) Name the joint action at the ankle. **(1)**

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

(c) Name the antagonist muscle for this joint action. **(1)**

(Total for Question 3 is 3 marks)

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4 At the start of a 100m race, a sprinter drives explosively out of the blocks, forcefully plantarflexing both ankles to push against the blocks.

(a) Name the joint action and the joint type at the ankle in this example. **(2)**

(b) Name the class of lever this ankle action represents. **(1)**

(c) Explain why this lever arrangement is well suited to driving powerfully out of the blocks. **(2)**

(Total for Question 4 is 5 marks)

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5 Table 1 gives four short statements about analysing a sporting movement. For each, name which ONE of the four movement-analysis tools (joint action, plane/axis, lever class, or agonist/antagonist muscle) it is describing.

Table 1

Row	Statement
(a)	'The elbow joint bends, decreasing the angle between the upper arm and forearm'
(b)	'The biceps brachii shortens while the triceps brachii lengthens'
(c)	'The movement takes place with the effort acting between the fulcrum and the load'
(d)	'The rotation happens with the body turning around a vertical line running from head to toe'

(a) Name the tool described in row (a). **(1)**

(b) Name the tool described in row (b). **(1)**

(c) Name the tool described in row (c). **(1)**

(d) Name the tool described in row (d). **(1)**

(Total for Question 5 is 4 marks)

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Mark scheme · 2.6 Movement Analysis: Applying Levers, Planes, Joint Actions and Muscles to Sporting Movements: Test Pack

Question 1

C **B1**

Answer: C

Question 2

transverse plane **B1**

longitudinal axis **B1**

Answer: Transverse plane, rotating about the longitudinal axis.

Question 3

(a) dorsiflexion **B1**

(a) Answer: Dorsiflexion.

(b) tibialis anterior **B1**

(b) Answer: Tibialis anterior.

(c) gastrocnemius (accept soleus), oe **B1**

(c) Answer: Gastrocnemius.

Question 4

(a) plantarflexion **B1**

(a) hinge joint **B1**

(a) Answer: Plantarflexion, at a hinge joint.

(b) second class lever **B1**

(b) Answer: Second class lever.

(c) a second class lever has the effort arm longer than the load arm, giving a mechanical advantage above 1, oe **B1**

(c) this favours force, allowing the calf muscles to drive against the blocks and move the sprinter's full body weight without needing to generate more force than that body weight, oe **B1**

(c) Answer: A second class lever has the effort arm longer than the load arm, giving a mechanical advantage above 1, which favours force: the calf muscles can drive against the blocks and move the sprinter's full body weight without needing to generate more force than that body weight.

Question 5

(a) joint action (flexion) **B1**

(a) Answer: Joint action (flexion).

(b) agonist and antagonist muscles **B1**

(b) Answer: Agonist and antagonist muscles.

(c) lever class (third class) **B1**

(c) Answer: Lever class (third class).

(d) axis of rotation (longitudinal axis) **B1**

(d) Answer: Axis of rotation (longitudinal axis).

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