2.6 Movement Analysis: Applying Levers, Planes, Joint Actions and Muscles to Sporting Movements: 10-minute Pack

Total Marks

AQA 8582 · Calculators not allowed · about 10 minutes

Name: _____ Date: ____ / ____ / _____

Answer ALL questions. Show all your working.

1 Which class of lever is represented by a calf raise, as used to push off the ground during a jump?

- ☐ A) First class lever
- ☐ B) Second class lever
- ☐ C) Third class lever
- ☐ D) Fourth class lever

(Total for Question 1 is 1 mark)

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2 Using at least three different joints from Tariq's take-off and flight, discuss how lever class, plane of movement, joint action/type and agonist/antagonist muscles together explain his technique, and evaluate why a coach analysing his jump needs all four of these tools rather than just one.

(Total for Question 2 is 9 marks)

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3 During the cocking (preparation) phase of a tennis serve, a player's throwing shoulder abducts to raise the racquet arm out to the side and up, while the elbow flexes. Identify the agonist for shoulder abduction and the lever class for elbow flexion.

(Total for Question 3 is 2 marks)

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Mark scheme · 2.6 Movement Analysis: Applying Levers, Planes, Joint Actions and Muscles to Sporting Movements: 10-minute Pack

Question 1

B **B1**

Answer: B

Question 2

Level 3 A detailed and coherent response that accurately applies lever class, plane of movement, joint action/type and agonist/antagonist muscles to at least three of Tariq's joints across take-off and flight, and gives a well-justified evaluation of why all four analytical tools are needed together. Sustained, accurate use of movement-analysis terminology throughout. **7-9**

Level 2 Some accurate application of two or more of the four analytical tools to at least two of Tariq's joints, but coverage may be incomplete, limited to fewer than three joints, or the evaluative point about needing all four tools may be underdeveloped. **4-6**

Level 1 Basic or generic statements about movement analysis with little or no specific application to Tariq's take-off or flight, and little or no evaluation. **1-3**

Level 0 No relevant content. **0**

Indicative content:

- Hip (take-off): extension, sagittal plane, agonist gluteus maximus, antagonist hip flexors; a ball and socket joint, allowing this extension as well as the earlier approach-run flexion/extension cycle.
- Knee (take-off): extension, sagittal plane, agonist quadriceps, antagonist hamstrings, third class lever (short effort arm, mechanical advantage below 1), favouring the speed needed to drive off the board quickly.
- Ankle (take-off): plantarflexion, sagittal plane, agonist gastrocnemius, antagonist tibialis anterior, second class lever (mechanical advantage above 1), favouring the force needed to push off the ground.
- Lead leg in flight: hip and knee flexion, sagittal plane, agonists hip flexors and hamstrings respectively, preparing the leg for landing in a running-style action.
- Evaluative point: the joint action alone (e.g. 'the knee extends') does not explain whether the movement favours force or speed; the lever class adds that information (here, favouring speed at the knee but force at the ankle, within the very same take-off).
- Evaluative point: the muscle names alone do not explain the direction or plane of the resulting movement; the joint action and plane are needed to connect the muscle contraction to the actual body movement produced.
- Evaluative point: the joint type explains why some joints (hip, a ball and socket joint) can combine several different actions across the approach and take-off, while others (knee, ankle, hinge joints) are limited to flexion/extension-type actions only.
- Balanced conclusion: only by combining all four tools, joint action/type, plane/axis, lever class and agonist/antagonist muscles, can a coach fully explain both WHAT is moving, WHERE it is moving, HOW MUCH force or speed it produces, and WHICH muscles are responsible, across the whole jump.

Question 3

agonist for shoulder abduction: deltoid **B1**

lever class for elbow flexion: third class **B1**

Answer: Agonist for shoulder abduction: deltoid. Lever class for elbow flexion: third class.

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