1 Which one of these muscles is found at the shoulder joint?

A Deltoid
B Gastrocnemius
C Gluteals
D Tibialis anterior

(Total 1 mark)

2 Which one of these bones is located at the ankle joint?

A Femur
B Humerus
C Scapula
D Talus

(Total 1 mark)
The photograph below shows Usain Bolt driving away from the starting blocks in a 200m race.

Using the photograph, identify the joint movements at the hip and ankle of Usain Bolt’s driving leg.

Hip____________________________________________________________________

Ankle__________________________________________________________________

(Total 2 marks)

The diagram below shows a diagram of the knee joint.

(a) Identify structures A and B from the diagram.

Structure A____________________________________________________________________

Structure B__________________________________________________________________
(b) For one of the structures identified in part(a), describe its function in the prevention of injury.

Structure___________________________________________________________
Function____________________________________________________________
___________________________________________________________________
___________________________________________________________________

(2) (Total 4 marks)

5 Define isometric contraction.
Use a sporting example in your answer.
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

(Total 2 marks)

6 Explain the role of the skeletal system in producing movement of the body.
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

(Total 5 marks)
Flat bones provide a protective function within the body.

Name two flat bones and, using a sporting action of your choice, suggest how these bones provide protection during performance.

1. _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________

2. _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________
   _____________________________________________________________________

(Total 4 marks)

Explain how muscles and bones work together to produce movement.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

(Total 4 marks)
The image shows a performer weight training. This movement is brought about by the muscular and skeletal systems working together.

Explain how the muscles and bones work together to produce the movement from position **A** to position **B**.

_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________
_______________________________________________________________________

(Total 3 marks)
The image below shows a rugby player throwing the ball during a lineout.

Complete the table to identify:

- the type of joint operating at the **elbow**
- the agonist muscle causing the movement at the elbow from Position A to Position B
- the type of contraction occurring in the agonist muscle at the **elbow** to cause this movement.

<table>
<thead>
<tr>
<th>Type of joint</th>
<th>Agonist muscle</th>
<th>Type of contraction</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

(Total 3 marks)
Mark schemes

1  [AO1 = 1]
   A – Deltoid

2  [AO1 = 1]
   D – Talus

3  [AO2 = 2]
   Award one mark for each of the following points up to a maximum of two marks.
   Hip – Extension (1)
   Ankle – Plantar flexion (1)
   Max 2 marks

4  (a)  [AO1 = 2]
   Award one mark for each of the following points up to a maximum of two marks.
   A – Cartilage (1)
   B – Synovial fluid (1)
   Max 2 marks

(b)  [AO1 = 2]
   Award one mark for each of the following points up to a maximum of two marks.
   Cartilage:
   • It absorbs shock and acts as a buffer between the bones (1)
   • Prevents bones rubbing together reducing friction (1)
   Synovial fluid:
   • Lubricates the joint (1)
   • Prevents bones rubbing together reducing friction / allow joint to run smoothly (1)
   Accept any other suitable function of the structures of the knee joint highlighted in part(a).
   Answers must be related to the prevention of injury.
   Max 2 marks
[AO1 = 1  AO2 = 1]

Award one mark for the definition and one further mark for an example.

**AO1 (sub-max 1 mark)**

- Isometric contraction - Where the length of the muscle does not alter. The contraction is constant, i.e. pushing against a load or where the muscle does not shorten or lengthen (1)

**AO2 (sub-max 1 mark)**

- Plank (1)
- Handstand (1)
- Pushing in a scrum (1)
- Crucifix (1)

Accept any other suitable definition of isometric contraction. Sporting examples must relate to where isometric contraction occurs in that sport. Only one example can be credited.

**NB** If the definition is incorrect, no mark can be awarded for the example.

Max 2 marks

[5]

[AO1 = 5]

Award one mark for each of the following points up to a maximum of five marks

- The skeletal system allows movement at a joint (1)
- Short bones enable finer controlled movements whilst long bones enable gross movement (1)
- The different joint types allow different types of movement (1)
- Hinge joint allows extension and flexion whilst ball and socket allows flexion, extension, abduction and adduction and circular motion (1)
- The skeleton provides a point of attachment for muscles (1)
- When muscles (contract) they pull the bone (1)

Accept any other suitable response.

[5]
[AO1 = 2  AO2 = 2]
Award one mark for each of the following points up to a maximum of four marks. Award up to a maximum of two AO1 marks and up to a maximum of two AO2 marks.

- Cranium (1 × AO1)
  Provides protection for the brain whilst heading a football / equivalent (1 × AO2)
- Sternum (1 × AO1)
  Provides protection to the heart when controlling a football on the chest / equivalent (1 × AO2)
- Scapula (1 × AO1)
  Provides protection for the shoulder joint during contact made with another player when catching a netball / equivalent (1 × AO2)
- Ribs (1 × AO1)
  Protect the lungs during any impact with a hockey ball / equivalent (1 × AO2)
- Pelvis (1 × AO1)
  Protects the reproductive system / bladder during contact made in a rugby tackle / equivalent (1 × AO2)

The bones can be credited for AO1 (up to a maximum of 2 marks) but the example must be applied to the protective role of the named bone during a sporting action for AO2 (up to a maximum of 2 marks). Alternative appropriate sporting actions can be credited.

[AO2 = 4]
Award one mark for each of the following points up to a maximum of four marks.

- Muscles are attached to bones via tendons (1)
- The origin is attached to the stationary bone / the insertion is attached to the moving bone (1)
- Muscles are arranged in (antagonistic) pairs / because they can only pull (1)
- The agonist or prime mover contracts (shortens) / and the antagonist, relaxes (lengthens) (1)
- Movement only occurs at a joint, where two bones meet (1)

NB 1 mark for stating one muscle contracts or shortens, and the other relaxes or lengthens.
Award one mark for each of the following points up to a maximum of three marks. Answers must refer to the movement from A to B.

- Bicep is the agonist / the prime mover which contracts / shortens to cause the movement from A to B (1)
- Biceps are attached to bones in the lower arm via tendons (1)
- Biceps contraction causes a pull on the bones in the lower arm (radius) (1)
- Causing flexion at the elbow (1)
- Tricep is the antagonist which relaxes / lengthens during the movement (1)
- Contraction of the bicep allows movement at the third class lever (1)

Accept any other suitable explanation of how the muscles and bones work together to produce the movement from Position A to Position B.

Accept one mark for each of the following points up to a maximum of three marks.

<table>
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<tr>
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<th>Agonist muscle</th>
<th>Type of contraction</th>
</tr>
</thead>
<tbody>
<tr>
<td>AO1</td>
<td>Hinge (1)</td>
<td>AO2</td>
</tr>
<tr>
<td>AO2</td>
<td>Tricep / triceps brachii (1)</td>
<td>Concentric (1) (Do not accept isometric)</td>
</tr>
</tbody>
</table>

Max 3 marks