WORKBOOK

OCR A LEVEL

PE 1

PAPER 1

- Full topic coverage
- Over 300 questions
- Answers free online

✔ Actively develops knowledge and encourages independent learning with practice questions and short topic summaries

✔ Prepare for assessment with exam-style practice questions and clear spotlight of the Assessment Objectives

Kate McDonnell

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Contents

Topic 1 Applied anatomy and physiology

Skeletal and muscular systems

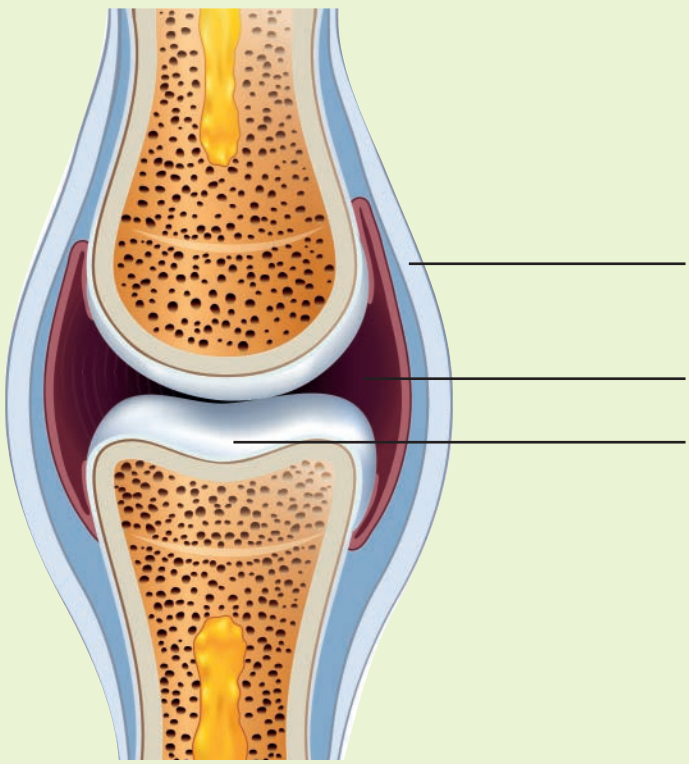
Understanding how the skeletal and muscular systems function is crucial for improving movement, executing skills and performance. Study of the skeletal system covers the structure and movements at the major joints.

Movement is created when agonist muscles contract to pull on bones and operate lever systems to transfer the force generated to the skeletal system. Muscle contraction is caused by motor units, which stimulate one of three different muscle fibres. Each fibre type has different structural and functional characteristics and the percentage of each fibre held in a muscle determines the activity an individual is suited to.

Practice questions ?

AO1: Knowledge and understanding

1 (a) Identify the key features of the synovial joint shown on the diagram. **3 marks**



(b) Describe the function of each structure identified in the image above. **3 marks**

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2 Identify **three** types of synovial joint. **3 marks**

1 .....

2 .....

3 .....

3 Define each of the following terms: **3 marks**

Agonist:

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Antagonist:

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Fixator:

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4 Is the following statement true or false? Circle the correct answer.
'The antagonistic muscle pair responsible for flexion and extension of the hip joint are the gluteus maximus and the iliopsoas muscles.' **1 mark**

True / False

5 The teres minor is a muscle in the rotator cuff group which help to stabilise the shoulder. Identify **two** other muscles in the rotator cuff group. **2 marks**

1 .....

2 .....

6 What is myoglobin? **1 mark**

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7 Outline the role of mitochondria in muscle cells. **1 mark**

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8 Identify the predominant muscle fibre type required for cross-country skiing. Describe **two** structural and **two** functional characteristics of this fibre type. **5 marks**

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Example student answer

The predominant fibre type is slow oxidative for a cross-country skier as the event lasts a long time. These fibres have a lot of capillaries and mitochondria as they use oxygen. These fibres are small and contract with a low force but can work for a long time.

AO1: The first part of the question asks you to 'identify': if the command word is 'identify' you only need to give the answer and not an introduction. The student has correctly identified the fibre type as 'slow oxidative'.

AO1: The student has included two structural characteristics of the fibre type, identifying that they have a high capillary density and contain many mitochondria. The answer contains a third structural point- 'small fibre type'- which is not required. If a question specifies the number of points to be made, the mark scheme will often state 'mark first x attempts only'. You could number the points made to make it clear to the examiner.

AO1: One mark is awarded for functional characteristics. The student has stated that the fibres 'contract with a low force'. This is correct. The answer then states that the fibres work for a long time. This is too vague to achieve the mark. To improve this, the student would need to state that these fibres have a high aerobic capacity or high resistance to fatigue.

9 Identify a work:relief ratio which a coach would apply to the cross-country skier's training programme to develop these fibres. **1 mark**

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10 Identify **three** structural characteristics of fast oxidative glycolytic fibres. **3 marks**

1 .....

2 .....

3 .....

11 Identify the components of a motor unit. **2 marks**

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12 Write the sentences below in the correct order, to describe the nervous stimulation of a motor unit. **6 marks**

An action potential triggers the release of acetylcholine. ACh transmits the impulse.	All of the fibres will contract (with maximum force).	The impulse crosses the synaptic cleft.
If the impulse is above the threshold a muscle action potential is created.	A nerve impulse travels down the axon.	If the action potential does not reach the threshold charge, none of the muscle fibres will contract.

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AO2: Application

13 Identify the agonist for the following movements. Provide a practical example for each movement. **10 marks**

Adduction of the hip:

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Medial rotation of the shoulder:

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Dorsi-flexion of the ankle:

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Horizontal flexion of the shoulder:

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Extension of the wrist:

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14 Describe the different types of isotonic contractions. Provide a practical example of each type of contraction. **4 marks**

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15 Explain the impact of stimulating large motor neurons. **3 marks**

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16 Using sporting examples, explain how the predominance of each muscle fibre type may impact on performance. **4 marks**

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Example student answer

If you had mainly type 1 fibres, you would be suited to endurance-based events such as marathons. If you had mainly type 2b fibres, you would be suited to power events such as discus or shot put. If you had mainly type 2a, you would be suited to speed endurance events such as 800 m.

AO2: The student has correctly identified that performers with mainly type 1 fibres would be suited to endurance based events. They have also correctly explained that performers with mainly type 2b fibres would be suited to power events.

AO2: An appropriate sporting example has also been provided in both instances, achieving another mark.

Overall, this was a concise and well written answer however, there are too few points are made. The final mark would be to explain the impact on performance of having a mix of fibres.

AO3: Analysis and evaluation

17 The image below shows a performer executing a lateral raise. Complete the table to show the movement that takes place at the shoulder joint during the execution phase. **4 marks**

Movement produced	Agonist	Antagonist	Plane of movement

18 Analyse the role of the quadriceps during the upward and downward phase of a squat. **6 marks**

 Workbook answers at **www.hoddereducation.co.uk/workbookanswers**

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Exam-style questions

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1 Identify the type of synovial joint at the wrist.

1 mark

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2 Identify **one** muscle from the quadricep group. **1 mark**

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3 What is acetylcholine? **1 mark**

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4 The image shows a gymnast performing a handstand. Identify the type of contraction occurring. **1 mark**

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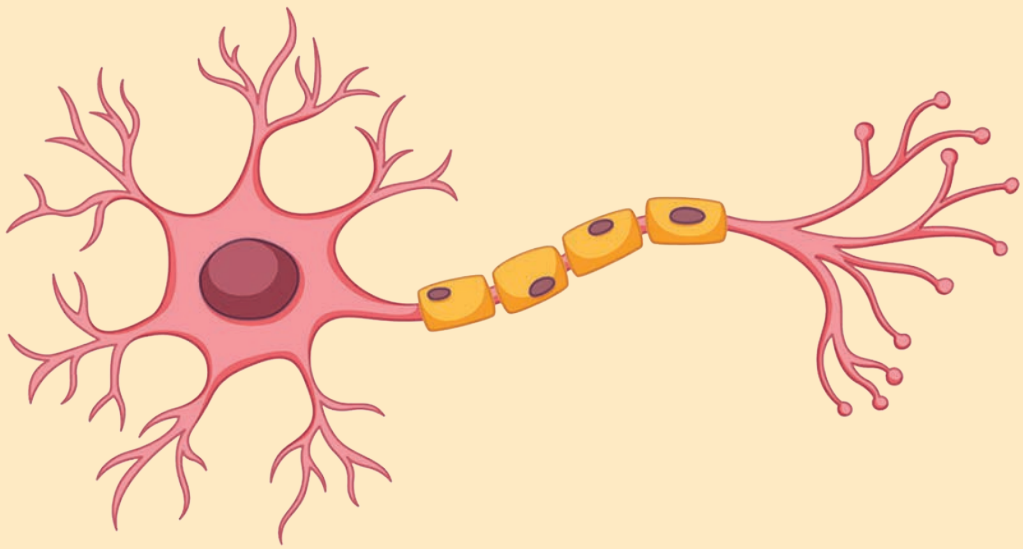
5 A motor neuron is a specialised cell which transmits nerve impulses. Describe the structure of motor neurons. **2 marks**



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6 Explain the 'all or none' law. **2 marks**

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7 Complete the table for hip abduction and elbow flexion. **8 marks**

Movement produced	Joint type	Agonist	Antagonist	Practical example
Hip abduction				
Elbow flexion				

8 Complete the table below to show the movement that takes place at the ankle joint during the upward phase of a calf raise exercise. **6 marks**

Joint type	Movement produced	Agonist	Antagonist	Plane of movement	Type of contraction

WORKBOOK

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PE 1

PAPER 1

Strengthen your understanding of key OCR A Level topics and develop the vital skills required to attain the best results possible in the Paper 1 exam, with this expert-written Student Workbook.

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