SECOND EDITION

endorsed for BTEC

REVISE BTEC NATIONAL

Sport

UNITS 1 AND 2

REVISION WORKBOOK

Pearson

endorsed for BTEC

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REVISION WORKBOOK

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Pearson

Introduction

This Workbook has been designed to help you revise the skills you may need for the externally assessed units of your course. Remember that you won't necessarily be studying all the units included here – it will depend on the qualification you are taking.

BTEC National Qualification	Externally assessed units
Certificate	1 Anatomy and Physiology
Extended Certificate	1 Anatomy and Physiology 2 Fitness Training and Programming for Health, Sport and Well-being
Foundation Diploma	1 Anatomy and Physiology 2 Fitness Training and Programming for Health, Sport and Well-being
Diploma (Fitness Services)	1 Anatomy and Physiology 2 Fitness Training and Programming for Health, Sport and Well-being

Your Workbook

Each unit in this Workbook contains either one or two sets of revision questions or revision tasks, to help you **revise the skills** you may need in your assessment. The selected content, outcomes, questions and answers used in each unit are provided to help you to revise content and ways of applying your skills. Ask your tutor or check the Pearson website for the most up-to-date **Sample Assessment Material** and **Mark Schemes** to get an indication of the structure of your actual assessment and what this requires of you. The detail of the actual assessment may change so always make sure you are up to date.

This Workbook will often include one or more useful features that explain or break down longer questions or tasks. Remember that these features won't appear in your actual assessment!

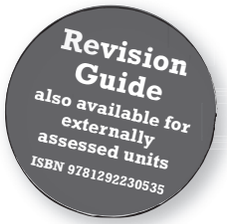
Grey boxes like this contain **hints and tips** about ways that you might complete a task, interpret a brief, understand a concept or structure your responses.

Guided This icon will appear next to an **example partial answer** to a revision question or task. You should read the partial answer carefully, then complete it in your own words.

This is a revision activity. It will help you understand some of the skills needed to complete the revision task or question..

These boxes will tell you where you can find more help in Pearson's BTEC National Revision Guide. Visit **www.pearsonschools.co.uk/revise** for more information.

There is often space on the pages for you to write in. However, if you are making ongoing notes you may want to use a separate piece of paper. Similarly, some units will be assessed through submission of digital files, or on screen, rather than on paper. Ask your tutor or check the Pearson website for the most up-to-date details.



Contents

Unit 1: Anatomy and Physiology

Unit 2: Fitness Training and Programming for Health, Sport and Well-being

A small bit of small print

Pearson publishes Sample Assessment Material and the Specification on its website. This is the official content and this book should be used in conjunction with it. The questions in this book have been written to help you practise the knowledge and skills you will require for your assessment. Remember: the real assessment may not look like this.

Unit 1: Anatomy and Physiology

Your exam

Unit 1 will be assessed through an exam, which will be set by Pearson. You will need to use your understanding of how the skeletal, muscular, cardiovascular and respiratory systems function and the fundamentals of the energy systems. You then respond to questions that require short and long answers.

Your Revision Workbook

This Workbook is designed to **revise skills** that might be needed in your exam. The details of your actual exam may change from year to year so always make sure you are up to date. Ask your tutor or check the **Pearson website** for the most up-to-date **Sample Assessment Material** to get an idea of the structure of your exam and what this requires of you.

To support your revision, this Workbook contains revision questions to help you revise the skills that might be needed in your exam. These revision questions are divided into six sections.

Questions

Your response to the questions will help you to revise:

- The function of the skeletal system for sports performance (pages 1–3 and 16–17)
- The function of the muscular system for sports performance (pages 4–6 and 18–20)
- The function of the respiratory system for sports performance (pages 7–9 and 21–22)
- The function of the cardiovascular system for sports performance (pages 10–12 and 23–25)
- Energy systems for sports performance (pages 13–14 and 26–28)
- The interrelationships between body systems for sports performance, by bringing together knowledge from all the content areas (pages 15 and 29)

Links To help you revise skills that might be needed in your exam this Workbook contains two sets of revision questions starting on pages 2 and 16. The first is guided and models good techniques, to help you develop your skills. The second offers less guidance as you apply your skills. See the introduction on page iii for more information on features included to help you revise.

Revision test 1

This Workbook is designed to revise the skills that might be needed in your exam. The details of the actual exam may change so always make sure you are up to date. Ask your tutor or check the Pearson website for the most up-to-date Sample Assessment Material to get an idea of the structure of the exam and what this requires of you.

Section A: Skeletal system for sports performance

Answer ALL questions. Write your answers in the spaces provided.

1 During a school ski trip a student fell and fractured his cranium.

(a) State the name of the cranium's bone type. 1 mark

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Guided

(b) Explain how the function of this bone type would help the student when he fell. 3 marks

Its function is to provide protection. It achieves this by forming a .....

.....

Think about what is encased by the cranium. What is it protecting? What injury is the cranium reducing the risk of if the student fell and hit their head?

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Total for Question 1 = 4 marks

Guided

2 Exercise stimulates an increase of mineral uptake in the bones.

Explain the impact of this if exercise is carried out on a regular basis. 2 marks

Regular exercise will cause the body to adapt. The regular increase in mineral uptake will increase the strength of the bone, therefore reducing the risk of .....

The question is asking for an explanation, so you should try to justify or give a reason for your answer.

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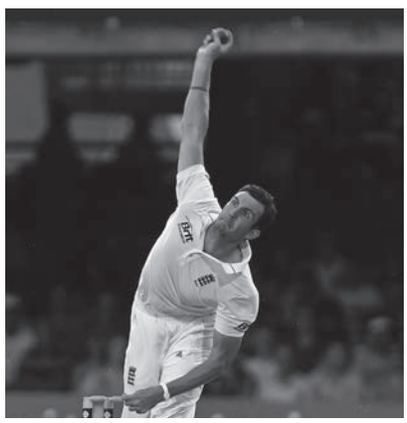
Total for Question 2 = 2 marks

Guided **3** The picture shows a cricketer bowling a ball.



Analyse how the structure and function of the shoulder joint allow the cricketer to bowl the ball well.

6 marks

For an essay-style question, it is a good idea to produce a quick plan before starting to write your response. Use this plan to attempt the question.

Plan:

Type of joint – ball and socket

Structure – bones articulating to form joint

Shape/structure linked to range of movement – full range of movement

Function – bone type – leverage, red blood cell production, protection

Links to performance of technique – movements required, problems if unable to use this range of movement

Links For information on the structure and function of joints look at page 7 of the Revision Guide.

The shoulder joint is a ball and socket joint. The joint is formed by the meeting of the humerus and scapula. The humerus forms the 'ball' in the joint, allowing the bone to .....

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Total for Question 3 = 6 marks

TOTAL FOR SECTION A = 12 MARKS

Section B: Muscular system for sports performance

Answer ALL questions. Write your answers in the spaces provided.

Guided

4 The body has three different muscle types. Each type is essential to successful performance in sport or exercise.

Explain **two** characteristics of cardiac muscle that make it ideal for its function. 4 marks

The use of **bold** in this question emphasises the word. Make sure you use this information when answering the question. Here, the word in bold emphasises that you need to explain **two** characteristics.

Two characteristics of cardiac muscle are:

1. It is non-fatiguing muscle. This makes it ideal for its function, as .....

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2. It is an ..... muscle. This means we do not have to consciously think to make the heart beat, so we can concentrate on other things such as tactics or how to perform a technique.

Total for Question 4 = 4 marks

Guided

5 During physical activity muscles work together as antagonistic pairs.

Describe the antagonistic muscle pair action during hip flexion. 2 marks

The hip flexors work as the agonist muscle in this movement, as they contract .....

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Note how the question identifies the specific movement you need to refer to. Make sure you talk about **hip flexion**.

Total for Question 5 = 2 marks

Guided

6 Table 1 shows results of the vertical jump test for four different athletes.

Athlete	Rating in vertical jump test
1	Average
2	Excellent
3	Poor
4	Very good

Using these data, explain **two** physiological reasons, linked to the muscular system, why Athlete 2 achieved a higher rating than the other athletes.

4 marks

Make sure you read the questions carefully. Your answer to this question must focus on the **muscular system**. You also need to give two reasons why **Athlete 2** is better, so make sure you talk about her rather than the other athletes.

Athlete 2 may have a higher percentage of .....

muscle fibres. Therefore, she could generate more .....

allowing her to jump higher.

In addition, this athlete may have carried out more .....

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Total for Question 6 = 4 marks

Guided

7 Sam uses weight training to increase her muscular strength. During a weight training session Sam's muscles contract in different ways.

Analyse how the different types of muscle contraction allow Sam to move from standing to the squat position shown, and then back to standing. 6 marks

This question asks for an **analysis**. You will need to **break down** the movement. Think about the types of muscle contraction in the different phases of the movement. Focus on the legs, as these are responsible for movement in the question context.

Plan:

Different types of muscle contraction – focus on muscle action of legs

Analysis of movement – downward phase; end of squat/stationary; upward phase

Downward phase – need to control movement against gravity

Moment when no movement but muscles still working

Movement again as move from squat to standing position

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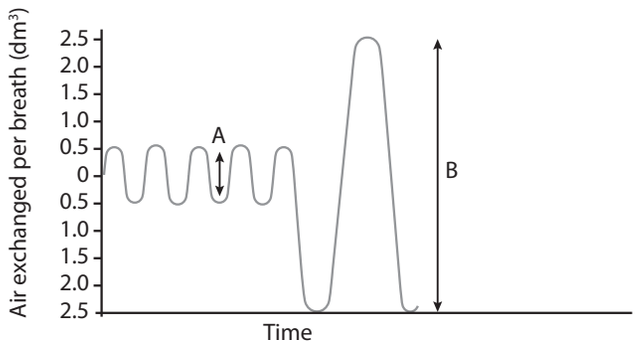
Total for Question 7 = 6 marks

TOTAL FOR SECTION B = 16 MARKS

Section C: The respiratory system for sports performance

Answer ALL questions. Write your answers in the spaces provided.

8 Heather is a 1500 m runner. She completes a number of fitness tests, including a treadmill test, to measure her lung volumes at rest and during exercise.
The graph shows one set of readings of Heather's lung volumes.



(a) Identify the lung volumes A and B. 2 marks

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Guided

(b) Explain whether the lung volumes shown in the graph are taken when Heather is resting or when she is running at varying intensities on the treadmill. 3 marks

Note the reference in the question to running at **varying intensities**. What happens to your breathing rate when you change from jogging to a faster pace? How would this change be reflected on a graph?

The trace for tidal volume is very even. This would suggest

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because ……

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Total for Question 8 = 5 marks

9 (a) State the role of the chemoreceptors during exercise. 2 marks

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Note that **two** marks are available for this question. Try to think of two examples of the role.

Guided

(b) Describe the role of the medulla oblongata in controlling breathing rate during exercise sessions of varying intensities. 3 marks

The medulla oblongata …… .

……..

By varying the speed of the impulses from the medulla oblongata to the ……..

……..

……..

This question asks for a **description**. This means you need to **give an account of the process** to control breathing rate. However, you **do not** need to justify or give reasons in your answer.

Total for Question 9 = 5 marks

Guided

10 The Tour de France is a long-distance cycle race. Cyclists ride for 21 days and cover in excess of 3000 km, covering a variety of terrains, some at high altitude.

Assess the effect on performance of working at high altitude in a long-distance cycle race. 6 marks

Although only a short question, lots of key information has been given. Here, **assess** means you need to **make a judgement**, possibly as a conclusion to your response. You need to explain what is significant about 'working at high altitude'. How might a difference in the partial pressure of oxygen impact on performers, in particular, 'long-distance cyclists'?

Links See page 43 of the Revision Guide for further guidance on how to approach long-answer questions.

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To conclude, owing to the lower partial pressure of oxygen at altitude, and the cyclists' increased need for oxygen transport due to the intensity of the exercise they are performing, working at high altitude will make it harder for them to maintain the quality of their performance. Therefore,

they will not be able to cycle ……..

……..

Total for Question 10 = 6 marks

TOTAL FOR SECTION C = 16 MARKS

Section D: The cardiovascular system for sports performance

Answer ALL questions. Write your answers in the spaces provided.

Guided

11 During a circuit training session, performers work maximally and then have a recovery period before moving on to the next station.

(a) Oxygen delivery and removal of waste products are essential to maintain performance in circuit training. Explain **one other** role of the cardiovascular system during an exercise session. 4 marks

Note how the question asks for **one other** role. Do not use the roles given in the question in your answer.

Another role of the cardiovascular system during exercise is thermoregulation .....

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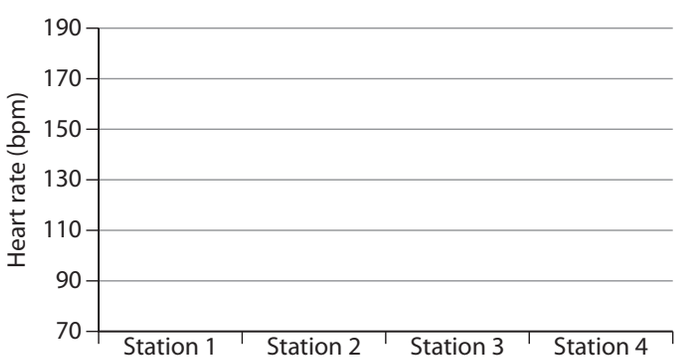
Heart rate can be recorded during circuit training to monitor the impact of the exercise on heart rate.

(b) (i) Complete the graph to show the likely changes in heart rate during a typical circuit session. 2 marks

Remember, **you can only work with the data you have**. You are not told the age of the performer, so you cannot work out their maximum heart rate. However, you are given some information at the beginning of the question – you are told they work maximally at the station and then have time for recovery between stations. What will happen to their heart rate when working flat out? What will happen when they stop?



Guided

(b) (ii) Describe the likely changes in heart rate after the final station in the circuit, during the first five minutes of recovery. 2 marks

Immediately after the exercise there should be a steep drop in heart rate at first, although this will gradually .....

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Guided

(c) Explain the nervous control of the heart that allows us to regulate our heart rate during exercise.

5 marks

Links For more on nervous control of the cardiac cycle look at page 31 of the Revision Guide.

The sinoatrial node acts as a ....., controlling how quickly the heart contracts. .....

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Therefore, by controlling the rate that these electrical impulses are sent .....

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The parasympathetic nervous system sends messages to the sinoatrial node to ..... heart rate during less intense exercise. .....

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Total for Question 11 = 13 marks

12 Explain why it is necessary for veins to have valves in order to achieve their function.

3 marks

Remember, veins return blood to the heart. Think about their characteristics. Why are they the only type of blood vessel that needs valves?

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Total for Question 12 = 3 marks

Guided

13 Benji wanted to increase his fitness so joined a fitness class. Before taking the class for the first time, the instructor asked Benji to complete a questionnaire about his health.

Assess the importance to cardiovascular health of completing a medical check before undertaking strenuous exercise for the first time.

6 marks

Plan:
Purpose of medical check – why it is important? Examples
Relevance of strenuous activity
How might cardiovascular health be affected if no medical check, include examples
Judgement

A medical check is carried out by the organisers of the fitness class to check to see if Benji has any

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For example, if Benji has high blood pressure, as he exercises his blood pressure will increase further in response to the exercise, ...

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Although for most people medical screening does not show any health conditions that the organisers and individual need to be aware of, for those with an existing cardiovascular health condition medical screening is essential as .....

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Total for Question 13 = 6 marks

TOTAL FOR SECTION D = 22 MARKS

Section E: Energy systems for sports performance

Answer ALL questions. Write your answers in the spaces provided.

14 Participation in sport requires a constant supply of energy.

(a) Describe the process of ATP resynthesis via the lactate system.

4 marks

Remember the lactate system is **anaerobic**.

Links For information on the lactate system look at page 37 of the Revision Guide.

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Guided

(b) Explain why the lactate system would be of limited use in activities lasting over 2–3 minutes.

3 marks

Why would the lactate system be of limited use? Complete the paragraph provided to give a clear explanation.

The lactate system can only be used for a limited amount of time because the waste products of anaerobic glycolysis, such as ....., increase the ..... of the blood, making it more difficult to continue with energy production, causing muscle .....

Total for Question 14 = 7 marks

15 Explain how diabetes could impact on performance in endurance activities, such as triathlons or iron man competitions.

3 marks

Note the question context: 'endurance activities'. Remember those with diabetes are unable to regulate blood glucose levels. How might this impact on performance in endurance events?

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Total for Question 15 = 3 marks

Guided

16 The 10 000 m race is run over 25 laps of the track.

Assess the impact of adaptations of the energy systems on performance in a 10 000 m race. 6 marks

Look at the **question context**. A specific energy system has not been mentioned, so you need to consider **all three** in your answer. However, you are told this is in the context of a long-distance race, so make sure you apply your answer to this context. The command word is **assess**, so make a judgement about the importance of these adaptations.

See page 43 of the Revision Guide for further guidance on how to approach long-answer questions.

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Therefore, although adaptations to each energy system can be advantageous to the long-distance runner, the most significant adaptations in terms of performance are on the aerobic energy system due to the time taken to complete the race.

Total for Question 16 = 6 marks

TOTAL FOR SECTION E = 16 MARKS

Section F: Interrelationships between body systems for sports performance

Answer the question. Write your answer in the space provided.

Guided

17 To what extent do the muscular and cardiovascular systems need to work together to allow good performance in activities such as a 90-minute game of football?

8 marks

This question requires you to demonstrate your knowledge of how **two or more** body systems work together during sport and exercise. Examples of possible combinations might be muscular and energy systems, cardiovascular and respiratory systems, energy and cardiovascular systems.

Plan:

Role of muscular system in sport and exercise

Role of cardiovascular system in sport and exercise

Overlap between systems – how one allows the other to 'do its job'

Consequences if they don't work together

Total for Question 17 = 8 marks

TOTAL FOR SECTION F = 8 MARKS

END OF PAPER 1

TOTAL FOR PAPER = 90 MARKS

Revision test 2

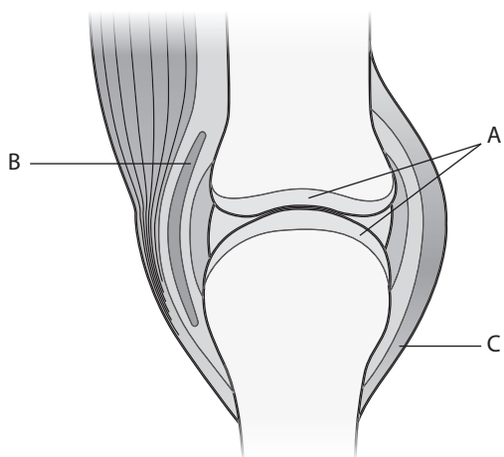
This Workbook is designed to revise the skills that might be needed in your exam. The details of the actual exam may change, so make sure you are up to date. Ask your tutor or check the Pearson website for the most up-to-date Sample Assessment Material to get an idea of the structure of the exam and what this requires of you.

Section A: Skeletal system for sports performance

Answer ALL questions. Write your answers in the spaces provided.

1 Synovial joints are important to sports performers because they allow movement to complete sport and exercise.

The picture shows a synovial joint.



(a) Identify the components A and B. 2 marks

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(b) Explain, using an example, the importance of the component labelled C to a sports performer. 4 marks

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Although the question doesn't specifically ask you to name 'C' from the picture it is a good idea to do so, to make it clear that you know the name of the structure you are explaining the importance of.

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Total for Question 1 = 6 marks

2 The picture shows a high jumper attempting to clear the bar.

Analyse how the cartilaginous joints of the upper and lower skeleton allow the high jumper to clear the bar.

6 marks

For an essay-style question, it is a good idea to produce a quick plan before starting to write your response.

Use this plan to attempt the question:

- What are the cartilaginous joints in the upper and lower skeleton?
- Structure – irregular shape, with cartilage between each vertebrae
- Shape/structure linked to range of movement – limited movement individually but greater range when the whole spine is considered
- Links to performance of technique – what movement is required in high jump/in picture, problems for performer if unable to use this range of movement.

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Total for Question 2 = 6 marks

TOTAL FOR SECTION A = 12 MARKS

Section B: Muscular system for sports performance

Answer ALL questions. Write your answers in the spaces provided.

3 Sometimes during or after an exercise session, an athlete can experience cramp.

(a) Describe what happens to the athlete when they experience cramp. 2 marks

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(b) Apart from taking on sufficient water, how else can an athlete reduce the risk of getting cramp? 1 mark

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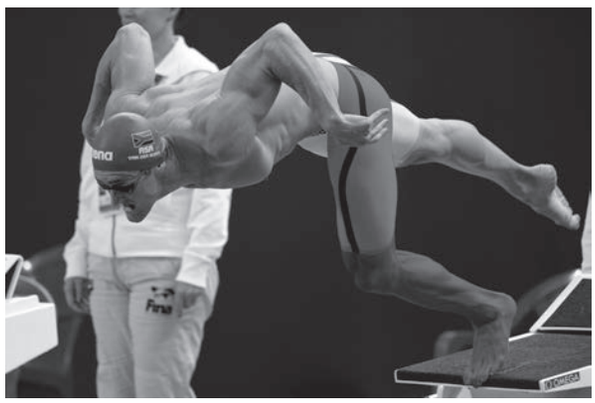
Total for Question 3 = 3 marks

4 The picture shows a swimmer as he starts a race.



(a) Analyse the antagonistic muscle action at the ankle **and** the knee of the shaded leg, which results in the swimmer pushing off the blocks to start the race.

4 marks

Make sure you read the question carefully. Your answer to this question must focus on the **antagonistic pair of muscles** working at the ankle and knee of the **shaded leg only**. There is no need to reference the other leg.

Links See pages 8 and 15 of the Revision Guide for more on flexion, dorsiflexion and antagonistic muscle pairs.

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(b) Explain which muscle fibre type would be used to propel the swimmer from the blocks.

3 marks

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Total for Question 4 = 7 marks

5 Jacob trains regularly to improve his fitness for basketball.
The picture shows Jacob attempting to score a basket.

Discuss the importance of adaptations to Jacob's muscular system in improving his basketball performance.

6 marks

This question asks for a **discussion**. You will need to consider the adaptations to the muscular system and whether these will have any potential impact on Jacob's performance. Use the picture to help.

Links See page 43 of the Revision Guide for further guidance on how to approach long-answer questions.

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Total for Question 5 = 6 marks

TOTAL FOR SECTION B = 16 MARKS