**Pearson Edexcel Level 3 GCE**

## Wednesday 24 May 2023

Afternoon (Time: 2 hours 30 minutes)

**Paper reference** **9PE0/01**

# Physical Education

**Advanced**
**COMPONENT 1: Scientific Principles of Physical Education**

**You must have:**
Calculator and ruler

Total Marks

## Instructions

- Use **black** ink or ball-point pen.
- **Fill in the boxes** at the top of this page with your name, centre number and candidate number.
- Answer **all** questions in Sections A and B.
- Answer the questions in the spaces provided
  – *there may be more space than you need*.

## Information

- The total mark for this paper is 140.
- The marks for **each** question are shown in brackets
  – *use this as a guide as to how much time to spend on each question*.
- The question marked with an **asterisk (*)** requires candidates to use their knowledge and understanding from across the course of study in their answer.

## Advice

- Read each question carefully before you start to answer it.
- Try to answer every question.
- Check your answers if you have time at the end.

*Turn over* ▶

**SECTION A – Applied anatomy and physiology**

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**1**  Define the following:

(i)  Fixator

**(1)**

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(ii)  Synergist

**(1)**

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**(Total for Question 1 = 2 marks)**

**2**  Name the main muscle responsible for each movement.

| Movement | Muscle responsible |
|---|---|
| (i)  Flexion of the trunk | ................................................................................................................................ **(1)** |
| (ii)  Dorsi flexion of the ankle | ................................................................................................................................ **(1)** |
| (iii) Plantar flexion of the ankle | ................................................................................................................................ **(1)** |

**(Total for Question 2 = 3 marks)**

**3** Summarise the structural characteristics of fast glycolytic (type IIx) muscle fibres.

(5)

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**(Total for Question 3 = 5 marks)**

**4** Summarise the chronic functional adaptations of the cardiovascular system to aerobic training.

(4)

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**(Total for Question 4 = 4 marks)**

**5** Using sporting examples, outline how the **five** forms of energy are transferred.

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**(Total for Question 5 = 5 marks)**

P 7 2 5 9 3 R A 0 4 2 8

**6** Describe vascular shunting.

(4)

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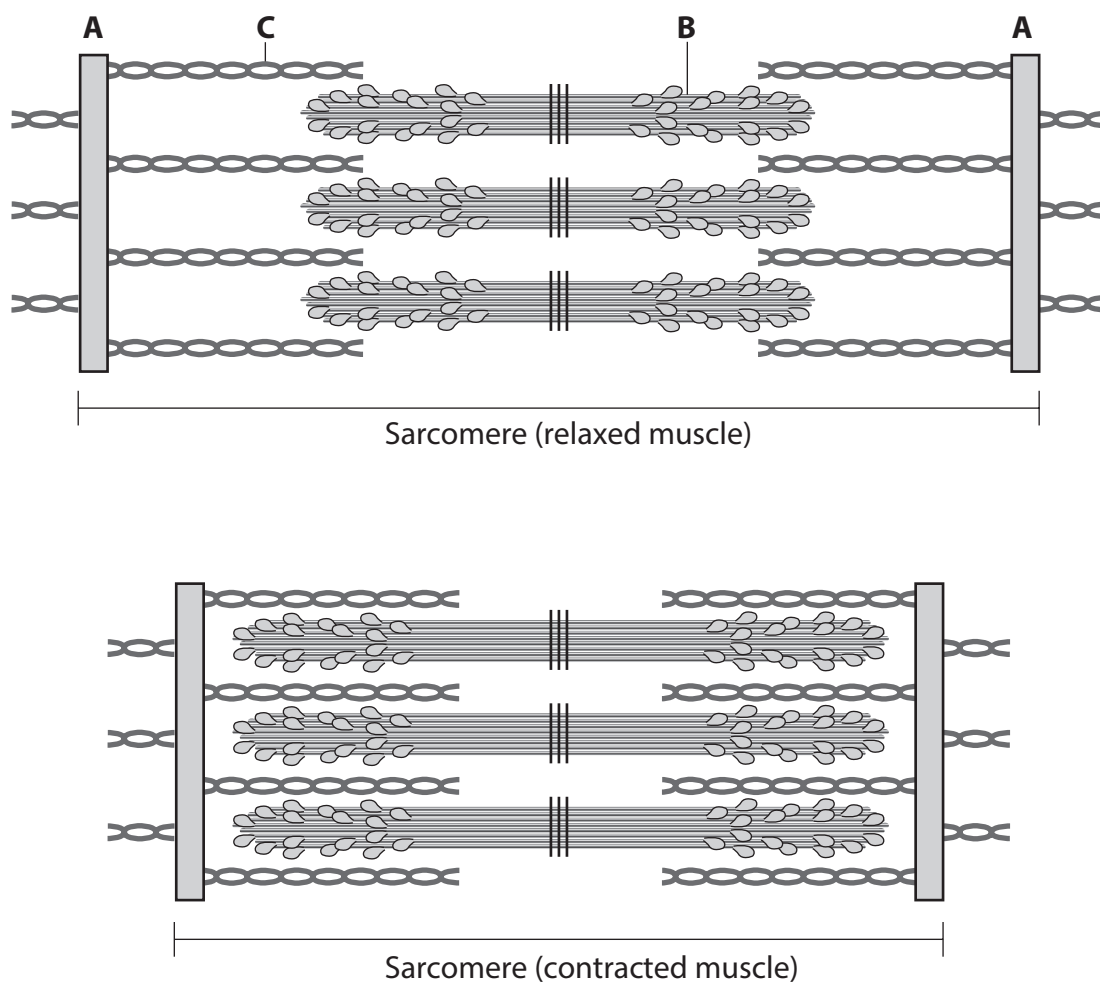
**(Total for Question 6 = 4 marks)**

P72593RA0528

**7** **Figure 1** shows a muscle sarcomere.



Sarcomere (relaxed muscle)

Sarcomere (contracted muscle)

(Source: https://www.shutterstock.com/image-vector/
detail-muscle-sarcomere-showing-thin-thick-1288781587)

**Figure 1**

(a) Name the parts in the diagram.

(i) A

**(1)**

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(ii) B

**(1)**

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(iii) C

**(1)**

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(b) Summarise what happens within the sarcomere during a muscle contraction.

(5)

**(Total for Question 7 = 8 marks)**

8 Outline the ATP-PC system.

(4)

**(Total for Question 8 = 4 marks)**

P 7 2 5 9 3 R A 0 7 2 8

**9** Summarise the physiological processes occurring in the slow component of recovery.

(4)

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**(Total for Question 9 = 4 marks)**

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**10** Examine how the muscular and skeletal systems respond to a warm-up.

(8)

**(Total for Question 10 = 8 marks)**

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**11** Examine how the anatomical structures labelled in **Figure 2** cause the heart muscle to contract.

**(8)**
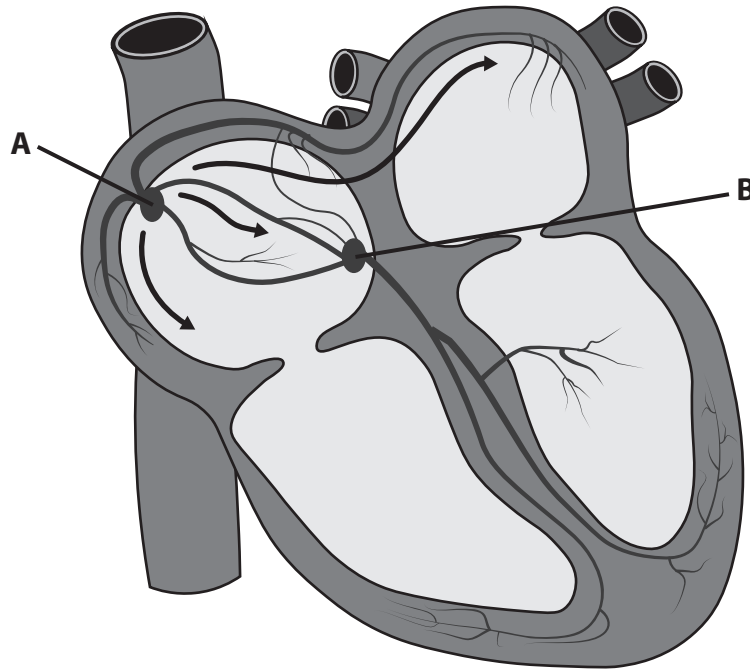


**Figure 2**

(Source: https://www.shutterstock.com/image-vector/
conduction-system-heart-showing-sa-av-228014488)

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**(Total for Question 11 = 8 marks)**

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**12** Using examples, analyse how Newton's **three** Laws of Motion apply to sport.

(15)

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**(Total for Question 12 = 15 marks)**

**TOTAL FOR SECTION A = 70 MARKS**

**SECTION B – Exercise physiology and applied movement analysis**

**Answer ALL questions.**

**Write your answers in the spaces provided.**

**13** Define the term power.

(1)

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**(Total for Question 13 = 1 mark)**

**14** Outline **three** different types of flexibility training.

(3)

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**(Total for Question 14 = 3 marks)**

**15** A 20 year-old male long jumper completes a series of fitness tests. The results are shown in **Table 1**.

| Test | Result | Rating |
|---|---|---|
| Cooper 12 Minute Run | 2350 metres | Average |
| Margaria Kalamen Test | 1,563 watts | Average |
| 20 m Acceleration Sprint | 4.1 seconds | Above average |
| Yo Yo Intermittent Recovery Test | 16.3 | Average |

**Table 1**

(i) Using the results from **Table 1**, identify **one** score that he should aim to improve.

(1)

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(ii) Explain how an improvement in this test could improve his performance in the long jump.

(2)

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**(Total for Question 15 = 3 marks)**

**16** Describe the protocol for the Cunningham and Faulkner test.

(4)

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**(Total for Question 16 = 4 marks)**

**17** Outline **four** disadvantages of fitness testing.

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**(Total for Question 17 = 4 marks)**

**18** Summarise the effects of topspin on a tennis ball.

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**(Total for Question 18 = 5 marks)**

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**19** Data from a 400 m athletics race is shown in **Table 2**.

| Distance (–metres) | Time taken (seconds) | Speed (ms⁻¹) |
|---|---|---|
| 100 | 12.1 | 8.3 |
| 200 | 22.7 | 8.8 |
| 300 | 37.8 | |
| 400 | 52.3 | 7.7 |

**Table 2**

(i) Calculate the athlete's average speed at 300 m.

**(1)**

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(ii) Using the information in **Table 2** plot a speed-time graph for the 400 m race.

**(3)**

(iii) Explain how the race strategy used by the athlete would have affected the use of the energy systems at each 100 m in the race.

(4)

(iv) Explain how the athlete might have run the race more effectively using knowledge of energy systems.

(3)

**(Total for Question 19 = 11 marks)**
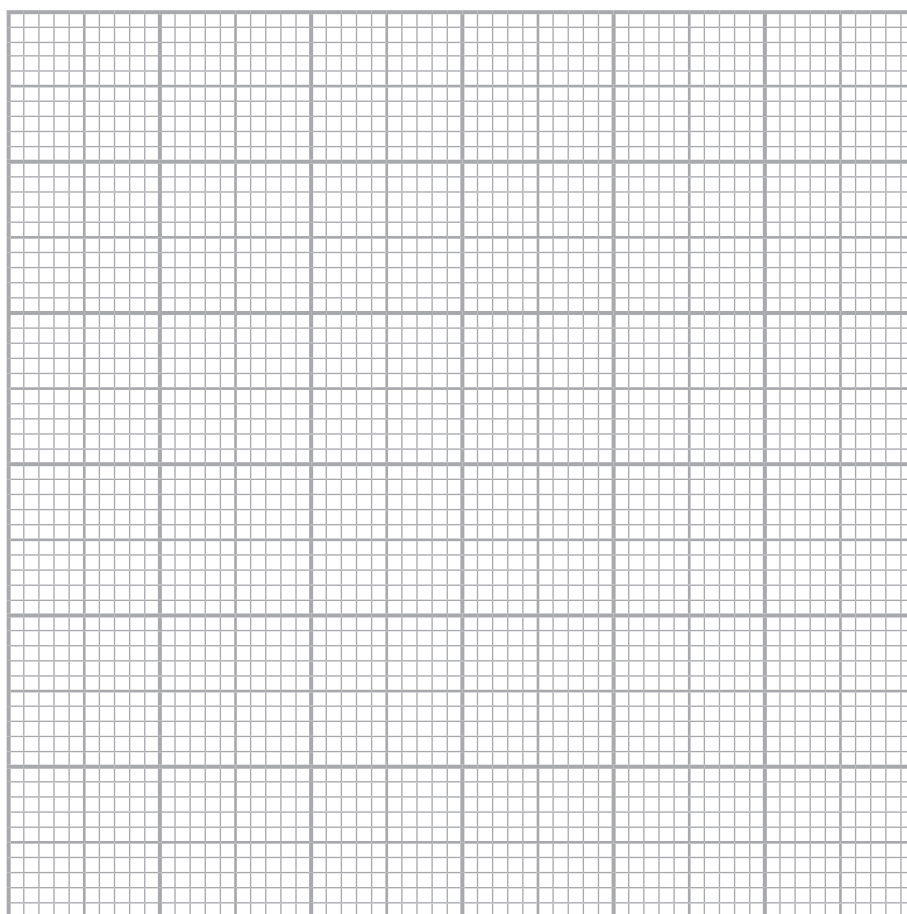
**20** Examine the effects of different dietary supplements on power athletes.

(8)

*(Total for Question 20 = 8 marks)*

P72593RA02228

**21** Examine how an athlete could prepare for performance at altitude.

(8)

**(Total for Question 21 = 8 marks)**

**22** Using examples of different body positions, examine how angular velocity would change during a dive from a 10 m platform as shown in **Figure 3.**



(Source: https://qualifications.pearson.com/content/dam/pdf/A%20Level/
Physical%20Education/2016/Teaching%20and%20learning%20materials/
Topic-guide-3-Biomechanical-Movement-final.pdf)

**Figure 3**

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**(Total for Question 22 = 8 marks)**

**\*23** Evaluate the most suitable fitness tests for a team game of your choice.

Use your knowledge and understanding from across the course of study to answer this question.

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(Total for Question 23 = 15 marks)

**TOTAL FOR SECTION B = 70 MARKS**
**TOTAL FOR PAPER = 140 MARKS**

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