

Physical Education

Advanced

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

Total Marks

Wednesday 24 May 2023 – Afternoon

Time: 2 hours 30 minutes

In the boxes below, write your name, centre number and candidate number.

Surname					
Other names					
Centre Number					
Candidate Number					

YOU MUST HAVE

Calculator and ruler

YOU WILL BE GIVEN

Diagram Booklet

INSTRUCTIONS

Answer ALL questions in Sections A and B.

Answer the questions in the spaces provided in this Question Paper or in the separate Diagram Booklet – 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.

There may be spare copies of some diagrams.

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.

SECTION A – Applied anatomy and physiology

Answer ALL questions.

Write your answers in the spaces provided.

1 Define the following:

**(i) Fixator
(1 mark)**

**(ii) Synergist
(1 mark)**

(Total for Question 1 = 2 marks)

2 Name the main muscle responsible for each movement.

Movement	Muscle responsible
(i) Flexion of the trunk	<hr/> <hr/> (1 mark)
(ii) Dorsi flexion of the ankle	<hr/> <hr/> (1 mark)
(iii) Plantar flexion of the ankle	<hr/> <hr/> (1 mark)

(Total for Question 2 = 3 marks)

- 3 Summarise the structural characteristics of fast glycolytic (type IIX) muscle fibres.
(5 marks)

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3 continued.

(Total for Question 3 = 5 marks)

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

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(Total for Question 4 = 4 marks)

- 5 Using sporting examples, outline how the FIVE forms of energy are transferred.**
(5 marks)

Answer space continues on the next page.

5 continued.

(Total for Question 5 = 5 marks)

**6 Describe vascular shunting.
(4 marks)**

[illegible]

(Total for Question 6 = 4 marks)

7 Look at FIGURE 1 for Question 7 in the Diagram Booklet. It shows a muscle sarcomere.

(a) Name the parts in the diagram.

(i) A
(1 mark)

(ii) B
(1 mark)

(iii) C
(1 mark)

(continued on the next page)

7 continued.

- (b) Summarise what happens within the sarcomere during a muscle contraction.
(5 marks)**

Answer space continues on the next page.

7(b) continued.

(Total for Question 7 = 8 marks)

- 8 Outline the ATP-PC system.
(4 marks)

Answer space continues on the next page.

8 continued.

(Total for Question 8 = 4 marks)

- 9 Summarise the physiological processes occurring in the slow component of recovery.
(4 marks)

Answer space continues on the next page.

9 continued.

(Total for Question 9 = 4 marks)

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

Answer space continues on the next 2 pages.

10 continued.

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Turn over

10 continued.

(Total for Question 10 = 8 marks)

- 11 Look at FIGURE 2 for Question 11 in the Diagram Booklet. Examine how the anatomical structures labelled in FIGURE 2 cause the heart muscle to contract.
(8 marks)**

Answer space continues on the next page.

11 continued.

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(Total for Question 11 = 8 marks)

- 12 Using examples, analyse how Newton's THREE Laws of Motion apply to sport.
(15 marks)**

Answer space continues on the next 5 pages.

12 continued.

[illegible]

12 continued.

[illegible]

12 continued.

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12 continued.

[illegible]

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12 continued.

(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 mark)**

(Total for Question 13 = 1 mark)

14 Outline THREE different types of flexibility training. (3 marks)

[illegible]

(Total for Question 14 = 3 marks)

15 Look at TABLE 1 for Question 15 in the Diagram Booklet. A 20 year-old male long jumper completes a series of fitness tests. The results are shown in TABLE 1.

- (i) Using the results from TABLE 1, identify ONE score that he should aim to improve.
(1 mark)**

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

Answer space continues on the next page.

15(ii) continued.

(Total for Question 15 = 3 marks)

**16 Describe the protocol for the Cunningham and Faulkner test.
(4 marks)**

[illegible]

(Total for Question 16 = 4 marks)

17 Outline FOUR disadvantages of fitness testing. (4 marks)

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(Total for Question 17 = 4 marks)

**18 Summarise the effects of topspin on a tennis ball.
(5 marks)**

Answer space continues on the next page.

18 continued.

(Total for Question 18 = 5 marks)

19 Look at TABLE 2 for Question 19 in the Diagram Booklet. It shows data from a 400 m athletics race.

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

**(ii) Look at the grid for Question 19(ii) in the Diagram Booklet. Using the information in TABLE 2 plot a speed-time graph for the 400 m race.
(3 marks)**

**(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 marks)**

Answer space continues on the next page.

19(iii) continued.

(continued on the next page)

19 continued.

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

Answer space continues on the next page.

19 continued.

(Total for Question 19 = 11 marks)

**20 Examine the effects of different dietary supplements on power athletes.
(8 marks)**

Answer space continues on the next 2 pages.

[illegible]

20 continued.

[illegible]

20 continued.

(Total for Question 20 = 8 marks)

- 21 Examine how an athlete could prepare for performance at altitude.
(8 marks)**

Answer space continues on the next 2 pages.

21 continued.

[illegible]

Turn over

21 continued.

(Total for Question 21 = 8 marks)

- 22 Look at FIGURE 3 for Question 22 in the Diagram Booklet. 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.**
(8 marks)

Answer space continues on the next 2 pages.

22 continued.

[illegible]

Turn over

22 continued.

(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.
(15 marks)**

Answer space continues on the next 7 pages.

23 continued.

[illegible]

Turn over

23 continued.

[illegible]

23 continued.

[illegible]

Turn over

23 continued.

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23 continued.

[illegible]

Turn over

23 continued.

[illegible]

Turn over

23 continued.

(Total for Question 23 = 15 marks)

TOTAL FOR SECTION B = 70 MARKS

TOTAL FOR PAPER = 140 MARKS

END OF PAPER