

Please check the examination details below before entering your candidate information

Candidate surname

Other names

**Pearson Edexcel  
Level 3 GCE**

Centre Number

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Candidate Number

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**Time** 2 hours 30 minutes

**Paper  
reference**

**9PE0/01**

**Physical Education**

**Advanced**

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

**You must have:**  
Calculator

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.
- 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.*
- Question marked with an **asterisk** (\*) requires students 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.
- Good luck with your examination.

Turn over ►

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Pearson

**SECTION A – Applied anatomy and physiology**

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

**1** Define the following:

(a) eccentric contraction

(1)

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(b) concentric contraction

(1)

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

**2** List **two** movements made at the knee.

(1)

(a) .....

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(1)

(b) .....

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

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3 When performing a squat there is movement at the knee in both the upward and downward phases. There is a two second hold at the bottom of the squat.

Identify the prime mover(s) and type of contraction at the knee joint in each phase of the squat.

	Muscle contracting	Type of contraction
Downward phase	(1)	(1)
Bottom of the squat	(1)	
	(1)	(1)
Upward phase	(1)	(1)

(Total for Question 3 = 7 marks)



4 State if each of the three lever systems has a mechanical advantage, mechanical disadvantage or both.

(1)

(a) 1st class lever: .....

(1)

(b) 2nd class lever: .....

(1)

(c) 3rd class lever: .....

**(Total for Question 4 = 3 marks)**

5 Summarise the functions of **three** structural components of the cardiovascular system.

(3)

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



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6 (a) State Newton's Second Law of Motion.

(1)

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Two rugby players go into a tackle. Player A has a mass of 91 kg and is accelerating at a rate of 2.5 m/s/s. Player B has a mass of 63 kg and is accelerating at a rate of 4 m/s/s.

(b) Using Newton's Second Law of Motion, calculate the force of each player in the tackle, the resultant force at the point of impact and who has the advantage.

(4)

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(Total for Question 6 = 5 marks)



7 Summarise how a nerve impulse initiates a muscular contraction.

(5)

Area with horizontal dotted lines for writing the answer to Question 7.

(Total for Question 7 = 5 marks)

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8 Summarise the characteristics of the aerobic pathway.

(6)

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**(Total for Question 8 = 6 marks)**



9 Explain strategies the coach of a team might employ to maximise recovery opportunities during a match.

(6)

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**(Total for Question 9 = 6 marks)**





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**10** Examine the chronic adaptations to the cardiovascular system experienced after a sustained period of endurance training.

(8)

Area with horizontal dotted lines for writing the answer to Question 10.

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



11 With reference to the exercise intensity and duration, examine how the ATP-PC system provides energy for ATP re-synthesis.

(8)

Dotted lines for writing.

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

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(Total for Question 12 = 15 marks)

**TOTAL FOR SECTION A = 70 MARKS**



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

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

**13** Define the following terms in the context of sports drinks:

(a) hypertonic

(1)

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(b) hypotonic

(1)

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(c) isotonic

(1)

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**(Total for Question 13 = 3 marks)**

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14 (a) Define the term ballistic stretching.

(1)

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(b) Explain the suitability of ballistic stretching for a high jumper.

(4)

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**(Total for Question 14 = 5 marks)**

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15 Summarise **four** principles of training.

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**(Total for Question 15 = 4 marks)**

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**16** Describe **five** advantages of using free weights over machines.

(5)

Area with horizontal dotted lines for writing the answer to Question 16.

**(Total for Question 16 = 5 marks)**



17 Outline the **three** factors that determine the horizontal displacement of a projectile at the point of release.

(3)

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**(Total for Question 17 = 3 marks)**

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**18** Outline the protocol for the Yo-Yo test.

(5)

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Area with horizontal dotted lines for writing the answer to Question 18.

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



**19** Summarise the potential physiological benefits from taking **three** different named nutritional supplements.

(6)

A series of horizontal dotted lines provided for writing the answer to Question 19.

**(Total for Question 19 = 6 marks)**

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**20** An athlete wishes to improve their submaximal aerobic fitness.

Use Karvonen's theory to calculate the training threshold of 50% to 85% and complete the missing figures in the table below.

<b>Resting heart rate (bpm)</b>	<b>70</b>
<b>Maximum heart rate</b>	<b>202</b>
<b>Heart rate reserve</b>	(1)
<b>Lower training heart rate</b>	(1)
<b>Upper training heart rate</b>	(1)

**(Total for Question 20 = 3 marks)**



21 Using sporting examples, explain **five** benefits of circuit training to games players.

(5)

Area for writing the answer to Question 21, consisting of 20 horizontal dotted lines.

(Total for Question 21 = 5 marks)

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**22** Examine the suitability of fitness tests used to determine an athlete's maximal aerobic fitness.

(8)

Area with horizontal dotted lines for writing the answer to Question 22.

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



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**23** Using examples, examine how the Magnus effect alters the flight path of a ball for **three** different types of spin.

(8)

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(Total for Question 23 = 8 marks)



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**24** Discuss the strategies an athlete could use to ensure optimal food, fuel and fluid intake before, during and after a marathon.

(15)

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**(Total for Question 24 = 15 marks)**

**TOTAL FOR SECTION B = 70 MARKS**

**TOTAL FOR PAPER = 140 MARKS**



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