

**OXFORD CAMBRIDGE AND RSA EXAMINATIONS**

**Thursday 23 May 2019 – Afternoon**

**A Level Physical Education**

**H555/01 Physiological factors affecting performance**

**Time allowed: 2 hours**

**plus your additional time allowance**

**YOU MAY USE:**  
**a scientific or graphical calculator**

**Please write clearly in black ink.**

**Centre number**

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**Candidate number**

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**First name(s)** \_\_\_\_\_

**Last name** \_\_\_\_\_

**READ INSTRUCTIONS OVERLEAF**



## **INSTRUCTIONS**

**Use black ink. HB pencil may be used for graphs and diagrams only.**

**Answer ALL the questions.**

**Read each question carefully. Make sure you know what you have to do before starting your answer.**

**Write your answer to each question in the space provided. If additional space is required, you should use the lined page(s) at the end of this booklet. The question number(s) must be clearly shown.**

## **INFORMATION**

**The total mark for this paper is 90.**

**The marks for each question are shown in brackets [ ].**

**Quality of extended response will be assessed in the question marked with an asterisk (\*).**

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## SECTION A

Answer ALL the questions.

- 1 Identify TWO effects which exercise in the heat can have on the cardiovascular system.

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[2]

- 2 Flexibility can be evaluated using the sit and reach test or by using a goniometer. Make TWO comparisons between these methods of evaluating flexibility.

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[2]

- 3 Identify the predominant energy system used in an elite level performance for the following activities:**

**100 m freestyle swim completed in 50 seconds** \_\_\_\_\_

\_\_\_\_\_

**Gymnastics vault** \_\_\_\_\_ **[2]**

- 4 Give a sporting example for the following classes of lever:**

**Second class** \_\_\_\_\_

**Third class** \_\_\_\_\_ **[2]**

- 5 Identify a technology that is used in performance analysis to:**

**improve streamlining of an object** \_\_\_\_\_

**evaluate human movement in three dimensions** \_\_\_\_\_

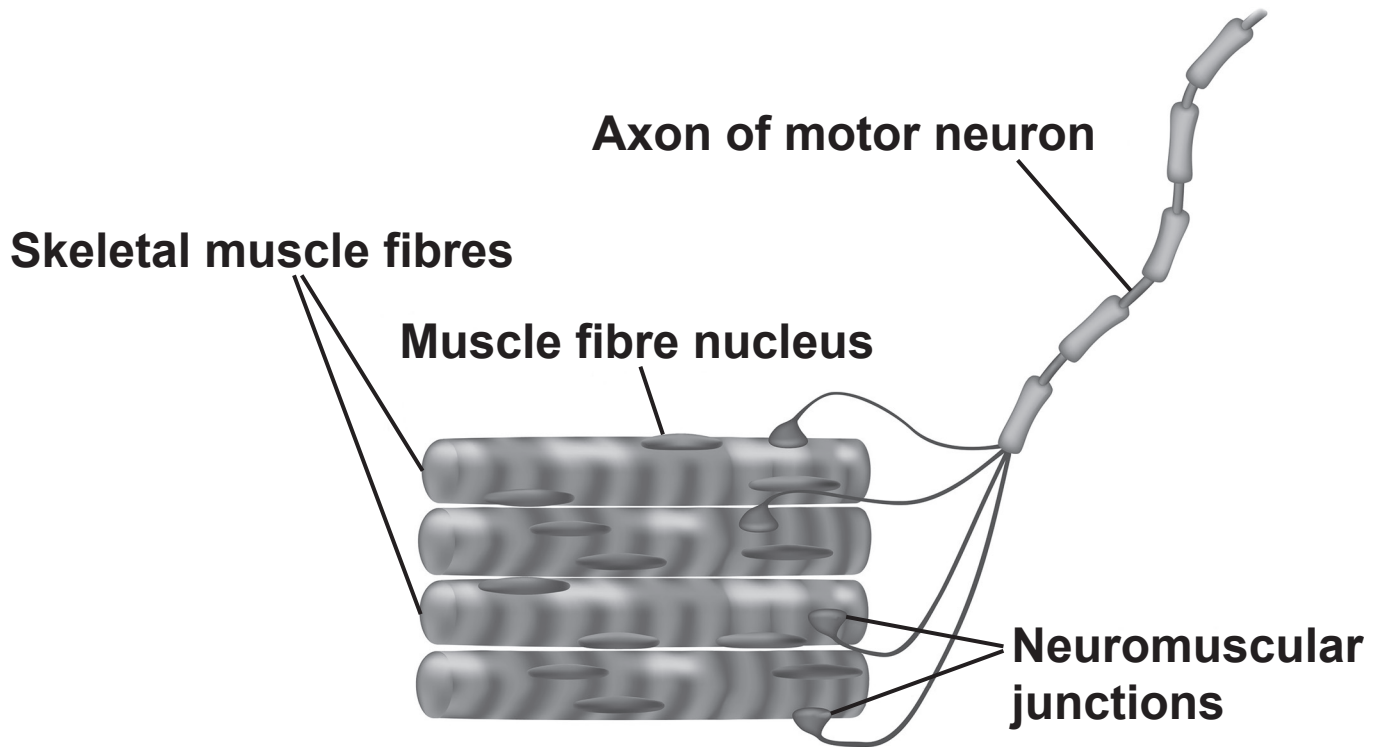
\_\_\_\_\_ **[2]**

## SECTION B

Answer ALL the questions.

6 FIG. 6.1 shows a motor unit.

FIG. 6.1



**(a) Explain how a motor unit is stimulated to cause muscular contraction.**

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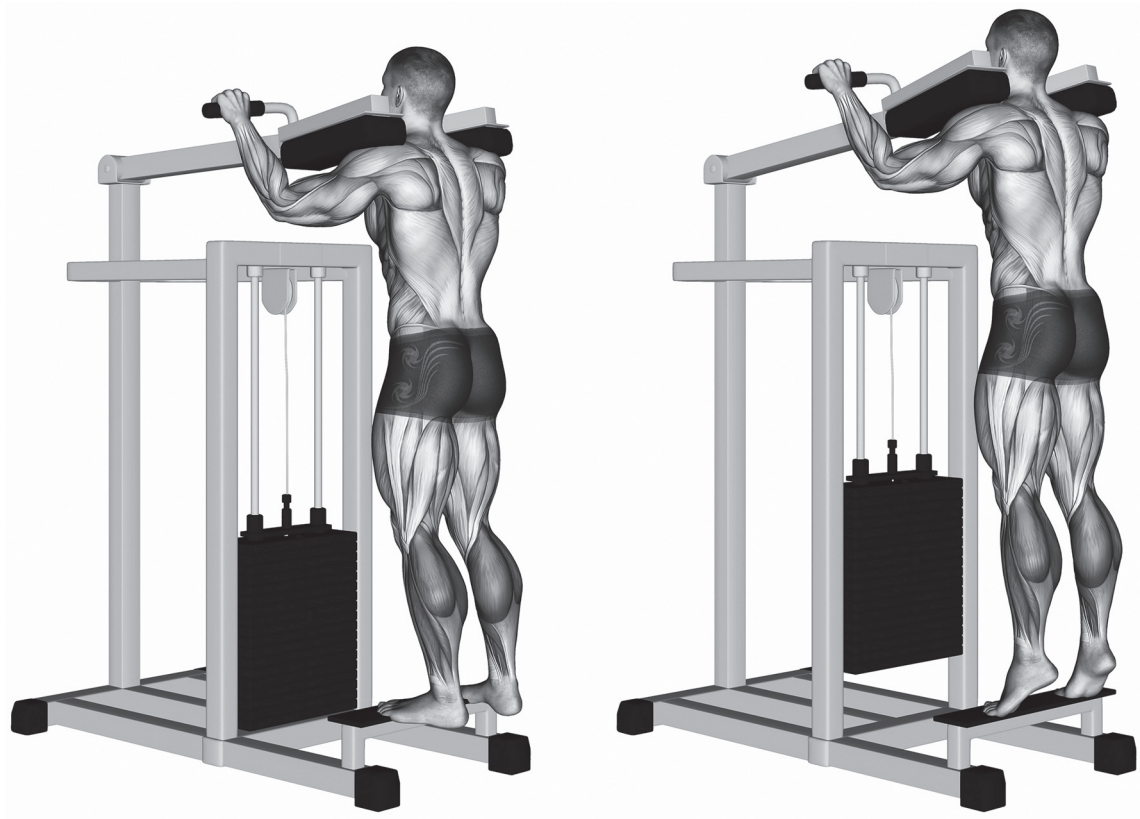
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**[3]**

(b) FIG. 6.2 shows a performer doing a calf raise.

FIG. 6.2



Complete the table below to analyse the movements at the knee and ankle during the upward phase of the lift. [5]

Joint	Joint type	Movement produced	Agonist	Type of contraction
Knee	Hinge	A: _____	Rectus femoris	B: _____
Ankle	C: _____	D: _____	E: _____	Concentric



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- [5]

**(ii) Evaluate the effectiveness of this system to resynthesise ATP.**

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**[3]**

9

**(d) Explain why a knowledge of Excess Post exercise Oxygen Consumption (EPOC) is beneficial to an 800 metre runner when planning a training session.**

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**[4]**

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- [4]

- (b) Define static and dynamic flexibility.  
Use practical examples to show how each type of flexibility can be beneficial to performance.**

**Static flexibility:** \_\_\_\_\_

\_\_\_\_\_

**Example:** \_\_\_\_\_

\_\_\_\_\_

**Dynamic flexibility:** \_\_\_\_\_

\_\_\_\_\_

**Example:** \_\_\_\_\_

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**[4]**

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[5]

**(d) Explain how the following adaptations from training help to delay the onset of blood lactate accumulation (OBLA).**

**Increased enzyme activity** \_\_\_\_\_

\_\_\_\_\_

\_\_\_\_\_

**Increased mitochondrial density** \_\_\_\_\_

\_\_\_\_\_

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**Increased buffering capacity** \_\_\_\_\_

\_\_\_\_\_

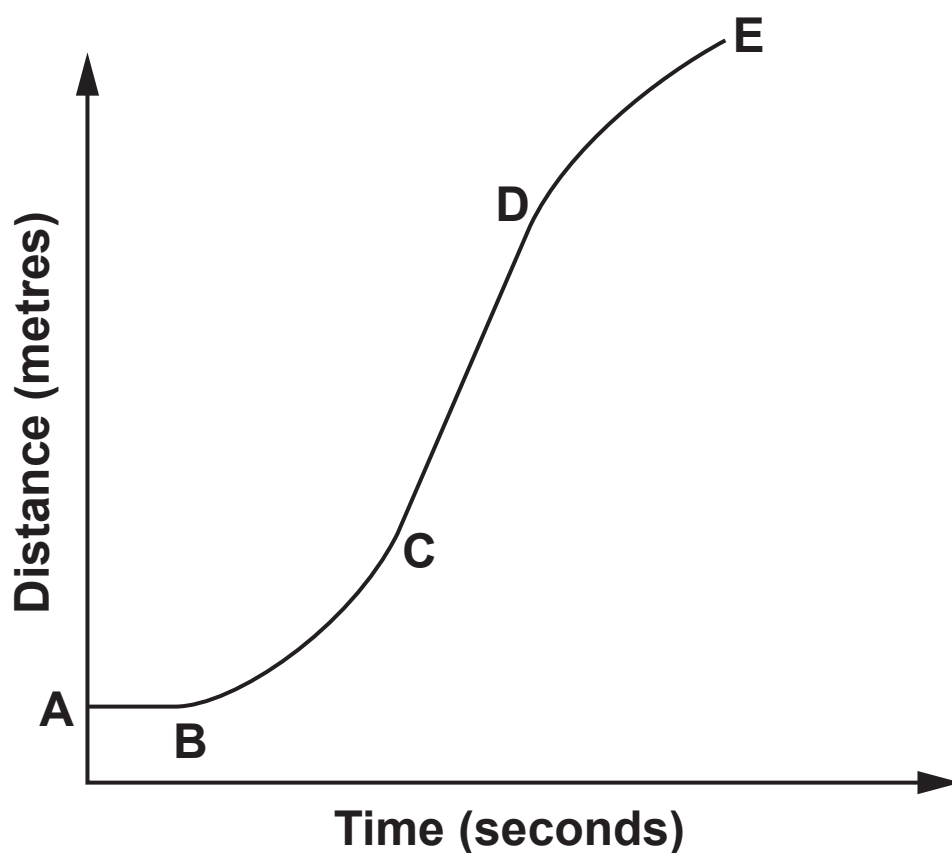
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**[3]**

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- 8 FIG. 8 shows a distance/time graph of the motion of a 100 metre sprinter.

FIG. 8



- (a) (i) Describe the changes in speed of the sprinter between the following points:

A – B \_\_\_\_\_

\_\_\_\_\_

B – C \_\_\_\_\_

\_\_\_\_\_

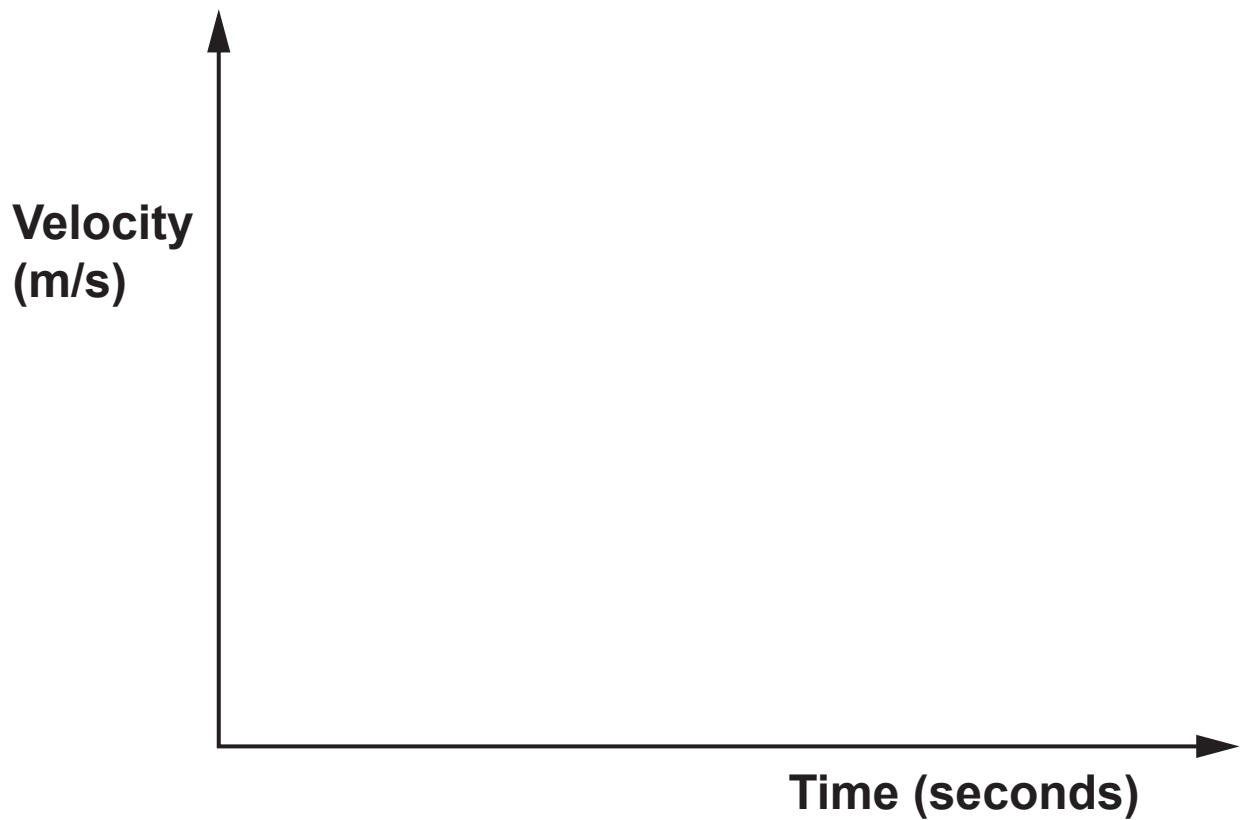
D – E \_\_\_\_\_

\_\_\_\_\_

[3]



- (ii) Sketch a velocity/time graph to show the motion of the sprinter from the time that the gun is fired until after crossing the finish line on the axes below. [4]



- (b) A gymnast performs a handstand as part of their routine.**

**Identify the vertical forces acting on the gymnast and explain their relationship during the handstand.**

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**[3]**

- (c) A trampolinist performs a front somersault by creating angular motion.**

- (i) Define angular motion and explain how it is generated to produce a somersault.**

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**[2]**

- (ii) Describe the factors that affect the size of moment of inertia of the trampolinist during the front somersault.

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[2]

- (d) In the shot put event the shot becomes a projectile when it is thrown into the air.

- (i) Explain THREE factors that affect the horizontal distance travelled by the shot in flight.

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[3]

**(ii) Explain the shape of the flight path of the shot.**

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**[3]**

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## SECTION C

- 9\* Elite runners must consume a very large volume of oxygen for aerobic respiration during a race.**

**Explain, using your knowledge of mechanics of breathing, how large volumes of air are inspired and expired during exercise.**

**Ankle injuries are common in elite runners.**

**Identify common ankle injuries. Describe the use of contrast therapy and anti-inflammatory drugs to treat these injuries, and evaluate the effectiveness of these treatments. [20]**

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[illegible]

[illegible]



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**END OF QUESTION PAPER**

### ADDITIONAL ANSWER SPACE

**If additional space is required, you should use the following lined page(s). The question number(s) must be clearly shown in the margin(s).**

[illegible]



