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Examiners' report

PHYSICAL EDUCATION

H555
For first teaching in 2016

H555/01 Summer 2019 series

Version 1

Contents

Introduction

Our examiners' reports are produced to offer constructive feedback on candidates' performance in the examinations. They provide useful guidance for future candidates. The reports will include a general commentary on candidates' performance, identify technical aspects examined in the questions and highlight good performance and where performance could be improved. The reports will also explain aspects which caused difficulty and why the difficulties arose, whether through a lack of knowledge, poor examination technique, or any other identifiable and explainable reason.

Where overall performance on a question/question part was considered good, with no particular areas to highlight, these questions have not been included in the report. A full copy of the question paper can be downloaded from OCR.

Paper 1 series overview

H555/01 is one of three examined components for GCE Physical Education. This component examines the topic areas of anatomy and physiology, exercise physiology and biomechanics. To do well on this paper, candidates need to apply knowledge and understanding using examples from sports and practical activities.

H555/01 includes one extended response question that requires candidates to show knowledge, understanding, practical application, evaluation and analysis.

Candidate performance overview:
Candidates were generally well prepared, managed their time well and showed good use of subject-specific vocabulary. Candidate answers were generally clear and concise and reflected the space that was provided in the question booklet and the number of marks available.

Candidates who did well on this paper generally did the following:
• produced clear and concise responses • made appropriate practical applications when required (4, 7b, 7c and 9) • correctly interpreted the practical context of a question (3, 5, 6b, 8ai, 8b, 8di, 8dii and 9) • communicated a depth of knowledge and understanding (6cii, 6d, 7d, 7di and 9) • were able to evaluate showing positive and negative aspects to access full marks (7aii and 9).
Candidates who did less well on this paper generally did the following:
• confused key concepts, misunderstood or misread the question (3, 4, 5, 6b, 6ci, 7b, 8b and 8dii) • produced responses that lacked depth or repeated the same point in a variety of ways (1, 6d, 7aii and 9) • found difficulty in interpreting diagrams or graphs (6b, 8ai and 8aii).

Most successful questions:	***Least successful questions:***
• 3: identifying the correct energy system • 5: identifying the correct technology • 6a: motor unit stimulation • 7aii: positives and negatives of cooling aids • 7c: use of PRICE. • 8ai: interpreting the state of motion from a graph.	• 6d: application of EPOC • 7b: flexibility definitions and applications • 7d: training adaptations linked to OBLA.

Section A overview

Section A consists of five questions all equally weighted, totalling 10 marks.

Question 1

1 Identify **two** effects which exercise in the heat can have on the cardiovascular system.

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..... **[2]**

A well-answered question with many candidates providing clear short statements. Most candidates identified the increase in heart rate and decrease in blood volume. Some candidates gave more than two responses and a common mistake was to state an increase in stroke volume or cardiac output.

Question 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]**

Where candidates made direct comparisons between the sit and reach test and goniometry they largely scored well. A lack of direct comparisons and focus around one being cheaper or faster than the other hindered some candidates.

Question 3

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]

A very well-answered question where most candidates could correctly identify the appropriate energy systems.

Question 4

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

Second class .....

Third class .....

[2]

Candidates who performed well recognised the need for a sporting example and answered succinctly, e.g. calf raise. Candidates who performed less well omitted a sporting example or were too vague about the location of the lever, e.g. take-off in high jump (it is not clear which joint would be acting as the second class lever).

Question 5

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

improve streamlining of an object .....

evaluate human movement in three dimensions .....

[2]

A very well-answered question where most candidates could correctly identify the appropriate technologies.

Section B overview

Section B consists of three questions split into sub-sections of short-answer questions. Questions covered topics of anatomy and physiology, exercise physiology and biomechanics and ranged in size from 2 to 5 marks.

Question 6 (a)

6 **Fig. 6.1** shows a motor unit.

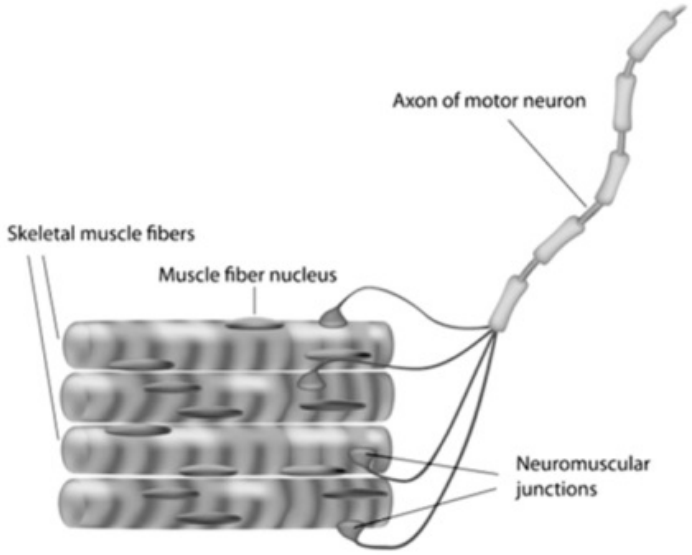

Fig. 6.1

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

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..... **[3]**

A well-answered question by most candidates scoring full marks accessing three of the seven points on the mark scheme with relative ease. Candidates commonly showed knowledge of the action potential, release of a neurotransmitter and the 'all or none' law.

Question 6 (b)

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

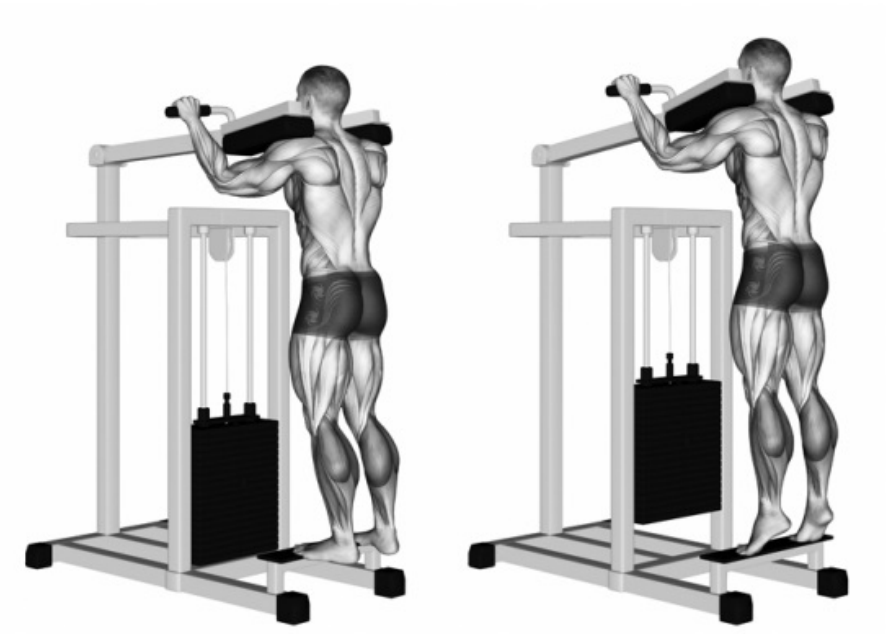

Fig. 6.2

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

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

[5]

A well-answered question. A typical mistake was to label the type of contraction of the rectus femoris as 'eccentric' and the joint type at the ankle as 'condyloid'.

Question 6 (c) (i)

(c) (i) Describe the predominant energy system which resynthesises ATP while performing the long jump in athletics.

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..... **[5]**

Most candidates were able to identify the ATP-PC system and access the full mark scheme. A clear and methodological approach was beneficial to candidates here: site, controlling enzyme, process etc. Some candidates focused their description around the effectiveness of this system, which was not required. A common pitfall was a lack of communication of the role of energy as central to the energy system, e.g. PC is broken down to release energy, and energy used to resynthesize ATP.

Question 6 (c) (ii)

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

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..... **[3]**

Many candidates evaluated well by stating the benefit or drawback of a key aspect of the system. Generally less well answered in comparison to 6ci. Less successful candidates were too descriptive in their response without a direct reference to effectiveness, e.g. no oxygen required (rather than **no delay** to wait for oxygen arrival).

Exemplar 1

This system is only effective for short bursts as it is anaerobic and needs no oxygen. However, then is a limited amount of P-C in the body blood so it can run out quickly and less ATP will be available to use and you will have to use the lactic acid system. **[3]**

'This system is only effective for short bursts as it is anaerobic and needs no oxygen' – too vague to access point 3 on the mark scheme the effect of 'no oxygen required' is absent.

'Limited amount of PC in the body so it can run out quickly' – 1 mark as the effect of limited amount of PC is stated.

Question 6 (d)

(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]**

Successful candidates were able to apply a reduction in the oxygen deficit to incorporating a warm-up, speeding up the removal of lactic acid to an active recovery, 3-minute phosphagen restoration to the need for appropriate rest breaks and monitoring training intensity to delay OBLA. Less successful candidates did not link how knowledge of EPOC is beneficial when planning a session. Many candidates considered training in general and not the specifics of a single session. Some candidates showed a lack of knowledge and understanding of EPOC in general.

Exemplar 2

This is beneficial to an 800 metre runner as knowledge about EPOC will enable them to plan how much recovery time is needed after training (depending on intensity). They can vary the intensity of the training sessions to work out recovery time. They could also use knowledge of EPOC to predict when OBLA will occur and aim to improve their time before OBLA occurs (e.g. run the 800m race faster or last longer before OBLA). It is also beneficial as they can work on ways of removing lactic acid – for instance by sweating or by converting it into glucose or glycogen.

'Knowledge about EPOC will help them to plan how much recovery time is needed after training (depending on intensity)' – too vague. How much recovery time after training is needed to do what?

'Vary the intensity of training sessions to work out recovery time' – too vague. Recovery time will depend on the accumulation of lactic acid, vary intensity to minimise the accumulation of lactic acid or use an active recovery to speed up the removal of lactic acid.

'Work on ways of removing lactic acid – for instance by sweating or by converting it into glucose or glycogen' – too vague. How is the training session adapted?

Question 7 (a) (i)

7 (a) (i) Outline the physiological implications of a warm up that would be beneficial to a games player before a match.

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..... **[4]**

Successful candidates linked the physiological implications of a warm-up to the benefits held for a games player, e.g. increased heart rate to increase oxygenated blood flow to the working muscles. Less successful candidates either focused on the effect of a warm-up or to the benefit to a games player, e.g. increased elasticity of muscles or decreased oxygen deficit.

Question 7 (a) (ii)

(ii) Critically evaluate the use of cooling aids as a means of performance enhancement.

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..... **[4]**

A typically well-answered question with most candidates showing some knowledge of the benefits or drawbacks of cooling aids. Common answers included reduced temperature, reduce swelling to treat injuries, mask injuries and cause ice burns. Most candidates considered both positive and negative effects. Less successful candidates focused on the cost, accessibility and legal status of cooling aids.

Question 7 (b)

(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: .....

.....

[4]

Many candidates incorrectly focused on 'stretching' rather than 'flexibility', which affected the accuracy of definitions and limited practical examples. The question required a knowledge of static and dynamic flexibility rather than static and dynamic stretching. When the definitions were correct, many candidates did not relate practical examples to the benefit for performance. Practical examples were typically of the type of flexibility rather than its benefit. A successful response would include a benefit, e.g. high levels of dynamic flexibility will help a goalkeeper reach further.

Question 7 (c)

(c) Explain the use of PRICE to manage a hamstring strain in a triple jumper.

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..... **[5]**

A well-answered question with most candidates showing good knowledge of PRICE well applied to hamstring strain. Less successful candidates struggled to explain how compression or elevation would manage the hamstring strain.

Question 7 (d)

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

Increased enzyme activity .....

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.....

Increased mitochondrial density .....

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Increased buffering capacity.....

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.....

[3]

Many candidate responses focused on OBLA and how each of the adaptations affected OBLA (and the removal of lactic acid) rather than how the adaptations **delayed** OBLA. Successful candidate focused on how each adaptations reduced or delayed OBLA, e.g. increased mitochondrial density increases aerobic energy production. A large proportion of candidates demonstrated an incorrect understanding of buffering capacity.

Question 8 (a) (i)

8 **Fig. 8** shows a distance/time graph of the motion of a 100 metre sprinter.

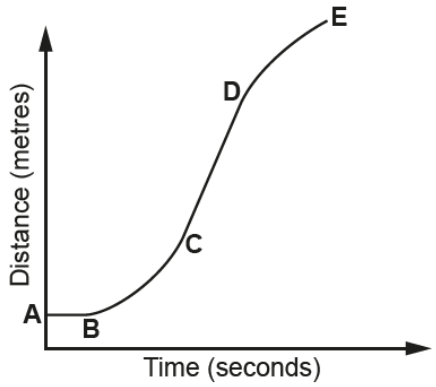

Fig. 8

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

A – B .....

.....

B – C .....

.....

D – E .....

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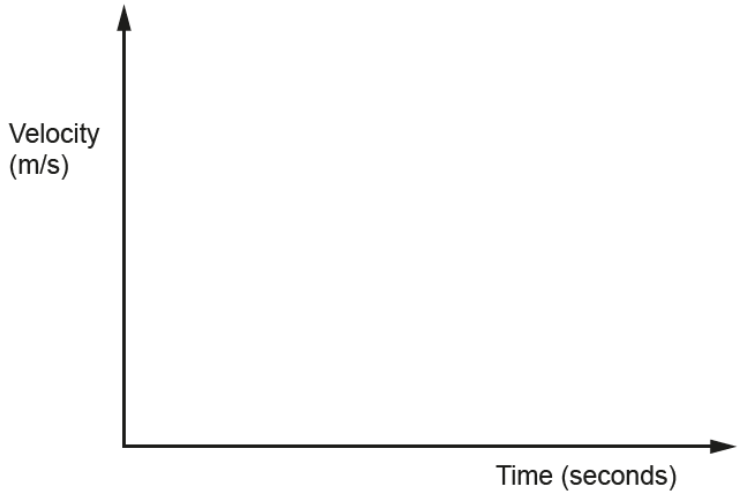
[3]

A well-answered question by the majority of candidates.

Question 8 (a) (ii)

(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]

A generally well-answered question with clearly sketched graphs showing the correct trend. Less successful candidate's graphs did not show a clear plateau. Most showed positive and negative gradients.

Question 8 (b)

(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]**

A well-answered question by most candidates correctly identifying weight and reaction forces, which are equal in size and opposite in direction. Less successful candidates confused weight with mass or gravity or considered the forced not to be balanced.

Question 8 (c) (i)

(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]**

Candidates performed well giving clear concise definitions of angular motion and explaining one of the multiple descriptive terms for how it is generated.

Question 8 (c) (ii)

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

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..... **[2]**

A proportion of candidates successfully described the two factors clearly. Less successful candidates described mass however did not describe the distribution of mass from the axis or rotation. A proportion of candidates considered factors such as angular velocity and body shape.

Question 8 (d) (i)

(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]**

Most candidates correctly identified speed, angle and height of release and correctly explained the relationship between speed and height of release and horizontal distance. Due to the height of release being higher than the landing height in shot put many candidates did not explain the relationship between angle of release and horizontal distance correctly. Candidates who considered factors such as air resistance, weight and surface characteristics of the shot put did not score.

Question 8 (d) (ii)

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

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..... **[3]**

Most candidates correctly identified the shape of the flight path as parabolic or symmetrical due to weight force being dominant. Fewer candidates considered the insignificant impact of air resistance to the flight path.

Section C overview

Section C consists of a single extended response question. A 20-mark question considering the topics of anatomy and physiology and exercise physiology. Answers were assessed using a levels mark scheme based on knowledge, understanding, practical application, evaluation and analysis.

Question 9

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]**

Candidates that were more successful focused on the mechanics of breathing during exercise and spent little time referring to resting conditions. They identified a range of common ankle injuries often including practical examples. A detailed knowledge of contrast therapy and anti-inflammatory drugs was shown with examples of use and a comprehensive evaluation of their benefits but also weaknesses. Excellent responses included reference to the type of injury and timing of use most appropriate.

Less successful candidates focused on the mechanics of breathing at rest without reference to the changes that occur during exercise. They were able to identify few common ankle injuries and showed limited knowledge of the use of contrast therapy or anti-inflammatory drugs – often mistaking contrast therapy for a type of physiotherapy. The weakest responses often included only one treatment method with no attempt at evaluation.

There was no evidence candidates did not understand the question or were time pressured.

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