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Examiners' report

PHYSICAL EDUCATION

H555

For first teaching in 2016

H555/01 Summer 2024 series

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. A selection of candidate answers is also provided. 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 and the mark scheme 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 which 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's responses reflected good understanding of the question asked, and clear and concise responses which reflected the space provided in the question booklet and number of marks available.

Candidates who did well on this paper generally:	Candidates who did less well on this paper generally:
• produced clear and concise responses • read and understood the demands of the question • correctly interpreted the practical context of the question and made appropriate practical applications when required • communicated a depth of knowledge and understanding • were able to evaluate aspects to access full marks. Most successfully answered Questions: • 1, 2, 6 (a), 6 (b), 6 (c), 7 (a), 7 (c) (ii), 8 (a) (i), 8 (d)	• confused key concepts, misunderstood or misread the questions • produced responses that lacked a depth of insight • found it difficult to express definitions • struggled to apply theoretical knowledge to the practical context required. Least successfully answered Questions: 4(b), 6(d), 7(b) (i), 7 (b) (ii), 7(d), 8 (a) (ii)

Section A overview

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

A generally well answered section by many candidates who provided clear and concise short answers. Most candidates made correct identifications in 1 and 2 however some lacked the description required in 2 to score. Candidates clearly understood the demands of the questions in 3 and 4 however some lacked the knowledge and understanding to score fully. Question 5 offers an opportunity for further learning.

Question 1

1 Name **one** agonist muscle that contracts to cause knee extension. Identify the plane of movement.

Agonist muscle: .....

Plane of movement: .....

[2]

A generally well answered question where most candidates gained both marks available.

Misconception

A common error seen was candidates confusing the biceps femoris as one of the quadriceps muscles.

Question 2

2 Describe **two** factors that affect the maximum strength of a performer.

1: .....

.....

2: .....

.....

[2]

Generally a well answered question with candidates most commonly accessing points 3 on gender and 4 on age, from the mark scheme. Those failing to score identified two factors rather than describing their effect on maximum strength.

Exemplar 1

1: type of muscle fibres, if there are more type 2a and 2b muscle fibres there will be a greater force of contraction produced

2: gender. Men tend to have a greater maximum strength than women as they have greater muscle mass.

[2]

Some candidates identified two factors affecting maximal strength, which are correct but alone do not answer the question. The candidate in Exemplar 1 describes two factors and the affect they have on maximal strength, scoring 2 marks.

Question 3

3 Define periodisation of training. Explain **one** benefit of using it when planning training.

Definition: .....

.....

Benefit: .....

.....

.....

[2]

Most candidates scored on this question, especially for the benefit of use – hitting point 5 most commonly.

Question 4 (a) and (b)

4

(a) Describe the term net force.

.....

..... **[1]**

(b) Use a practical example from sport to explain the effect of net force.

.....

.....

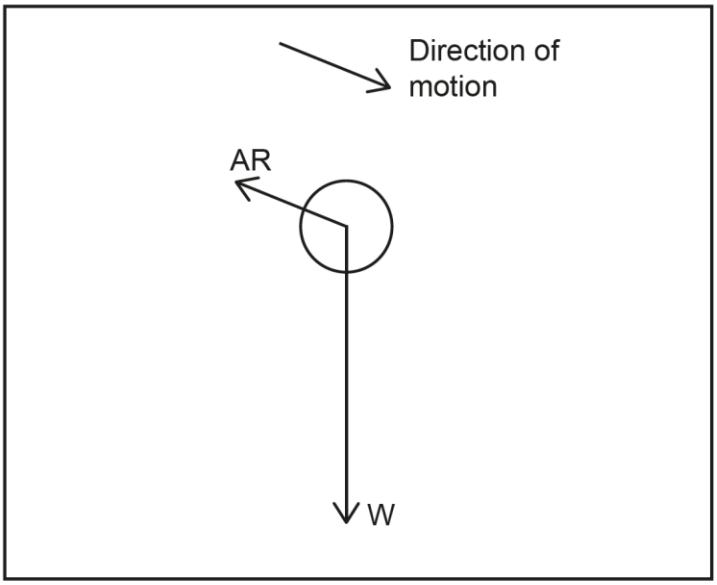
..... **[1]**

Some candidates answered this question well although others missed the need to fully answer the question for part b. Descriptions often omitted the reference to a 'body or object' which left responses too vague to score. The practical examples often omitted reference to 'net force' as required in the question. Answers described the forces and referenced whether they were balanced or not however didn't relate to the concept of net force (being zero, positive or negative).

Question 5

5 The diagram shows the forces acting on a shot put in flight.

On the diagram, draw and label the net force acting on the shot put. Use the parallelogram of forces.



[2]

Most candidates were able to indicate the direction of net or resultant force on the diagram however the ability to sketch a correct parallelogram was often missing.

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 1 to 6 marks.

Candidates typically performed well in Questions 6 (a), 7 (a), and 8 (d) where knowledge and understanding were assessed. Candidate performance was variable where a greater depth of understanding/ more marks/longer responses were required in Questions 7 (b)(ii) and 8 (b).

It is clear candidates performed less well where an application of knowledge and understanding to sporting situations was required in Questions 6 (c) and 7 (d).

Candidate's performance on Question 8 and its sub-sections was less secure whereby some candidates performed well in all sections and some candidates performed less well. The examination of biomechanical content again was relatively binary in nature especially in Questions 8 (a)(ii), 8 (b), and 8 (c).

Question 6 (a)

6

(a) Nervous stimulation of a motor unit causes skeletal muscle to contract.

Describe the nervous stimulation of a motor unit.

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.....

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

A well answered question with most candidates scoring fully. Most commonly candidates described the impulse moving down the axon, the release of a neurotransmitter, reaching a threshold and the all or none law.

Question 6 (b)

(b) Describe the changes in heart rate before, during and in recovery from a submaximal training run.

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.....

.....

..... **[6]**

Although a straightforward question which required the description of heart rate (HR) response to sub-maximal exercise. A common misconception made by candidates was to explain the reasons to the HR response to exercise. Some candidates gave explanations of neural control of HR when it wasn't required. Other common mistakes were to not be specific in the degree of HR increase and decrease although most candidates scored point 1 and 6.

Question 6 (c)

(c) The table shows the relative percentage contribution of each energy system during three different sporting activities.

Sporting activities	ATP-PC system (%)	Glycolytic system (%)	Aerobic system (%)
Activity A	0	5	95
Activity B	53	40	7
Activity C	8	54	38

Suggest a suitable different sporting example for each activity **A**, **B** and **C** using the data in the table.

Justify your answers.

Sporting example for **activity A** .....

Justification .....

.....

.....

.....

Sporting example for **activity B** .....

Justification .....

.....

.....

.....

Sporting example for **activity C** .....

Justification .....

.....

.....

.....

[6]

A range of responses provided by candidates. Those scoring highly often used specific events as examples, from athletics, swimming or gymnastics. Those candidates who used team games often struggled to be specific enough to gain sporting example marks, for example 'a football match' is not specific enough. Justifications required an acknowledgement of exercise intensity which most candidates did well.

Question 6 (d)

(d) Explain the effects of exercising in the heat on the respiratory system and on performance in sport.

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.....

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.....

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

A generally less well answered question. Some candidates focused on the cardiovascular response rather than respiratory explaining cardiovascular drift, blood flow and viscosity. Other candidates attempted to explain the effects on performance however were not specific to aerobic activities. The most commonly given points were 1, 3 and 6.

Question 7 (a)

7

(a) The use of physiological ergogenic aids in sport has potential benefits and risks.

Compare the use of blood doping with intermittent hypoxic training (IHT).

.....

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

A generally well attempted question where candidates showed a good knowledge and understanding of blood doping, unfortunately a lower knowledge and understanding of IHT. Successful candidates scored high marks with ease by being concise, for example: blood doping and IHT both increase the red blood cell count and aerobic capacity for endurance athletes, although blood doping is illegal whereas IHT is legal. Candidates understood the demand of the question and attempted to compare the physiological aids.

Question 7 (b) (i)

(b)

(i) Define aerobic capacity. Give an example of an activity or sport in which aerobic capacity is a key fitness component.

Definition: .....

.....

.....

Example: .....

[2]

Most candidates successfully gave a correct response however there was a general misconception that VO2max and aerobic capacity had the same definition. Many candidates incorrectly gave the definition of VO2max.

Question 7 (b) (ii)

(ii) Describe how features of an individual's physiological make-up may affect their maximal oxygen uptake (VO_2 max).

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.....

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

This was an accessible question with large variety on the mark scheme. Candidates who scored well successfully identified the feature and linked it to the effect on VO2max. Candidates often accessed points 1, 2, 6 and 7 however rarely points 4, 5, 8 and 9. Less successful candidates did not link the feature to relationship with VO2max.

Exemplar 2

Individual's may be born with naturally Stoang respiratory muscles which mean more oxygen can be inspired per breath as individuals may have greater respiratory volumes, so greater VO_2 max. An individul may have more alvoli that are large in surface area meaing more efficient gaseos exchange and higher VO_2 max. An individuals may have a more efficient cardiovascular system by having large chambers of the heart and Strag walls so more oxygenated blood can be pumped around the body increasing VO_2 max. If perfomers have greater elasticity of ~~tissue~~ arteries then more oxygenated blood can be transported and utilised by the muscles. The ~~more mitochondria~~ greater the capillary density of a perfomer mean they have greater VO_2 max as more oxygen can diffuse into the blood. **[4]**

The candidate identifies points 1, 2, 3 and 4 well, describing the relationship with VO2max well.

Question 7 (c) (i)

(c) The image shows a hurdler jumping over a hurdle during a race.

(i) Identify the type of flexibility most appropriate for a hurdler and explain why it is important.

.....

.....

.....

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

Candidates largely identified the type of flexibility correctly and a good proportion of candidates successfully explained why it is important to the hurdler. Some candidates were unsuccessful as they didn't relate their explanation to speed.

Question 7 (c) (ii)

(ii) Explain how physiological adaptations from flexibility training benefit the performance of the hurdler.

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

A generally well answered question with candidates successfully accessing all three points on the mark scheme. Common errors were the lack of 'resting' length in point 1 and using a double negative for point 2 'decreased' reduction in stretch reflex.

Question 7 (d)

(d) Assess how intrinsic risk factors can be managed to prevent injuries in sport.

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.....

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

Overall, this question proved problematic for candidates. Many mentioned several individual factors however didn't say how they can be managed. Candidates were most successful with points 3, 6 and 7, however there were many candidates incorrectly spending time assessing poor equipment, clothing and technique.

Question 8 (a) (ii)

(ii) Explain how the performer generates the ground reaction force during a vertical jump.

.....

.....

..... **[1]**

Most students correctly incorporated Newton's third law of motion into their response. However, some did not score due to the need to specifically identify the direction of the forces due to the question focussing on a vertical jump.

Question 8 (a) (iii)

(iii) Describe how force plates can be used to improve the performance of a vertical jump.

.....

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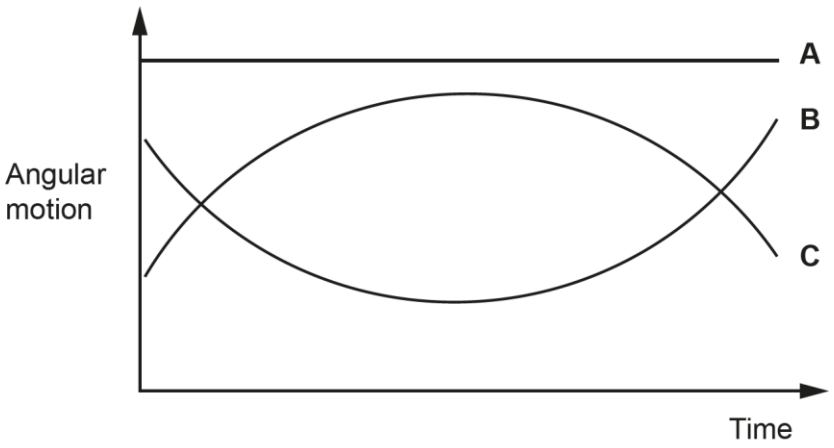
.....

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

A generally well answered question with most candidates gaining marks 1 and 3, with some also accessing point 2.

Question 8 (b)

(b) The image shows a graph that represents the angular motion of a performance of a pike somersault.



Identify the quantities of angular motion labelled **A**, **B** and **C** on the graph.

Explain your answers.

A: .....

Explanation: .....

.....

.....

B: .....

Explanation: .....

.....

.....

C: .....

Explanation: .....

.....

.....

[6]

A relatively binary response where candidates with a good level of knowledge and understanding scored full marks easily and a minority with no knowledge or understanding of the questions' context scoring 0.

Question 8 (c)

(c) Describe the release factors affecting the horizontal distance travelled by a projectile.

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.....

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

A well answered question with candidates usually gaining marks successfully for points 1 and 2. Some candidates described the angle of release but not in relation to the release height, which prevented access to points 3, 4 or 5.

Exemplar 3

Height of release, the higher the projectile is released, ~~that~~ the further horizontal distance it will travel. If it is released lower, it won't travel as far.

Speed of release, the faster a performer releases a projectile, the further it will go, as air resistance is reduced. However, if a projectile is released slowly it will travel a shorter distance.

The angle of release, the closer the angle of release is to 45° the further it will travel. If it is a much larger or much smaller angle, it won't travel a very far horizontal distance.

The candidate scores points 1 and 2 with excellent responses, however fails to gain marks for points 3, 4 or 5 due to the lack of reference to release and landing heights.

Question 8 (d)

(d) Upward or downward lift forces can be explained using Bernoulli's principle.

Explain Bernoulli's principle.

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

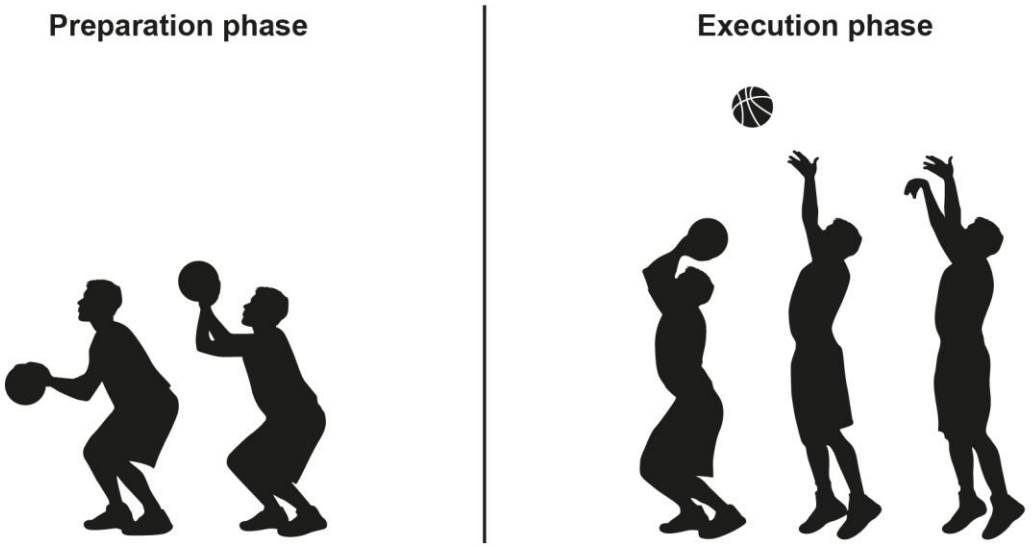
A well answered question with access to points 1, 2 and 3 easily.

Section C overview

Section C consists of a single extended response question. A 20-mark question considering the topics of anatomy and injury response. Answers were assessed using a levels mark scheme based on knowledge and understanding (AO1), practical application (AO2), and evaluation and analysis (AO3).

Question 9*

9* The images show a basketball player during the preparation and execution phases of a free throw.



Analyse the movements at the shoulder, elbow and wrist joints during the preparation and execution phases of the free throw.

Your answer should include for each joint:
- movements produced
- named agonist and antagonist muscles involved
- the role of fixator muscles.

Explain and evaluate the use of SALTAPS and PRICE in the treatment of sporting injuries in the upper body. **[20]**

Overall candidates all could make an attempt to provide a response to this question demonstrating some knowledge and understanding. More successful candidates included examples and evaluations. Few candidates used the AO1 table accessing points 1–15, of those that did points 5, 9 and 11 were common. It was common for the shoulder to be incorrectly analysed and the wrist analysed the wrong way round for the phases. SALTAPS and PRICE were known to the candidates and most managed to state the stages, less could add extra example detail, and few evaluated beyond 'easy to remember' and 'could make it worse'. Few candidates related the protocols to lower body injuries incorrectly.

Candidates scoring in Level 1 (1–6 marks) tended to be able to provide a partial movement analysis – often of the elbow however inaccuracies in the wrist and a lack of knowledge on the shoulder. This was usually limited to the movement and agonist/antagonist muscle named. Candidates named letters in SALTAPS and PRICE with limited description. There lacked exemplification, application or evaluation as protocols.

Candidates scoring in Level 2 (7–11 marks) tended to provide a partial movement analysis – often of the elbow and wrist with some attempt of the shoulder in one phase. There may have been some mention of contraction type and the role of a fixator. Candidates named most letters in SALTAPS and PRICE with some description. There was limited exemplification and a lack of application to a sporting context. It was common there wasn't a successful attempt to evaluate the protocols.

Candidates scoring in Level 3 (12–16 marks) tended to have an almost complete and correct movement analysis and gave extra information regarding the contraction types and role of a fixator. Candidates named, described and gave examples of the SALTAPS and PRICE protocols and there was an increasing positioning within a sporting injury context. Candidates did evaluate the protocols.

Candidates scoring in Level 4 (17–20 marks) tended to have a complete, correct and detailed movement analysis with contraction type, roles of muscles, examples of fixators and an application to the basketball free throw. SALTAPS and PRICE were described with exemplification and application throughout to specific sporting injury contexts. Candidates evaluated the protocols extensively with both positive, negative and alternative possibilities proposed.

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Question 9*: Image of basketball player, © imagean / iStockphoto.com

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