

GCSE (9-1)

Examiners' report

PHYSICAL EDUCATION

J587

For first teaching in 2016

J587/01 Summer 2019 series

Version 1

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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.



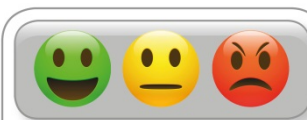
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Paper 1 series overview

J587/01 is one of two examined components for GCSE (9-1) in Physical Education. This component links together the topic areas of applied anatomy and physiology and physical training. To do well on this paper, candidates need to apply knowledge and understanding using practical examples from sports and practical activities, and to show an understanding of data analysis.

J587/01 includes one extended-response question that forms part of synoptic assessment, in which the candidates are required to apply knowledge and understanding from J587/02 to this extended question.

Candidate performance overview

Candidates who did well on this paper generally did the following:

- produced clear and concise responses
- gave a clear explanation of progression, overload and reversibility, applying their knowledge to a gymnast's training programme and gave several reasons for the use of beta blockers: Q21b
- applied knowledge and understanding using examples from a practical activity, when this was a requirement of the question: Q7b, Q11(i), Q11(ii), Q14, Q22(a)
- made direct comparisons or used comparative language: Q14, Q21(a)(iii), Q23(b)(i).

Candidates who did less well on this paper generally did the following:

- produced responses that lacked depth, or repeated the same point in a variety of ways: Q21(a)(iii), Q23(a)
- misunderstood or misread the question and gave irrelevant knowledge: Q1, Q21(b), Q23(b)(i)
- found difficulty in explaining differences in the results in a data table: Q21(a)(iii).

<i>Most successful questions</i>	<i>Least successful questions</i>
<ul style="list-style-type: none"> • Synovial joint allowing more than two types of movement Q3. • Muscle group used when performing a sit-up Q4(i). • Class of lever during biceps curl Q6. • Name the movement plane Q7(a). • Protective equipment for the cranium Q20. • Fitness component measured by sit and reach test Q21(a)(i). 	<ul style="list-style-type: none"> • Description and practical example of components of a warm-up Q11. • Reasons for differences in flexibility Q21(a)(iii). • Explanation of principles of training Q21(b). • Description using example of functions of skeleton Q22(a). • Differences between pulmonary artery and pulmonary vein Q23(b)(i).

Section A overview

Section A consists of twenty questions ranging in size/mark allocation and making 30 marks in total, taken from across the two topics (Anatomy and Physiology; Physical Training). Question formats include multiple choice; true/false; short responses.

Question 1

- 1 A warm up prepares the body for physical activity by increasing the temperature of the muscles.


Describe **two** other physical benefits a warm up has on the muscular system.

1.

 2.

[2]

Many candidates were able to describe two benefits of warming up on the cardiovascular system. Some answers described benefits to other systems such as the cardiovascular and respiratory systems and these responses did not gain marks.

	<p>Misconception There is a misconception that warming up can prevent injury and prevent the build-up of lactic acid. The word 'prevent' is not an appropriate word to use in these circumstances. Injuries may still happen. The correct word to use is 'reduce'. A warm-up can only reduce the risk of injury and reduce the build-up of lactic acid.</p>
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Question 2 (a)

- 2 (a) State the function of valves in the heart.

..... [1]

Many answers correctly stated that valves prevent the backflow of blood. Blood is a key feature of this answer and is required to show understanding of the function of valves in the heart.

Question 2 (b)

- (b) The bicuspid and tricuspid valves are structures in the heart.

Name **one** other valve in the heart.

..... [1]

Most answers named the semi-lunar valves. Some candidates named the aortic and pulmonary valves and although the syllabus does not cover these names they were marked as correct. However, other names for the bicuspid and tricuspid valves, such as the mitral valve and atrio-ventricular valves were not accepted.

Question 3

3 Identify a synovial joint in the body that allows more than two types of movement.

..... [1]

Most candidates identified the shoulder or hip joint or ball and socket joints as the correct answer. Other correct synovial joints were also allowed. Synovial joints that only allow two types of movement did not gain a mark, and nor did joints that are not classified as synovial joints.

Question 5

5 Fig. 5 shows the performance of a gymnastic move.

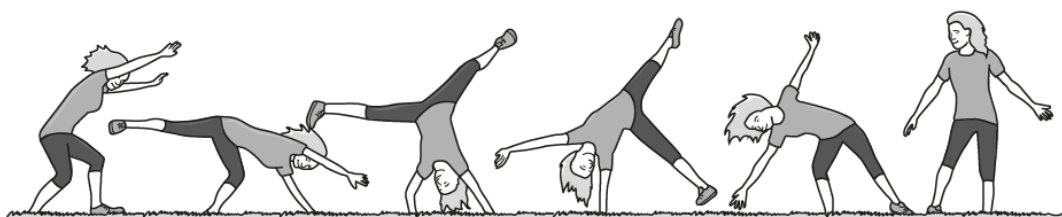


Fig. 5

Name the axis of rotation in Fig. 5.

..... [1]

OCR call the axis of rotation for this gymnastic move the frontal axis. However, it is acknowledged that this axis has other names and if one of these names was used it was also marked as correct.

Question 7 (a)

7 Fig. 7 shows a diagram that highlights one plane of movement.

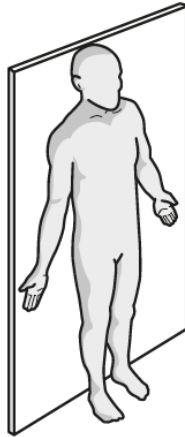


Fig. 7

(a) Name the movement plane highlighted in Fig. 7.

..... [1]

Most candidates were able to state that the movement plane highlighted was the frontal plane. Responses that gave a wrong name for this plane were still able to gain a mark for 7(b).

Question 7 (b)

(b) Identify a sporting skill that passes through the movement plane in Fig. 7.

..... [1]

Candidates are reminded that sporting examples must clearly show what movement has been performed that passes through a specific plane. Correct answers included performing a star jump or a cartwheel in which the only movement is through the frontal plane. Sporting actions that involve more than one plane must be qualified to highlight the correct movement. For example, breast-stroke leg kick moves through more than one plane, therefore does not gain credit. For this example to be marked correct, abduction or adduction at the hip during breast-stroke leg kick had to be stated.

Question 9

9 A wet and slippery floor in a sports hall is a potential hazard.

Identify **two** other hazards in a sports hall.

1.

2.

[2]

Most candidates correctly identified at least one potential hazard in a sports hall. Some answers identified two different objects or pieces of equipment left on the floor, and this only gained 1 mark.

Question 10 (i) and (ii)

10 Power is an important component of fitness required in many sports and can be measured by using the standing broad jump test.

Name another suitable test for power and describe **one** feature of this test.

(i) Name of test:

..... [1]

(ii) Feature of test:

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

Most candidates were able to name the vertical jump or Sargent jump test. Phonetic spellings were allowed. Those candidates who could not name a suitable test but were able to describe a feature of a suitable test still gained a mark for (ii). The feature had to be described. It was recognised that centres may carry out the vertical jump test in a variety of ways and answers that showed an understanding of the test gained credit.

Question 11 (i) and (ii)

11 Describe the following key components of a warm up using a practical example for each.

(i) Mobility:

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

(ii) Dynamic movements:

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

Correct answers described each component of a warm-up and gave a practical example for each. Candidates are reminded to read the question carefully. Some answers described the components accurately but did not give a practical example, whereas others gave good examples but did not describe the component.

Question 14

14 Describe **one** difference between aerobic and anaerobic exercise.

Give a practical example of each type of exercise.

Difference:
.....
.....

Example of aerobic exercise:

Example of anaerobic exercise: [2]

Most answers correctly stated that aerobic uses oxygen whereas anaerobic doesn't and gave good examples of aerobic and anaerobic exercise. Some candidates got their examples the wrong way round even though they had described a difference correctly. This suggested that they had not read the headings for each exercise properly.

Question 15

15 Define stroke volume.

..... [1]

Many answers correctly defined stroke volume. Some answers were incomplete and did not mention the heart or per beat. Some candidates confused stroke volume with tidal volume.

Question 16 (i)

16 During exercise cardiac output changes.

(i) Explain what is meant by the term cardiac output.

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

Most candidates correctly defined cardiac output either as the volume of blood pumped out of the heart per minute or as heart rate x stroke volume. Some responses lacked one part of the definition and missed out on a mark as a result.

Question 16 (ii)

(ii) State how cardiac output changes during exercise.

..... [1]

Most responses correctly stated that cardiac output increases during exercise. Some answers misread the question and explained why it changes during exercise.

Question 17

17 Describe the role of tendons during physical activity.

..... [1]


Most answers correctly stated that tendons attach muscles to bones. Some incorrect responses described the role of ligaments rather than tendons.

Question 18 (a)

18 (a) Describe capillarisation.

..... [1]

Capillarisation is an increase in the number of capillaries or an increase in capillary density. Many responses described this process, including the formation and use of new capillaries.

	<p>Misconception</p>	<p>Some candidates stated that capillarisation means a growth in capillaries, or bigger capillaries. This is incorrect. Thicker walls or a larger lumen would inhibit the process of gaseous exchange which requires a short diffusion pathway between the haemoglobin and alveoli or myoglobin.</p>
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Question 19

19 Name the type of interval training used when a performer alternates between short bursts of speed followed by periods of recovery.

..... [1]

Most responses correctly named high intensity interval training (or HIIT). Some stated fartlek training but this is a form of continuous training and is therefore an incorrect answer to this question. Circuit training may involve a speed element but is not its main feature and was not accepted as a valid answer.

Section B overview

Section B consists of three, 10-mark questions each comprising of part-questions. Each question is linked to a physical activity. One part-question from among the three questions is a 6 mark extended response question with a levels of response mark scheme.

Question 21 (a) (i)

21 (a) Fig. 21.1 shows the national norms for the sit and reach test for 16–19 year olds.

(i) Name the fitness component that is measured using the sit and reach test.

..... [1]

Most answers correctly identified flexibility as the fitness component measured by the sit and reach test.

Question 21 (a) (ii)

(ii) Using the values in Fig. 21.1 state how many students in Fig. 21.2 are in the average range.

..... [1]


Most candidates correctly identified that two students were in the average range, or named them as Abdul and Olivia. Both forms of answer were acceptable.

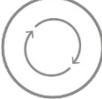
Question 21 (a) (iii)

(iii) Analyse the results in Fig. 21.2 and suggest reasons for the differences between students who were scored as excellent compared to those who were given a poor rating.

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

Higher ability candidates explained that the most flexible students may have warmed up, had greater elasticity in their muscles and may do sports that require good flexibility, whereas those with a poor score may not have warmed up and did sports where the focus of training may be on other fitness components. They also explained that girls are generally more flexible than boys.

	Misconception	<p>The ability to analyse data, or give reasons for differences in the results is a requirement of this subject. This meets assessment objective AO3.</p> <p>Some candidates stated what the table showed by listing the scores of each student, rather than considering why the results were different. These candidates were showing AO1 knowledge, not AO3.</p>
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	AfL	<p>In order to describe differences between two results the use of direct comparisons or comparative language should be used.</p> <p>The following statement shows an example of a direct comparison: 'those with excellent scores may have warmed up and the person with a poor score may not have warmed up'. Both parts of this sentence are required to gain a mark.</p> <p>The following statement is an example of a comparative answer: 'the students with excellent scores may have had more elastic muscles'. This is a correct answer as the question asks for differences and the implication is that there is a difference with those with poor scores.</p>
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Exemplar 1

From the table it is clear that the females tend to be more flexible as none of them scored below average and only girls scored excellent scores. This could be due to the sports they play for example Farah could be a gymnast or it could be down to whether they exercise or not as a long term effects of exercise increases flexibility. [2]

This response correctly stated that females are generally more flexible. This is a comparative statement that has been drawn from the table. The response also makes the point that Farah, who scored excellent, may be a gymnast. However the candidate does not support this comment by suggesting that Liam, who scored poor on the test, may not work on his flexibility as much as he may do a sport like football or rugby. The final sentence suggesting that people who exercise regularly are more flexible is not necessarily true.

Question 21 (b)

(b)* Specificity is one principle of training that would allow a gymnast to focus on relevant exercises suited to their routine.

Using practical examples, explain the use of other principles of training in a gymnastic training programme.

Evaluate reasons why some gymnasts may use beta blockers within their training programme.

.....

.....

.....

.....


.....

.....

.....

[6]

Most candidates knew that beta blockers slowed down heart rate and helped to calm a performer’s nerves, and were able to apply this to a gymnast performing a routine. Many responses identified the other three principles of training and explained at least one of them, applying their knowledge to a gymnast’s training programme. However, answers were often superficial and did not show a clear understanding of how the principles of training should be applied. Some responses talked about progressive overload and credit was given. High ability candidates gave clear explanations and practical examples for each principle of training, and evaluated the benefits of beta blockers in detail, covering a wide range of reasons for their use. Candidates are reminded that credit is not given for answers that are not relevant to the question, such as the negative effects of beta blockers and the consequences of being caught taking an illegal substance.

	<p>Misconception</p>	<p>Some candidates were not aware that the extended response question contains a synoptic element that requires knowledge of an area of the syllabus covered on paper 2.</p>
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Exemplar 2

A gymnast may also use progression in their training programs. For example they could add ~~different~~ ^{another} stages into their routine.

A gymnast could also use overload in their training programme. For example they could ~~add~~ ^{make} their routine go on for longer.

A gymnast could also ~~use~~ suffer from reversibility in their training programme. For example, they could miss their training programme for a few weeks resulting in the gymnast having to start it again.

One reason a gymnast would use beta blockers is to keep them focused. For example, their heart rate won't be as high meaning they are fully concentrated. This means it will be easier for the gymnast to complete their routine without mistakes. [6]

This response scored 3 marks. A basic knowledge and understanding of principles of training is shown. The explanation of progression is too vague. An example shows some understanding of overload, and the term reversibility is understood, but not the principle of avoiding its effects. Evaluation of beta blockers is satisfactory and takes the overall standard of this response into the bottom of Level 2.

Exemplar 3

The gymnast would also need to apply the principle of fitness of overload this ~~could~~^{would} mean in increasing the FITT principles of Frequency, Time, and Type and Intensity of training. This is done to increase the strength and to create the long term effects of exercise. Increasing the frequency may mean the gymnast trains 6 hours a week on her routine instead of 4 hours. Increasing the intensity would mean working out at a higher intensity while practising her routine as well as individual moves. An increase in Time would mean the gymnast would spend long practising the routine without rest and Type means that she needs to focus using the right type of training e.g. she may use plyometric training to increase the power of her jumps during her routine.

The gymnast would also ~~mean~~^{need to} ~~that~~ ~~use~~ train using the principle of progression. This means that she would overload herself and increase the intensity of her ~~training~~ training progressively. i.e. if at week 1 she can do 50 sit ups by week 2 she may do 70. [6]

instead of rapidly increasing to 200. This is for many reasons one that progressing too quickly will cause injuries and two that if the athlete prog sets her progression standard too high this is an unrealistic goal and may cause herself to lose motivation. However progression is important to allow the athlete to improve as otherwise she would maintain her performance but never better herself and her ability.

Additionally, the gymnast may apply the principle of reversibility to her training programme understanding that the long term effects of exercise revert back to normal time as fast as they occur. For example if an athlete carries out a 6 week training programme they will have reversed back to normal after three weeks of rest after. This means the gymnast needs to give herself appropriate rest so as not to cause injury but also not too long rest so reversibility can occur //

This response scored 6 marks. This is a detailed and comprehensive answer that meets all the discriminators for the top of Level 3. All three principles of training are explained clearly using a range of practical examples that link to a gymnast's training programme. A detailed evaluation of the reasons a gymnast may take beta blockers is given with direct links to how they may improve a gymnast's performance. The answer does contain some information that is not relevant and this does not gain any credit, but also does not detract from the quality of the answer.

Question 22 (a)

22 (a) Describe, using a sporting example for each, how the skeleton allows the following functions.

Protection:

.....
.....
.....

Movement:

.....
.....
.....

[2]

Many candidates were able to describe how the skeleton protects vital organs and gave a sporting example, such as the cranium protects the brain when heading a football.

High ability candidates also described the function of movement using a sporting example.

Candidates are reminded to read the question carefully. Many responses understood the functions of the skeleton but did not use a sporting example to support their answer.

Exemplar 4

Protection:

In rugby, the ribs will protect the lungs
if you are being tackled.

Movement:

In football, the joint in the knee will
allow movement when kicking a ball.

[2]

This response scored 2 marks. It correctly describes the role of the ribs in protecting the lungs during a rugby tackle. It also states that the knee joint allows movement to kick a football.

Question 22 (b) (i)

(b)

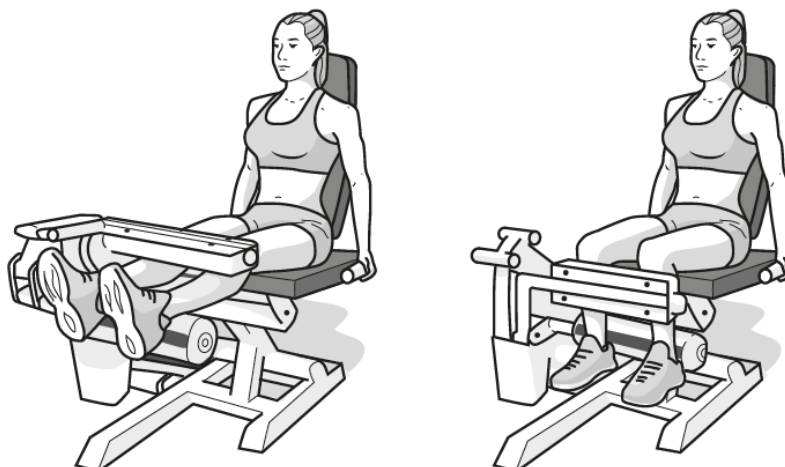


Fig. 22

(i) Name the leg muscle that contracts during the extension phase of the exercise in Fig. 22.

..... [1]

Many candidates correctly identified the quadriceps muscle. Centres are reminded that the use of shortened versions of muscles, such as quads, is not acceptable.

Question 22 (b) (ii)

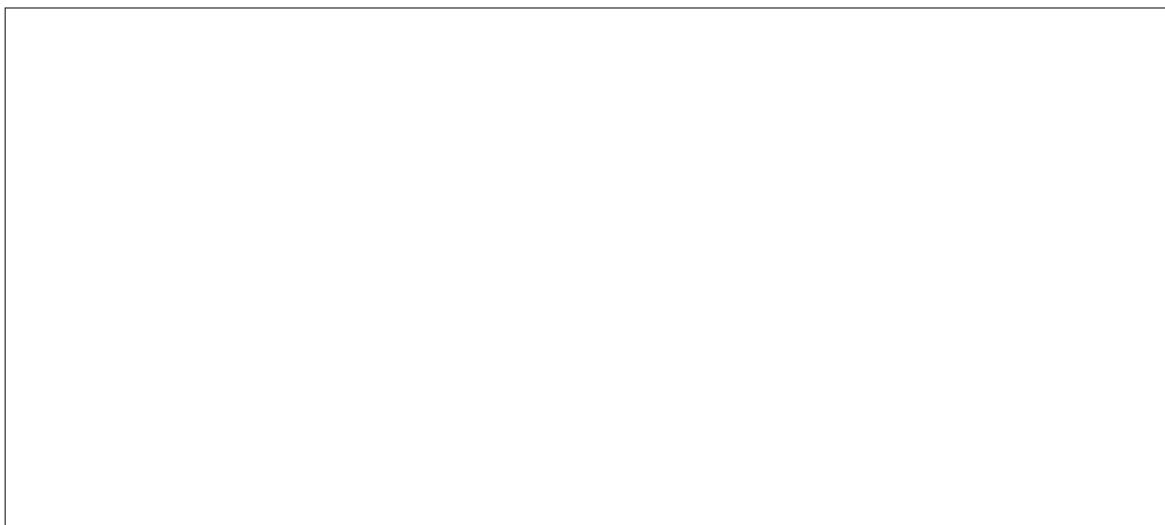
(ii) Explain how the pair of muscles at the knee work together during the extension phase of the exercise in Fig. 22.

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

Many responses gave a full and accurate explanation of muscles working together as an antagonistic pair, with the quadriceps as agonist and the hamstrings as antagonists. Some candidates described knee flexion which was not a requirement of the question. Candidates who mistakenly stated that hamstrings were the agonists and quadriceps were antagonists could still gain credit if it was stated that the pair of muscles are working antagonistically.

Question 22 (c)

(c) In the box below, draw and label the lever system used at the neck when heading a ball in football.



[3]

Most candidates drew a lever system. Some drew a picture of a head. Both were acceptable. Correct answers showed the fulcrum in the middle with the effort and load at either end of the lever. In the first class lever system used to head a football the direction of both effort and load forces are downwards. Candidates are expected to show the correct direction in which the forces act when asked to represent lever systems using a diagram.

Question 23 (a)

23 (a) Describe the long term effects of a six-month training programme on the heart.

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

Many responses described some long-term effects of training on the heart. High ability candidates recognised that five effects were required and wrote clear and concise descriptions. The use of bullet points was acceptable. Some candidates described respiratory or muscular adaptations. These were not relevant to this question but did not prevent an answer scoring full marks if five correct effects on the heart were stated. Hypertrophy is a muscular adaptation but if a candidate made it clear that hypertrophy of the heart muscle, or cardiac hypertrophy, was an adaptation then credit was given.

Exemplar 5

The long term effects of the heart would be an overall decrease in resting heart-rate and there would be hypertrophy of the heart. You will also have the ability to train for longer and will have an increased stroke volume and cardiac output.

This response gained 4 marks. It correctly states that a lower resting heart rate, hypertrophy of the heart, and increased stroke volume and cardiac output are all long-term effects on the heart.

This response would be improved by stating that hypertrophy of the heart means that the heart can contract with greater force.

Question 23 (b) (i)

(b) (i) Describe the differences between the pulmonary artery and the pulmonary vein.

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

Many responses correctly described the pulmonary artery as a carrier of de-oxygenated blood to the lungs, and the pulmonary vein as a carrier of oxygenated blood from the lungs back to the heart. High ability candidates also stated that the pulmonary artery takes blood from the right ventricle under (slightly) higher pressure than in the pulmonary vein, which transports blood to the left atrium. Some candidates described differences between arteries and veins. These responses could only gain 2 marks if differences in blood pressure, lumen size and/or thickness of vessel walls were correctly compared.

Exemplar 6

The pulmonary artery takes deoxygenated blood from the heart to the lungs where it becomes oxygenated. It has thicker walls than the pulmonary vein as the blood travels at a higher pressure. The pulmonary vein brings oxygenated blood from the lungs to the heart to then be pumped around the body via the aorta. It has thinner walls than the pulmonary artery.

This response scored 4 marks. It correctly contrasts deoxygenated blood in the pulmonary artery with oxygenated blood in the pulmonary vein, and states the difference in direction of blood flow to the lungs (pulmonary artery) and from the lungs (pulmonary vein). The comments stating that the pulmonary artery has thicker walls and carries blood under higher pressure are comparative statements that gain credit on their own as it is implied that there is a difference in the pulmonary vein. The use of comparative terms is recommended when describing differences between two features or structures in the body.

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