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Examiners' Report

June 2017

GCE Physical Education 8PE0 01
Scientific Principles of Physical Education

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Introduction

To be successful in 8PE01, candidates must be familiar with all of the new content in the specification. Much of the new material that was tested was not well-learnt.

The command words in the back of the specification are critical to a good performance in the examination. Candidates must be familiar with what each command word requires them to do. The weakest performance by far was on 'explain' questions, where candidates were required to link points together.

Disappointingly, a number of the straightforward definition questions, which are designed to be accessible to all candidates, were also not known. Centres need to use both the specification and the topic guides to help with this.

Questions are structured to elicit different levels of responses. This is indicated both by the marks available and the command word used. For example, there are recall questions asking to identify, name, or give a definition. There are also discussion and explanation-based questions, requiring application.

For levels-based questions, a sustained response is needed. In calculation questions, marks were also deducted for missing or incorrect units. If a question asks for examples, then they must be given.

Question 1

Candidates must be familiar with all of the definitions in the specification. These should be well-learnt. Any definition of any key word in the specification can be tested. There is a glossary at the back of the specification to assist with this. Key words must be learnt. The topic guides on the website for each unit also have comprehensive details of other key points. Both should be referred to regularly, in centres. This definition was known by the majority of candidates.

Prime mover is the agonist muscle in an action and is responsible for the movement that occurs as it will contract to enable the movement to occur.



ResultsPlus

Examiner Comments

This candidate is able to provide an accurate definition and therefore receives a mark.

1 mark



ResultsPlus

Examiner Tip

Learn the definitions: there are always marks to be gained for knowing them

Question 2

When naming movements, only the correct spellings are acceptable. Unfortunately, less-able candidates lost marks through incorrect or phonetic spelling. The majority of candidates were able to name both movements, and to achieve maximum marks.

1 Dorsiflexion

2 Plantiflexion



ResultsPlus

Examiner Comments

This candidate has spelt 'plantar flexion' incorrectly and so is unable to gain that mark.

1 mark



ResultsPlus

Examiner Tip

Learn to spell movements and muscle names

1 Dorsi flexion

2 plantar flexion



ResultsPlus

Examiner Comments

This candidate gains two marks for plantar flexion and dorsi flexion. These were the most usual two answers given.

2 marks

Question 3

Many candidates knew this well. They were able to give the definitions of shortening while contracting, and lengthening when contracting. However, candidates need to be specific with examples. No marks were awarded if there were no examples: this question asked for examples to be used.

Correct muscle terms were required eg Bicep Brachii and not Biceps. Some candidates incorrectly referred to the Hamstring or Quadriceps, rather than the group of muscles. Some examples were vague and did not identify the muscle to which they referred.

The most frequent answer was the bicep curl, but when responses were marked, examiners needed to know if they referred to the upward phase or the downward phase and to which muscle. Some candidates also confused 'eccentric' and 'concentric' and had them the wrong way around.

~~In the~~ Concentric contraction is when the muscle starts to produce a force, for example your biceps brachii ~~contract~~ shorten in the upwards phase of a bicep curl. Eccentric contraction is the lengthening of a muscle as it contracts, for example, the biceps brachii contracts in the downwards phase of a bicep curl



ResultsPlus Examiner Comments

This candidate achieves full marks. They include accurate definitions, supported with detailed, accurate, examples.

4 marks



ResultsPlus Examiner Tip

If the question says use examples, then you must

concentric muscle action is when the muscle shortens.

e.g. bicept shortens when lifting a weight in a bicept curl (flexing the elbow).

eccentric muscle action is when the muscle lengthens under tension e.g. during bicept curl when extending elbow lowering the weight.



ResultsPlus Examiner Comments

Concentric definition is incorrect, but eccentric is detailed enough.

There is nothing in the concentric definition that mentions 'while contracting'.

In the first example, the muscle name is incorrect. The second example does not say to which muscle it is referring.

1 mark



ResultsPlus Examiner Tip

Learn muscle names scientifically and use their full names

Concentric contraction is the shortening of a muscle. This would be the biceps ^{brachii} contracting concentrically in a bicep curl.

An Eccentric contraction is the lengthening of a muscle. This would be the triceps brachii during a bicep curl.



ResultsPlus Examiner Comments

Whilst this candidate knows the definitions they are not specific enough with the examples. The examiner does not know in each part of the response if it refers to the upward or downward movement of the arm (flexion or extension at the elbow) and therefore cannot award marks for the examples. This response therefore only achieves two marks.

2 marks

Question 4

To achieve marks in Band 1, candidates needed to be familiar with the terms 'load', 'effort' and 'fulcrum' and could give a basic description of a third-class lever.

A few less-able candidates talked about the shoulder, rather than specifically the elbow joint. Candidates achieving marks in Band 2 were able to apply their understanding specifically to the elbow – for example, by saying 'the Bicep Brachii provides the effort, and the pivot is at the elbow'.

In a Band 3 answer, there was more application and reasoning. For example, rackets can increase the length so this would increase the force with which an object was struck.

Some candidates confused the different types of lever. Many candidates were not able to move beyond Band 2 with their answer.

The clip attached achieves Band 3 because it contains application.

A third class lever, is one where the fulcrum lies at the end, with the effort arm in the middle and the resistance arm at the end. The third class lever doesn't have a mechanical advantage of >1 so the purpose is to create quick muscle contractions. An example is in a bicep curl, the resistance is your weight + your hand, plus gravity acting upon it, the effort is the contraction of the biceps pulling on the ulna. And the fulcrum is the elbow joint. To increase the efficiency of a third class lever, the resistance arm can be increased, for example the use of a racket. This extension of the resistance arm means the speed of the contraction is greater so more power can be generated behind the action. For example serving in tennis, the racket with distance to the contraction occurs quicker, which allows them to hit it at 100+ mph.



ResultsPlus Examiner Comments

Use the glossary at the back of the specification to ensure you know what is required by each command word.

6 marks

Question 5

This definition appears in the glossary of key terms at the back of the specification. However, very few candidates were able to give the correct definition. Definitions must be learnt. There was much confusion regarding 'centre of mass'.

where all mass of an object is thought to be concentrated



ResultsPlus
Examiner Comments

This candidate knows the definition and therefore gains the mark.

1 mark

Question 6 (a)

The majority of candidates scored very highly on this question, gaining maximum marks. This topic had been well-taught by centres.

A few candidates omitted correct units for the answer, which lost them one mark. A few candidates used incorrect units, again losing one mark. Some candidates added the two values at the end, rather than subtracting one from the other.

$$F = ma$$

$$\text{Player A: } F = 72 \times 2 = 144 \text{ N}$$

$$\text{Player B: } F = 57 \times 3 = ~~171 \text{ N}~~ 171 \text{ N}$$

$$\text{Resultant force} = 171 \text{ N} - 144 \text{ N}$$

$$= 27 \text{ N}$$



ResultsPlus Examiner Comments

A clear example of an answer that achieved maximum marks.

4 marks



ResultsPlus Examiner Tip

Always use the correct units, or marks will be deducted

Question 6 (b)

A straightforward question, and the majority of candidates gained marks.

Question 7

This question was well-answered in centres. Many candidates were able to access maximum marks.

The most frequent answers referred to blocking of blood vessels, leading to reduced blood flow, increases in blood pressure and heart rate, leading in turn to a potential heart attack.

If there is too much saturated fat being eaten, then it will build up in the lumen of the arteries ^{as plaque} and ~~can~~ causes blood pressure to increase therefore. This can cause heart disease, heart attacks and increase pressure. Also too much salt can cause blood clots or thrombosis in arteries.



ResultsPlus

Examiner Comments

This candidate sets out their answer clearly and achieves maximum marks.

4 marks

Question 8

'Explain' questions demand linked responses. Less-able candidates had not been taught to answer 'explain' questions with linked statements. They were able to give simple statements, such as higher glycogen and higher PC. However, unless candidates linked this to the effect these had, the response was not worthy of any credit.

More-able candidates linked their responses. For example, "higher PC stores enable a higher speed of muscle contraction or power".

In preparing students for 'explain' questions, centres will need to look for linked responses.

Question 9

This is another example of an 'explain' question. Answers must be linked together for the functional response to achieve marks.

There was some confusion about the differences between 'structural' and 'functional'. Less-able candidates did not focus their answers on the muscular system only, and perhaps mentioned bones or heart. The most usual responses were hypertrophy leading to increased strength or power, and increased elasticity leading to injury reduction.

Question 10

All candidates were able to access this question.

The most basic answers included information about the warm-up being split into jogging, stretching and sports-specific drills. To move up the bands this knowledge needed to be linked to performance. For example, jogging will increase the amount of oxygen being delivered around the body, which will enable the oxygen to be delivered to the muscles.

More-able candidates could link what happens in the body as a result of the warm-up, to explain how this improved performance. For the highest mark, a valid counter-argument giving the positives and negatives of warming up, would be needed. The top-scoring candidates were able to draw from all the course of study where appropriate. They were able to make links with psychology, for example, and discuss the psychological benefits of warming up.

A warm up will often have a positive impact on the performance of an athlete by preparing them both mentally and physically, as long as the warm up is done correctly.

Naturally, the body experiences an 'anticipatory rise' as adrenaline secreted from the adrenal gland stimulates the sino-atrial node to increase heart rate to increase blood flow to the muscles before they begin working. Similarly, in the first phase of a warm up there should be a form of continuous training in order to further increase heart rate as well as stimulating muscular contractibility. By completing this part of the warm up the body will begin to adapt meaning high intensity work will not come as a shock, but also by completing the pulse raiser at the cardiac control centre will stimulate vasodilation within the muscles in order to allow a larger volume of blood to enter the tissues in order to oxidise them.

In the second phase of a warm up it is essential that both dynamic and static stretching are undertaken in order to increase muscle flexibility but also to stretch the muscles in order to prevent tearing and allow them to become supple and less prone to injury. By performing this phase of a warm up performance will be enhanced as the likelihood of an injury being sustained is lowered which

means the + performer will be able to perform to their highest ability as well as feeling an enhanced level of flexibility thus allowing them to perform movement skills to a higher standard.

The third and final phase of a warm up should always involve some form of match related game play or a skill based drill. This will not only enable the performer to fully focus on the task at hand as their attention will be increased by the complexity of the exercises but also stimulate S-R bonds in order to perform the skills correctly this will all have a positive impact as the performer will now feel prepared and motivated for the task they will soon have to perform.

In conclusion a warm up will have a positive effect on performance as it helps to stimulate blood flow to the working muscles prior to high intensity work, increases muscle flexibility thus reducing injury risk as well as helping the performer to fully focus on the task ahead and motivates them to perform.



ResultsPlus

Examiner Comments

This answer achieves the top band. It has full links to performance, and detailed knowledge. It does not quite cover all of the indicative content.

10 marks



ResultsPlus

Examiner Tip

Look in the specification and find out what is required for each command word

What should you do for 'Analyse'?
What should you do for 'Compare'?
What should you do for 'Discuss', and so on

Question 11 (a)

Exercise economy is a new area of the specification. It has not been taught well. Although this definition is not in the specification, it is in the topic guide.

It is important that centres use the topic guides within the Pearson PE page of the website. These will be updated regularly, and are a very useful source of information. It is the specification and the topic guide that will be referenced, for accuracy of definitions. Many candidates did not know what exercise economy was at all, and incorrectly guessed financial economy.

Question 11 (b)

Candidates were not familiar with the term 'exercise economy' in part (a), and were not able to use examples to explain it, in part (b). It is important that candidates are familiar with all the key terms in the specification.

Jogging is a good example as two joggers side by side may be jogging at the same speed but for one person they use their body resources more efficiently and therefore find it easier.



ResultsPlus Examiner Comments

This candidate is able to understand the terminology and provides an accurate example.

This response gains both marks: one for the example and one for correct application.

2 marks



ResultsPlus Examiner Tip

All definitions must be learnt from the specification or the topic guides

Question 12

This question specifically refers to recovery. It is important that candidates read the question carefully, perhaps underlining key words. In this question, the word 'recovery' (not performance or preparation) is crucial. A 'supplement' is something that is not part of the usual diet, therefore 'protein' was not accepted, but 'protein shakes' or 'whey protein' were accepted for this reason. Some candidates only referred to 'protein'.

Many candidates referred to herbal remedies. There is not enough scientific support for 'herbal remedies' to have been awarded marks. In this question, most marks came from amino acids, whey protein, creatine (but this needed to be linked to recovery of the ATP PC system and not for energy stores), and sports drinks to replenish electrolytes. Caffeine is not a recovery drink: this was a frequent answer that was not rewarded. The link with how supplements aid recovery was also important.

Question 13

Candidates were familiar with this area of the specification. Usual answers were about aerodynamics, thermoregulation, Delayed Onset Muscle Soreness (DOMS) and venous return. Again, this question demanded linked points, and many candidates knew the effects but could not link them to performance. Centres need to train candidates to be able to write linked responses.

Question 14

Periodisation was understood by most candidates. However, there was some reference to pre-season and phases of periodisation that are not in the specification.

The most well-understood mark on the mark scheme was bullet point one, where candidates knew this was reaching best performance at an appropriate time. They were able to talk about peaking or planning training around an event. Candidates were most familiar with Macrocycles, Mesocycles and Microcycles, with most marks coming from these four points.

There was less knowledge about preparation, competition and transition phases, and understanding about what happens during these periods.

periodisation is the planning of training in the build up to a competition.

The periodised year is broken down into 4 sections, the macrocycle which is the long term plan from a year to 4 years ect. The meso cycle is periods of 6-8 weeks in the macrocycle. The microcycle is the weekly periods in the mesocycle. The final periods are the daily cycles which involve daily training plans. The year is broken into 3 phases. The preparation phase involves general conditioning, so a high volume of training at a low intensity. In the competition phase training is tapered (volume reduced) in the line up to the competition/event. The transition phase involves active rest to recover from competition.



ResultsPlus Examiner Comments

This is a good example of an answer achieving full marks. It is well thought-through and details all the correct terminology, that is accurate and well-understood.

5 marks



ResultsPlus Examiner Tip

Ensure that you are familiar with all the terms in the specification – for example, pre-season is not in the specification.

Use the specification for your revision.

Periodisation is the process of breaking down ~~up~~ a time period into cycles and phases to make sure an athlete peaks at the right time. The overall and longest cycle is the macro-cycle, it can be a year or several years and includes all three phases. The next cycle is the meso-cycle as it focuses on one area for 2-5 weeks for improvement. This is broken down further into the micro-cycle, this is normally a week long and consists of daily cycles which detail day-to-day goals/exercises. The longest phase is the preparation phase, it focuses on building general fitness and sport-specific skills towards the competition phase. The competition phase has low frequency and intensity training sessions to avoid injury and to taper exercises so the athletes peak at the right time. Finally, there is the transition phase, which is the off-season where players rest and have very little training.

(Total for Question 14 = 5 marks)



ResultsPlus

Examiner Comments

Microcycle is spelt incorrectly so did not score marks, but there is enough accurate information for this to score maximum marks available.

Question 15

This is a new area of the specification. It was not well-understood by candidates.

Most candidates answered the question completely incorrectly. They discussed 'someone assisting you with your training' and achieved no marks. The most successful candidates were able to discuss downhill running and how this 'enables you to run faster than you could on the flat'.

There was some confusion between assisted and resisted training. More knowledgeable candidates were able to discuss running downhill.

Centres must look at which content is new in the specification and ensure that all the material has been covered. The topic guides are a useful resource for this.

Question 16

The more-able candidates were able to understand the Margaria-Kalamen fitness test and then talk about factors that would influence results. The most frequent answers were timing gates versus stopwatches, warming up beforehand, and weather conditions.

Less-able candidates were not familiar with the test. It is important that candidates are familiar with all tests in the specification.

The ^{horizontal} distance between the steps. The weather conditions, depending on whether its performed indoors or not. How accurate the assistant was at stopping and starting the time correctly. The accuracy of the assistant as when the foot lifts off or lands is a subjective topic.



ResultsPlus

Examiner Comments

This candidate achieves maximum marks and sets out their response clearly and succinctly.

3 marks

Question 17

There was some confusion about cross-training itself. Many candidates thought that cross-training was using different types of training or different components of fitness, rather than the use of another sport or more sports to improve fitness in a main sport. There was very little understanding of this topic area from the majority of candidates.

To access the second band, candidates needed to talk about why they would be playing the different sports and the effect this would have on their main sport. To access the top band, they needed to address the command word and assess if the sports were useful or not, with pros and cons.

Cross training refers to training in 2 or more sports in order to benefit their performance in another. An example would be an individual who plays rugby but also competes in athletics. The training undertaken in athletics could help develop the athlete's aerobic and/or anaerobic fitness levels which would help the athlete to be able to last longer in a game of rugby or be quicker at getting around on the field of play or increase their overall speed levels. However, injury could occur in both athletics and rugby which could hamper their performance in the team game and will affect their training in athletics.

Cross training also allows different muscle groups to be developed which contribute to the overall benefits within a team sport.

For example, tennis and hockey. Tennis training can help develop agility and spatial awareness which would benefit a hockey player in that they're able to evade defenders more easily. However, there could be a clash of training or the training could be placing too much stress and demand on the body which could lead to muscle exhaustion and long-term injury.

(Total for Question 17 = 8 marks)



ResultsPlus Examiner Comments

This is a top band answer. The candidate clearly knows what cross-training is. They are able to make accurate links about why they are doing this training.

The response is focussed on a games player, as per the question. It has some positives and negatives about why this training may be useful. It did not achieve full marks because it did not cover enough of the indicative content.

7 marks

This was an assess question, which required an evaluative statement (list of definitions in specification). Examiners needed to know if it is a useful method or not, with the balance of ideas to support the decision.

Cross training can help an athlete to develop specific components of fitness for example a ~~marathon runner~~ ~~runner~~ ~~could~~ football player could do marathon running to increase VO_{2max} and endurance. This is helpful to a football player who needs to be able to last a 90 minute game. However if the other sport ~~used~~ trained is not specific to the main components of fitness in the original sport, there may be a negative transfer of skills and adaptations of the muscles. For instance a badminton player doing tennis for cross training because they're both racket sports may have a negative effect due to different techniques (e.g tennis ~~needs~~ ^{has} more gross ~~stiffer~~ movements whereas badminton has fine movements of the wrist). Also the muscles may adapt negatively for instance a marathon runner doing hockey may cause an increase in the development of fast twitch fibres ^{due to its} ~~because~~ anaerobic nature. ^{Yes it may benefit them} ~~they should be developing~~ with their ~~their~~ ~~show~~ final sprint however may cause a decline in aerobic capacity.



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Examiner Comments

This candidate also gives a top band answer.

6 marks



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Examiner Tip

'Assess' questions must consider both 'for' and 'against'

Question 18

Candidates were not all familiar with all of the tests. There was also confusion over the terms 'maximal' and 'submaximal'. All of these tests are maximal, involving running and provide estimates of VO₂ max. Candidates who were not familiar with all three tests could only achieve marks in the first band.

Once a candidate had shown they knew all the tests, they needed to compare them and begin to analyse why the tests were good or bad. To compare, for example, they could have said that the Multi-Stage Fitness Test (MSFT) and Yo Yo are externally-paced, whereas the Cooper run is self-paced. The MSFT and Cooper tests have no rest, whereas the Yo Yo test has breaks within it. Only those candidates who compared the tests were able to achieve the top marks.

Most candidates were able to describe the MSFT and the Cooper run but were less familiar with the Yo Yo test. Some candidates had the distance between the cones correct. Better answers had good comparisons, with advantages and disadvantages of each. The term 'bleep test' is not accurate.

The fitness tests; Multistage fitness test, the Yo-Yo test and the Cooper 12 minute run can all determine an athlete's maximal aerobic power (VO₂ max). ~~Despite~~ Despite this, all these tests have many differences.

~~Each~~ Like The ~~rest~~ multistage fitness test and the Yo-Yo test are largely ~~not~~ similar however within the Yo-Yo test a longer break is used after each run. This gives the athlete more chance to recover which could be argued ~~is~~ to imply the main purpose of the test of ~~determine~~ determining an athlete's VO₂ max. In comparison the multistage fitness test is more ~~constant~~ constant.

Following on from this, the 12 minute

Cooper run is also a test on VO_2 max.
However this test may not give a true
reflection on VO_2 max as it can be considered
to be too long which leads to athletes
being less motivated.

The largest factor is which
determines the performance in each of these tests
& are factors, such as food diet intake prior
to the event. Not only this but also conditions
such as temperature and where the test is taking
place. Not only this but a minor similarity to ~~the~~
~~test~~ all 3 tests is that it is hard to tell
whether the athlete is giving maximum exertion
to the test. For instance with the 12 ~~loop~~
minute Cooper run the athlete may not fully
exert his/herself as they may ~~not~~ ~~to~~ become
bored.

Overall I believe the Yo-Yo test is the
most beneficial as not only does it determine an
athlete's ~~actual~~ VO_2 max but is also the most
specific to activities such as football because there is rarely constant
(Total for Question 18 = 12 marks) running.



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Examiner Comments

This candidate knows what all the tests are. They are able to start to analyse whether the tests are good or bad. The candidate knows they are all maximal tests.

There is some comparison, eg Yo Yo has recovery and the other two do not. It does not give a full comparison but achieves marks at the top of Band 3.

9 marks



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Examiner Tip

Two essays are worth 12 marks - if you are able to, draw on all areas of the course when you answer the essay questions

Paper Summary

Based on their performance in this examination, candidates are offered the following advice:

- Learn definitions from the specification
- Use the topic guides on the website
- Plan answers to essays, underlining all key phrases
- Know what is required for each command word
- Centres should ensure that all new content has been covered

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