Rewarding Learning

General Certificate of Secondary Education
2014

Physical Education

[G9741]

FRIDAY 16 MAY, AFTERNOON

MARK SCHEME

General Marking Instructions

Introduction

Mark schemes are published to assist teachers and students in their preparation for examinations. Through the mark schemes teachers and students will be able to see what examiners are looking for in response to questions and exactly where the marks have been awarded. The publishing of the mark schemes may help to show that examiners are not concerned about finding out what a student does not know but rather with rewarding students for what they do know.

The Purpose of Mark Schemes

Examination papers are set and revised by teams of examiners and revisers appointed by the Council. The teams of examiners and revisers include experienced teachers who are familiar with the level and standards expected of students in schools and colleges.

The job of the examiners is to set the questions and the mark schemes; and the job of the revisers is to review the questions and mark schemes commenting on a large range of issues about which they must be satisfied before the question papers and mark schemes are finalised.

The questions and the mark schemes are developed in association with each other so that the issues of differentiation and positive achievement can be addressed right from the start. Mark schemes, therefore, are regarded as part of an integral process which begins with the setting of questions and ends with the marking of the examination.

The main purpose of the mark scheme is to provide a uniform basis for the marking process so that all the markers are following exactly the same instructions and making the same judgements in so far as this is possible. Before marking begins a standardising meeting is held where all the markers are briefed using the mark scheme and samples of the students' work in the form of scripts. Consideration is also given at this stage to any comments on the operational papers received from teachers and their organisations. During this meeting, and up to and including the end of the marking, there is provision for amendments to be made to the mark scheme. What is published represents this final form of the mark scheme.

It is important to recognise that in some cases there may well be other correct responses which are equally acceptable to those published: the mark scheme can only cover those responses which emerged in the examination. There may also be instances where certain judgements may have to be left to the experience of the examiner, for example, where there is no absolute correct response – all teachers will be familiar with making such judgements.

		AVAILABLE MARKS
1	Appropriate responses would be to: • exercise regularly • eat the right kinds and amounts of foods • get sufficient sleep. Award [0] for an answer not worthy of credit. Award [1] for an acceptable thing that a person can do in their lifestyle to help improve physical health. (2 × [1]) [2]	2
2	For example, you need to avoid things that harm the body, such as: • smoking cigarettes • taking illegal drugs • taking excessive amounts of alcohol. Award [0] for an answer not worthy of credit. Award [1] for an acceptable thing that a person can do in their lifestyle that may harm physical health. (2 × [1]) [2]	2
3	For example, a person should: • aim to match energy intake to energy expenditure. • ensure that the balance between the nutrients falls within the guidelines. • eat complex carbohydrates rather than simple carbohydrates for energy and for dietary fibre. • ensure that no more than 10% of energy intake is from saturated fat. The remaining 15–20% should be monounsaturated or polyunsaturated fat. • eat small quantities of meat, fish or poultry, or a wide variety of vegetables, pulses or legumes for protein. • eat a wide variety of vegetables, fruit and low-fat dairy products to have sufficient vitamins, minerals and dietary fibre. Award [0] for an answer not worthy of credit. Award [1] for an acceptable dietary guideline. (3 × [1]) [3]	3
4	For example: • Smoking constricts the lungs' air passages. This means that it is more difficult to breathe air into the lungs. • The tar, dust and soot from the smoke lies in the alveoli (air sacs) in the lungs. This means there is less surface area than before for the exchange of oxygen and carbon dioxide. • The tar, dust and soot from the smoke lies in the alveoli (air sacs) in the lungs. This can cause cancer. • Blood vessels are constricted. This means the heart has to work harder and blood pressure will be raised. • Carbon monoxide takes the place of oxygen in the red blood cells. This means there is less oxygen available than before. Award [0] for an answer not worthy of credit. Award [1] for an answer that correctly states a physical effect that smoking has on the body. E.g. Smoking constricts the lungs' air passages. Award [2] for an answer that clearly explains a physical effect that smoking has on the body. E.g. Smoking constricts the lungs' air passages. This means it is more difficult to breathe air into the lungs. (2 × [2]) [4]	4

AVAILABLE MARKS

5 For example:
- liver damage and disease
- cirrhosis of the liver
- increased risk of fertility problems
- obesity.

Award [0] for an answer not worthy of credit.
Award [1] for an acceptable long-term physical effect that can develop as a result of drinking too much alcohol.
(2 × [1]) [2] 2

6 Examples of good health reasons:
- Sleep allows growth to occur. (Human growth hormone is released under conditions of sleep).
- Sleep allows the repairing of muscles, neurons in the nervous system and other tissues. The replenishing of immune cells. (This repairing is maximal during sleep as energy consumption is lowered and is directed towards the healing or recovery process).
- Sleep allows the brain to recharge. (Motivation is highest when mental alertness is highest).
- Sleep facilitates memory, learning and social processes. (Sleep enables the brain to encode new information and store it properly).
- To fully recover, your brain must experience all of the stages of sleep.
- Sleep deprivation accumulates over time and can lead to decreased attentiveness and concentration, decreased short-term memory, poor coordination, delayed reaction times, poor decision-making, moodiness, irritability and anxiety.
- Sleep deprivation over time can lead to depression.
- Sleep interruption over time increases the risk of developing cancer.

Award [0] for an answer not worthy of credit.
Award [1] for a good health reason to support the case for active teenagers having quality sleep each night.
(3 × [1]) [3] 3

7 Cultural heritage is the passing on and reinforcing of shared traditions from one generation to the next. These traditions can be national, local or family-based.

If your parents play a sport, there is a good chance that you will be influenced by this. If your parents play tennis they might have taken you to the tennis courts from a young age. At first, you would have retrieved the tennis balls, but would soon have been given a mini racket and your parents would have played with you. Soon you would have been taught to play, and perhaps received coaching. You might then have become involved in junior competitions, and your parents are likely to have supported you when you were playing. In no time playing tennis would have become a habit for you.

When you become an adult with your own children, you will probably also take them to the tennis courts. They will go through similar experiences to you when you were young. These experiences will be reinforced by your children's grandparents. This all leads to playing tennis becoming a tradition in the family.

The process can be similar in the local community. For example, some schools have developed a tradition of playing rugby, others a tradition of playing football, and others a tradition of playing Gaelic games. If you go to a school that has a particular tradition then there is a good chance that you will become part of that tradition. Local communities can set up clubs that become successful, and this success attracts young members. If this continues then the next generation will

		AVAILABLE MARKS
	also be attracted and it soon becomes a community that has a tradition in that particular sport. Award [0] for an answer not worthy of credit. **Level 1 ([1]–[2])** The definition of cultural heritage is weak and the explanation, with the examples of how it can develop within families and at community level, is limited to moderate. The quality of written communication is basic. There is limited use of specialist terms and spelling, punctuation and grammar are weak. **Level 2 ([3]–[5])** The definition of cultural heritage is reasonably sound and the explanation,with the examples of how it can develop within families and at community level, is moderate to competent. The quality of written communication is moderate to good. A range of specialist terms is used with facility and spelling, punctuation and grammar are reasonably good. **Level 3 ([6]–[8])** The definition of cultural heritage is sound and clear and the explanation, with the examples of how it can develop within families and at community level, is competent to highly competent. The quality of written communication is very good. A wide range of specialist terms is used adeptly and spelling, punctuation and grammar are almost faultless. [8]	8
8	Regular and appropriate exercise can: • help with weight control. It helps burn up excess fats. • help with posture. It tones the muscles so that you can keep your body in the positions that result in good posture. • help with self-confidence. The fit are more likely to sleep well, look well (shape and posture), feel good, and therefore be more confident in themselves. • help control negative habits such as smoking, drugs, excessive eating and excessive intake of alcohol. When you are fit you are more concerned about and inclined to look after your body, and so not as likely to get involved in these negative habits. • help with rest/sleep. Exercise can make you physically tired and therefore help you to get to sleep at night. • help reduce the risk of some illnesses and diseases. If you are fit and healthy your body is in good working order, you are less at risk of suffering from a heart attack, angina or arteriosclerosis (build up of fatty deposits and loss of elasticity in the artery walls). You are also less likely to become obese or suffer from osteoporosis (brittle bones). • help relieve stress. A stressful day when everything seems to be on top of you can be turned around by a session of exercise. It can take your mind off the problems, give you a different perspective, and re-energise you. • help extend a healthy active life. If you are fit and healthy your body is in good working order and therefore can continue to perform everyday tasks with ease. This makes you seem younger. Award [0] for an answer not worthy of credit. Award [1] for an acceptable benefit that regular and appropriate exercise can bring to those who do it. Award [2] for an acceptable benefit that regular and appropriate exercise can bring to those who do it and a clear explanation of this. (5 × [2]) [10]	10

AVAILABLE MARKS

9 **(a)** The training method being used is interval training.
No other response is acceptable. [1]

(b) This use of the training method is most likely to improve **anaerobic energy production/anaerobic fitness.**
Award [0] for an answer not worthy of credit.
Award [1] for anaerobic energy production/anaerobic fitness. [1]

(c) The recovery time between the repetitions is much longer than the work-time, which would indicate that the person was working hard (over 90% of MHR), therefore it would be anaerobic training. The ratio between the work-time and the recovery time is 1:4. This is typical for anaerobic training where the recovery time is at least four times longer than the work-time. There are also only 5 repetitions which would indicate that they must be working hard (over 90% MHR), so the component of fitness being improved is most likely to be anaerobic fitness.
Award [0] for an answer not worthy of credit.
Award [1] for one clear and acceptable piece of evidence from the workout.
Award [2] for two clear and acceptable pieces of evidence from the workout. [2] 4

10 **(a)** The training method being used is continuous steady pace (CSP) training. [1]
No other response is acceptable.

(b) This use of the training method is most likely to improve **aerobic endurance/aerobic fitness/cardio-respiratory endurance/ cardio-vascular endurance/stamina**.
Award [0] for an answer not worthy of credit.
Award [1] for an acceptable aerobic term. [1]

(c) The person runs continually for 30 minutes therefore it is most likely to be improving aerobic fitness. The intensity of the run is moderate, therefore it is most likely to be aerobic fitness.
Award [0] for an answer not worthy of credit.
Award [1] for one clear and acceptable piece of evidence from the workout.
Award [2] for two clear and acceptable pieces of evidence from the workout. [2] 4

11 **(a)** The training method being used is **interval** training.
No other response is acceptable. [1]

(b) This use of the training method is most likely to improve **aerobic endurance/aerobic fitness/cardio-respiratory endurance/ cardio-vascular endurance/stamina**.
Award [0] for an answer not worthy of credit.
Award [1] for an acceptable aerobic term. [1]

(c) The recovery time between the repetitions is short which would indicate that the person was operating below 90% of MHR, therefore it would be aerobic training. The ratio between the work-time and the recovery time is 1:1. This is typical for aerobic training where the recovery time is usually no longer than the work-time. Although the distance is short, there are 20 repetitions which again indicate that they are not working over 90% MHR, so the component of fitness being improved is most likely to be aerobic fitness.
Award [0] for an answer not worthy of credit.
Award [1] for one clear and acceptable piece of evidence from the workout.
Award [2] for two clear and acceptable pieces of evidence from the workout. [2] 4

			AVAILABLE MARKS
12	**(a)**	Your recovery rate is the time it takes for your heart rate to return to a set rate (eg 80bpm) after having completed a set piece of work. Award [0] for an answer not worthy of credit. Award [1] for an answer that partially explains recovery rate. E.g. Your recovery rate is the time it takes for your heart rate to return to a set rate (eg 80bpm) Award [2] for an answer that clearly explains recovery rate. E.g. Your recovery rate is the time it takes for your heart rate to return to a set rate (eg 80bpm) [1] after having completed a set piece of work. [1] [2]	
	(b)	To judge fairly, you need to do a set test or piece of work, then record your recovery rate. [1] After an appropriate length of time into your training programme, you do the same test or piece of work [1] and record your recovery rate once again exactly as before. [1] If the rate of your recovery is quicker than it was before you started your programme then you know that the training programme is effective. [1] [4]	6
13		**Fig. 1** represents what happens to blood flow when the body is at rest [1] and **Fig. 2** represents what happens to blood flow when the body is exercising. [1] When the body is resting, most of the blood flow goes to the gut and kidneys (appropriate % given) [1] whereas when exercising most of the blood flow goes to the muscles (appropriate % given) [1] [4]	4
14		**Fig. 3** represents the amount of oxygen taken out of the blood by muscle cells when the body is at rest [1] and **Fig. 4** represents the amount of oxygen taken out of the blood by muscle cells when the body is exercising. [1] At rest the muscle cells only use six millilitres of oxygen of the nineteen millilitres per one hundred millilitres available, [1] whereas when exercising the muscle cells use seventeen millilitres of oxygen of the nineteen millilitres per one hundred millilitres available. [1] [4]	4
15		The following are examples of potential hazards that could arise: • A pupil doing PE when s/he is already ill or injured • A pupil going over the top in participating and injuring himself/herself or injuring another pupil • A pupil wearing inappropriate clothing or footwear • Pupils exercising on a wet and slippy floor • A pupil not warming up • A pupil not using equipment properly • A pupil not following the rules • A pupil not using sound techniques Award [0] for an answer not worthy of credit. Award [1] for identifying an acceptable potential hazard. (4 x [1]) [4]	4

16 The three components of physical fitness that should definitely be included in the training programme are **aerobic energy production (etc); local muscular endurance** and **flexibility.**

AVAILABLE MARKS

Aerobic energy production, etc. should be included **because** the challenge demands the person to keep swimming aerobically for up to 40 minutes at a pace 50 metres per minutes (100 m/2 minutes; or 1 km/20 minutes), this requires efficient aerobic energy production, therefore aerobic energy production must be a component of physical fitness that is included in the training programme.

The person needs to include aerobic fitness training methods such as **continuous steady pace**, **fartlek** or **interval** training in the training programme.

Local muscular endurance should be included **because** the challenge demands the person's muscles involved in the swimming to be able to keep repeating the cycle of the swimming stroke for up to 40 minutes without tiring, this requires good local muscular endurance, therefore it must be a component of physical fitness that is included in the training programme.

The person needs to include muscular endurance training methods such as **circuit training** or **weight training** in the training programme.

Flexibility should be included **because** the challenge demands the person to be flexible especially around their shoulders, hips and ankles in order for them to be able to swim whatever swimming strokes they use efficiently and effectively, therefore flexibility must be a component of physical fitness that is included in the training programme.

The person needs to include flexibility training methods such as **static** or **dynamic** in the training programme.

For each of the three correct components of physical fitness:
Award [1] for identifying it as an appropriate component of physical fitness for the training programme.
Award up to [2] for the quality of the explanation as to why that component of physical fitness should be included in the training programme.
Award [1] for giving an appropriate method of training for developing that component of physical fitness.

(3 × [4]) [12] 12

AVAILABLE MARKS

17 (a) Examples of advantages:
Circuit training can be done anywhere. It can be done in a hall, at home, outside in a park whereas weight training using fixed weight machines needs to take place in a special area.

Circuit training does not need specialist equipment. The resistance is usually the person's own body weight whereas weight training uses fixed weight machines, dumb bells, bar bells etc.

Circuit training does not require the person to spend money on equipment whereas free weights are expensive and fixed weight machines are very expensive.

Circuit training can cope with any number of people doing it whereas you are limited by the amount of weights you have.

Award [0] for an answer not worthy of credit.
Award [1] for an answer that partially explains an advantage of circuit training as opposed to weight training.
E.g. Circuit training can be done anywhere. It can be done in a hall, at home, outside in a park.
Award [2] for an answer that clearly explains an advantage of circuit training as opposed to weight training.
E.g. Circuit training can be done anywhere. It can be done in a hall, at home, outside in a park whereas weight training using fixed weight machines needs to take place in a special area.
(3 x [2]) [6]

(b) Examples of disadvantages:
Circuit training is best suited to improving muscular endurance whereas weight training can cope with the full range from muscular endurance to muscular power.

Some people are heavier than others so the resistance for an exercise can vary from one person to another whereas when training with weights the resistance can be very specific.

With circuit training it can be difficult to make exercises more difficult (greater resistance) whereas with weight training it is easy to make the same exercise more difficult as you can add more weight.

With circuit training it can be difficult to monitor progress whereas with weight training it can be very precise.

Award [0] for an answer not worthy of credit.
Award [1] for an answer that partially explains a disadvantage of circuit training as opposed to weight training.
E.g. Circuit training is best suited to improving muscular endurance.
Award [2] for an answer that clearly explains a disadvantage of circuit training as opposed to weight training.
E.g. Circuit training is best suited to improving muscular endurance whereas weight training can cope with the full range from muscular endurance to muscular power.
(3 x [2]) [6]

12

AVAILABLE MARKS

18 ***Applying the principle of specificity***
Selecting the appropriate components of physical fitness
The person's exercise programme must include exercise to develop aerobic energy production, muscular endurance and flexibility. These are the core components of any health-related exercise programme as they help the person cope efficiently and effectively with everyday tasks.

Selecting suitable types of exercise and/or training methods
Aerobic energy production - The person should do aerobic exercise that they enjoy, for example, one or more from walking, running, swimming, cycling, dancing etc. The person could do one or more of these; the important thing is that they continue exercising. The continuous steady-pace method of training would mostly be used. This should help the person to cope efficiently and effectively with everyday tasks.

Muscular endurance - Exercises for core stability such as sit-ups should be included to cover the trunk, as well as other exercises for the upper and lower body. The exercise could be done in a circuit. This should help the person to cope efficiently and effectively with everyday tasks.

Flexibility - After doing the aerobic exercise, a series of static flexibility exercises should be performed as part of a cool-down. To develop flexibility, each stretch would be held for 20 seconds. Static flexibility exercises are the safest and most appropriate flexibility exercises for the person to do. This should help the person to cope efficiently and effectively with everyday tasks.

Applying the principle of overload
As the person was doing no exercise at all, the overload for Week 1 would simply be to get the person exercising in each of the three components.

The frequency, intensity and time may be below the minimum stated in the FITT principle for the three components, but this would still be an overload as the person had been doing no exercise at all. The person should not be put under too much stress, so the person will want to exercise the following week. If the person was capable of doing the minimum stated in the FITT principle then this can be done in the first week.

Applying the principle of progressive overload
The initial overload in the first week should be appropriate, but relatively comfortable. The intention would then be to gradually increase the frequency first, time second and intensity last, so that as soon as practicable the person is doing aerobic exercise, muscular endurance exercises and flexibility exercises with the minimum overload stated in the FITT principle. The overload would gradually be increased further until the person was doing daily exercise.

Applying the principle of rest/recovery
At the beginning of the exercise programme there would be lots of rest/recovery time between the exercise sessions. These rest/recovery days would be interspersed between the exercise sessions. Gradually the rest/recovery days would be reduced as the exercise sessions increased. If the person ends up doing daily exercise, then some of the sessions in the week could be easier and therefore count as rest/recovery sessions.

Award [0] for an answer not worthy of credit.

	AVAILABLE MARKS
Level 1 ([1] – [4]) The answer clearly demonstrates limited to moderate understanding in the application of the principles of training. The quality of written communication is basic. There is limited use of specialist terms and spelling, punctuation and grammar are weak.	
Level 2 ([5] – [8]) The answer clearly demonstrates moderate to competent understanding in the application of the principles of training. The quality of written communication is moderate to good. A range of specialist terms is used with facility and spelling, punctuation and grammar are reasonably good.	
Level 3 ([9] – [12]) The answer clearly demonstrates competent to highly competent understanding in the application of the principles of training. The quality of written communication is very good. A wide range of specialist terms is used adeptly and spelling, punctuation and grammar are almost faultless. [12]	12
Total	**100**