Rewarding Learning

General Certificate of Secondary Education
2018

Physical Education

Paper 1

[G9741]

FRIDAY 18 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	**(a)** For example, reading, walking, cycling... Award [0] for an answer not worthy of credit. Award [1] for a clear example of a leisure activity that would help maintain good mental health. (2 × [1])	[2]	
	(b) For example, stress; depression; nervousness; anxiety; loss of self-confidence. Award [0] for an answer not worthy of credit. Award [1] for a clear example of a condition people could develop if they neglect their mental well-being.	[1]	3
2	When people exercise to keep their body in reasonable working order, this is usually referred to as **physically healthy**. When a person trains their body to be in the best possible shape to perform a physical task, this is usually referred to as **peak physical fitness**. Award [0] for an answer not worthy of credit. Award [1] when the correct link is made. (2 × [1])	[2]	2
3	**(a)** Motivation is the **desire** or **drive you have to do something**. Award [0] for an answer not worthy of credit. Award [1] for a clear definition of motivation.	[1]	
	(b) Examples of extrinsic motivation. • **Positive feedback/encouragement/praise** from teachers, coaches, family or team members. • Motivated by trophies/badges/certificates/money, i.e. **tangible rewards**. • An opportunity to **join a team/**club. • **Role models**. • **Health and fitness benefits** explained, e.g. shown positive benefits for body image, i.e. to look good. • Having their **health/fitness measured** and shown areas for improvement. • **Making new friends**. • A young person may be extrinsically motivated to **gain a qualification**. Award [0] for an answer not worthy of credit. Award [1] for each valid example given on how a young person could be extrinsically motivated to follow an active, healthy lifestyle. (3 × [1])	[3]	4

4

	Public Sector	Private Sector
Owned by:	Local Councils/government	Owned by a company/ or an individual business person
Funded by:	Central/local government grants/ or usually paid for through taxes/ rates	Membership schemes/or charged admission rates
Purpose:	Example answers: • Open to all users to improve quality of life for local people • offer specialised sporting facilities/services • improved amenities • create employment • assist local economy • engage tourism • attract business • raise standards in sport • accessible sport facilities for all • to keep public fit Any other valid response	Operate for profit • Offer specialised sporting facilities/ services

Award [0] for an answer not worthy of credit.
Award [1] for each significant difference between public sector and private sector facilities.
N.B. do not credit repeat opposites.
(6 × [1]) [6] 6

5 **Proteins** should form 10–15% of a balanced diet.

Award [0] for an answer not worthy of credit.
Award [1] for proteins being the component. [1] 1

6 Example answers:
- Fats are vital for **normal tissue functioning**
- Fats act as an **insulator** to keep a person's body warm
- Fats help to **protect vital organs**
- Fats help to **regulate body hormones**
- Fats help in the **absorption of vitamins**

Award [0] for an answer not worthy of credit.
Award [1] for any one of the functions of fats in a diet. [1] 1
N.B. do not credit secondary source of energy.

7 **(a)** The component of diet is **carbohydrates**.

Award [0] for an answer not worthy of credit.
Award [1] for carbohydrate being the component. [1]

(b) An endurance athlete approximately **a week before an event** may **restrict** their **carbohydrate** intake to lower their body of this source of energy. The athlete would follow this by **eating high-carbohydrate meals**, e.g. pasta, which is a slow release energy source, in the three days before the marathon. This will increase the amount of glycogen in the muscles and

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	liver (to its maximum) giving the athlete more energy available during the run/this would **help to delay tiredness**/reduce levels of fatigue. This would help the athlete to maintain their performance in the later stages of the run as glycogen is an immediate reserve source of available glucose for muscle cells. The liver will also break down its stored glycogen into glucose and send it through the bloodstream as fuel for muscles. Award [0] for an answer not worthy of credit. Award [1] for a limited to moderate understanding of what carbohydrate loading. An endurance athlete approximately a week before an event may restrict their carbohydrate intake to lower their body of this source of energy. Award [2] for a moderate to competent understanding of what carbohydrate loading. An endurance athlete approximately a week before an event may restrict their carbohydrate intake to lower their body of this source of energy. The athlete would follow this by eating high-carbohydrate meals, e.g. pasta, which is a slow release energy source, in the three days before the marathon. Award [3] for a clear, competent and detailed understanding of what carbohydrate loading. An endurance athlete approximately a week before an event may restrict their carbohydrate intake to lower their body of this source of energy. The athlete would follow this by eating high-carbohydrate meals e.g. pasta, which is a slow release energy source, in the three days before the marathon. This will increase the amount of glycogen in the muscles and liver (to its maximum) giving the athlete more energy available during the run/this would help to delay tiredness/reduce levels of fatigue. [3]	4
8	Example effects: • Impaired vision • Impaired hearing • Loss of balance • Poor information processing • Poor judgement and decision making • Slowed reactions/reflexes • Personality can change – e.g. make the person more aggressive • Memory lapses • Blackouts • Impaired communication Award [0] for an answer not worthy of credit. Award [1] for a suitable effect of alcohol that could affect performance. **N.B.** Do not credit lack of coordination (2 × [1]) [2]	2
9	Example answers: • Taking part in a non-competitive physical activity can help with weight control as a result of burning up excess fats. • Taking part in a non-competitive physical activity can help a person's posture as it will tone muscles to keep your body in the positions that result in good posture. • Taking part in a non-competitive physical activity can help with self-confidence. The fitter a person is the more likely they are to sleep well, look well, feel good, and therefore, be more confident. • Taking part in a non-competitive physical activity can help control negative habits, e.g. 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.	

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- Taking part in a non-competitive physical activity can help with rest and sleep. Exercise can make a person physically tired which will help them to sleep.
- Taking part in a non-competitive physical activity can help reduce the risk of some illnesses and diseases. If a person is fit they are less at risk of heart attack, angina or arteriosclerosis. Less likely to become obese or suffer from osteoporosis.
- Taking part in a non-competitive physical activity can help relieve stress – the exercise will help a person take their mind off their problems, give them a different perspective and re-energises them.
- Taking part in a non-competitive physical activity can help extend a healthy active life. If a person is fit and healthy, they can continue to perform everyday tasks with ease.
- Group activities can provide social benefits through meeting and carrying out the activity with others.
- The individual can participate at their own pace and level.

Accept any other suitable responses

Award [0] for an answer not worthy of credit.
Award [1] for stating a correct benefit of a person taking part in non-competitive physical activities.
The quality of written communication is moderate. A range of specialist terms is used with facility and spelling, punctuation and grammar are reasonably good.
Award [2] for stating a correct benefit of a person taking part in non-competitive physical activities **and** explaining how this will improve a person's lifestyle.
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.
N.B. Do not credit answers related to fitness

(3 × [2]) [6] 6

10 **(a)** Muscular speed enables a person's muscle or group of muscles to contract and relax quickly.
Award [0] for an answer not worthy of credit.
Award [1] for a clear understanding that muscular speed enables a person's muscles to contract and relax quickly.
Award [1] for an understanding that muscular speed enables the muscles to apply a moderate to small force at high speed. [1]

(b) Example answers:
- Genetics.
- Muscle fibre types, e.g. fast twitch versus slow twitch.
- Technique.
- Gender.
- Ethnic background.
- Flexibility

Award [0] for an answer not worthy of credit.
Award [1] for each valid example of what determines a person's muscular speed.
N.B. Do not credit "age".

(2 × [1]) [2] 3

			AVAILABLE MARKS
11	**(a)**	I would choose **aerobic** energy production as being more important. Award [0] for an answer not worthy of credit. Award [1] for aerobic energy production being the component of fitness most relevant to a health-related exercise programme. [1]	
	(b)	Example answers: • Aerobic energy production would be the most important for inclusion in a health-related exercise programme as most physical work/tasks done in jobs, e.g. walking, climbing stairs; and during leisure time, e.g. gardening, vacuuming, decorating, are nearly all aerobic-based. That is they require the use of oxygen/aerobic energy production would be the most important for inclusion in a health-related exercise programme as most recreational activities that you can do in your leisure time would be aerobic activities. That is they require the use of oxygen. • There are few tasks that require consistently high intensity effort throughout the day. Only occasionally would you need anaerobic energy production, e.g. sprinting for the bus or to get out of the rain. Award [0] for an answer not worthy of credit. Award [1] for providing one acceptable point to clearly explain why aerobic energy production is most important to include in a health-related exercise programme. Aerobic energy production would be the most important for inclusion in a health-related exercise programme as most physical work/tasks done in jobs, e.g. walking, climbing stairs; and during leisure time e.g. gardening, vacuuming, decorating, are nearly all aerobic-based. That is they require the use of oxygen. Award [2] for providing one acceptable point to clearly explain why aerobic energy production is most important to include in a health-related exercise programme and one acceptable point why anaerobic is not. Aerobic energy production would be the most important for inclusion in a health-related exercise programme as most physical work/tasks done in jobs, e.g. walking, climbing stairs; and during leisure time, e.g. gardening, vacuuming, decorating, are nearly all aerobic-based. That is they require the use of oxygen. There are few tasks that require consistently high intensity effort throughout the day. Only occasionally would you need anaerobic energy production, e.g. sprinting for the bus or to get out of the rain. [2]	3
12	**(a)**	*The training method is* **continuous steady pace training**. Award [0] for an answer not worthy of credit. Award [1] for naming the correct method of training. [1]	
	(b)	**Figure 1** shows the athlete was **working continuously** for approximately 25 minutes at a steady pace, **intensity maintained at 70% of MHR**. The athlete had **no rest/recovery periods** in the exercise/training session. Award [0] for an answer not worthy of credit. Award [1] for one general acceptable and correct interpretation of what Figure 1 shows about the training method. Figure 1 shows the athlete was working continuously at a steady pace. Award [2] for two acceptable, specific and correct interpretations of what Figure 1 shows about the training method. Figure 1 shows the athlete was working continuously for approximately 25 minutes. Figure 1 shows the athlete's intensity was maintained at 70% of MHR.	

Award [3] for three acceptable, specific and correct interpretations of what Figure 1 shows about the training method.
Figure 1 shows the athlete was working continuously for 25 minutes. Figure 1 shows the athlete's intensity was maintained at 70% of MHR. Figure 1 shows the athlete had no rest/recovery periods in the exercise/training session. [3]

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(c) The variables that could be changed to the athlete's training to maintain interest include:

- Change the **physical activities/exercise** of the session. For example, you could do running one session, swimming in another and cycling in another.
- Change the **venues**. For example, you could run along the beach, then run in the gym on a treadmill and then run in a forest.
- Change the **time** at which you train. For example, you could swim before work in one session and swim after work in another.
- Change **whom** you exercise with. For example, you could train on your own in one session, with a friend in another or with a club.

Award [0] for an answer not worthy of credit.
Award [1] for a clear explanation of an appropriate variable that could be changed to apply the principle of variety.
E.g. You could provide variety by changing the **physical activities/exercise** of the session.
Award [2] for a clear explanation with an example of how the principle of variety could be applied.
E.g. You could provide variety by changing the **physical activities/exercise** of the session. For example, you could do running one session, swimming in another and cycling in another. [2] 6

13 (a) *The training method is* **interval training**.

Award [0] for an answer not worthy of credit.
Award [1] for naming the correct method of training. [1]

(b) The recovery time between the repetitions is much longer than the work-time, which would indicate that the person was working hard, i.e. over 90% of MHR. Therefore, it would be developing anaerobic physical fitness. 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 4 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]

(c)

Distance	400
Time	80 seconds (80–120 seconds)
Repetitions	10 (5–10 repetitions)
Recovery between	80–120 seconds or less (1:1 ratio or less)

		AVAILABLE MARKS
	Award [0] for an answer not worthy of credit. Award [1] for an appropriate and sound application of interval training to develop aerobic fitness. (3 × [1]) [3]	6
14 **(a)**	*The principle of training the athlete displayed from weeks 6–12 is* **reversibility.** Award [0] for an answer not worthy of credit. Award [1] for identifying the correct principle of training. [1]	
(b)	**Figure 2** shows the relationship between a person's development of strength in kg over a 12 week training programme. **Figure 2** shows the **first phase** of the training programme, weeks 1–3, was very **effective** as their strength developed from 80 kg to 150 kg. However, the second phase of training, weeks 6–12, was **not effective** as the person's strength went from **150 kg to 110 kg**. This shows that biological adaptations produced by the body were reversed in this phase of training, resulting in the person losing physical fitness in the area of strength. Award [0] for an answer not worthy of credit. Award [1] for an acceptable and correct interpretation of how **Figure 2** shows training was not effective in the second phase of programme. Figure 2 shows the second phase of training, weeks 6–12, was not effective as the person's strength went from 150 kg to 110 kg. Award [2] for an acceptable and correct interpretation of how **Figure 2** shows effective training in first phase of programme and a clear explanation as to how the principle of reversibility affected the person in the second phase of training. **Figure 2** shows the first phase of the training programme, weeks 1–3, was very effective as their strength developed from 80 kg to 150 kg. However, the second phase of training, weeks 6–12, was not effective as the person's strength went from 150 kg to 110 kg. This shows that biological adaptations produced by the body were reversed in this phase of training, resulting in the person losing physical fitness in the area of strength. [2]	3
15	**D** (Doing sit ups to increase abdominal strength) *best demonstrates the principle of specificity*. Award [0] for an answer not worthy of credit. Award [1] for identifying the correct principle of training. [1]	1
16	Example answers: • Allows the body time to repair damage caused by training • Allows muscles the time to adapt, grow, get stronger • Reduces the risk of over-use injury • Reduces the risk of over-training which could lead to fatigue/tiredness • Helps to get rid of lactic acid or waste products or repay oxygen debt • A person who is well rested will perform at a higher level or be able to train harder/longer • Helps a person to maintain motivation • Provides psychological benefits for the person – time for reflection, maintain alertness • Helps to replenish glycogen stores	

- Helps to delay onset muscle soreness (DOMS)
- Accept any other suitable response

Award [0] for an answer not worthy of credit.
Award [1] for a clear understanding of the importance of the principle of rest/ recovery.
(2 × [1]) [2] — AVAILABLE MARKS: 2

17 (a)

Resting heart rate	Working heart rate	Heart rate during recovery
70 BPM	**150 BPM**	**90 BPM**

[1]

(b) Example answers:
- Working heart rate will be the highest value as the heart has to work harder to supply more blood carrying oxygen to working muscles.
- Working heart rate will be the highest value as the heart beats faster when working.

Award [0] for an answer not worthy of credit.
Award [1] for clearly understanding why working heart rate would be the highest value. [1]

(c) Example answers:
- A person's heart rate during recovery will be higher than resting heart rate as insufficient time to return to resting heart rate/not have enough time to recover/as they are still repaying the oxygen debt.
- A person's heart rate during recovery will be lower than working heart rate as the heart will not have to beat as fast as when they were exercising.

Award [0] for an answer not worthy of credit.
Award [1] for clearly understanding why heart rate during recovery is above resting heart rate **or** below working heart rate.
Award [2] for clearly understanding why heart rate during recovery is above resting heart rate and below working heart rate. [2]

(d) If resting heart rate is **lower** than before the person started the exercise/ training programme then they will know it is effective. As you become fitter through aerobic exercise, your heart becomes more efficient at pumping blood around the body.

Award [0] for an answer not worthy of credit.
Award [1] for clearly understanding how monitoring resting heart rate can measure progress of aerobic training. [1] — AVAILABLE MARKS: 5

18 To assess a person's level of muscular fitness it is possible to measure the total **number of repetitions** of an exercise, e.g. sit ups that can be done in a **fixed time**, e.g. one minute. If your training is effective you will be able to complete more repetitions.

Award [0] for an answer not worthy of credit.
Award [1] if the candidate competently explains that you count the number of repetitions of an exercise completed.
Award [2] if the candidate competently explains that you count the number of repetitions completed, in a fixed time. [2] — AVAILABLE MARKS: 2

19 Example answers. Regular and appropriate aerobic exercise leads to:

- Increased capacity of arteries; network of capillaries. This helps to improve performance as more oxygen and nutrients/food can be delivered to the working muscles and more waste products/carbon dioxide/water can be taken away so the person can perform better aerobically/can work harder and for longer than before.
- Increased stores of myoglobin. This helps to improve performance as more oxygen can be taken into the working muscle/s so the person can perform better aerobically/can work harder and for longer than before.
- Increased number of mitochondria. This helps to improve performance as the muscle can produce more energy so the person can perform better aerobically/can work harder and for longer than before.
- Increased size of mitochondria. This helps to improve performance as the muscle can produce more energy so the person can perform better aerobically/can work harder and for longer than before.

Award [0] for an answer not worthy of credit.
Award [1] for stating a correct physical change that takes place in the skeletal muscles as a result of regular and appropriate exercise.
The quality of written communication is moderate. A range of specialist terms is used with facility and spelling, punctuation and grammar are reasonably good.
Award [2] for stating a correct physical change that takes place in the skeletal muscles as a result of regular and appropriate exercise **and** how this change helps improve performance.
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.
(3 × [2]) [6]

AVAILABLE MARKS: 6

20 Example answers:

- To prevent injury
- To make the physical activity less dangerous
- For fair play – so that the activity/game can be played fairly and effectively
- To help the game to flow
- To enable all participants to enjoy the activity
- Important to establish so that all participants know what is expected of them when playing a particular sport/engaging in exercise and physical activities, e.g. follow roles given
- So that behaviour is socially acceptable
- To enable officials to control the activity
- To show respect to those around you/to care about the well-being of others/ sportsmanship/good etiquette
- To not be disqualified/sent off/fined
- To not let your teammates down
- To ensure that a person's/team's reputation is not tainted/given a bad name

Award [0] for an answer not worthy of credit.
Award [1] for stating how lack of respect for rules could be a potential hazard.
(4 × [1]) [4]

AVAILABLE MARKS: 4

21 **(a)** Acceptable answers:

- To minimise the risk of muscle and joint injury.
- To mobilise the joints
- To stretch the muscles
- To prepare the person mentally for the workout/ensure the person is focussed and ready for the workout/event.
- To practice relevant skills.

Award [0] for an answer not worthy of credit.
Award [1] for clearly understanding the purpose of a warm up.
N.B. Do not credit answers related to circulatory system
(2 × [1]) [2]

(b) *Sprint reps of 60 m, 80 m, 100 m with 30 seconds rest in between reps working at 95% MHR. Do 3 sets.*
This section of the warm-up is not suitable; it is more suitable to the workout. The intensity of this section is 95% MHR which is very high. The person should instead start at a low intensity to gradually raise the intensity towards the level to be used in the workout, e.g. a light jog at 60% MHR.

Mobilise lower body joints by moving them as quickly as possible beyond their normal range of movement. Spend 30 seconds on each exercise.
- This section of the warm-up is not suitable. The focus in this warm-up is only to mobilise the lower body joints. The person should instead include mobility exercises to cover the major joints (neck, shoulders, arms, spine, hips, knees and ankles).
- This section of the warm-up is not suitable. It is suggested the person moves their body joints as quickly as possible beyond their normal range of movement which could cause injury. The person should instead move the bones at the joints gently and rhythmically within their normal range of movement.

Complete ballistic stretching exercises that cover the leg muscles. Spend 45 seconds on each stretching exercise.
- This section of the warm-up is not suitable. It is suggested the person completes ballistic stretching exercises; however, static flexibility exercises would be more suitable for a health related workout.
- This section of the warm-up is not suitable. It is suggested that the person only includes stretching exercises to cover the leg muscles however they should cover the major muscles of the body – especially as these will be used in the workout.
- The time being spent on each stretching exercise is too long – 45 seconds. It would be recommended for a health-related workout to hold static stretching exercises under mild tension for 5–15 seconds in the warm-up.

Award [0] for an answer not worthy of credit.
Award [1] for a clear evaluation of the appropriateness relating to **each** phase of the warm-up.
The quality of written communication is moderate. A range of specialist terms is used with facility and spelling, punctuation and grammar are reasonably good.
Award [2] for a clear evaluation of the appropriateness relating to each phase of the warm-up **and** a suitable recommendation to make the warm-up more effective.
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.
(3 × [2]) [6]

(c) **(i)** Including flexibility exercises in the cool-down eases the tension in tight muscles as a result of the workout.
The cool-down is the best time to develop flexibility, as the muscles are warm and pliable therefore can be stretched better.

Award [0] for an answer not worthy of credit.
Award [1] for clearly understanding the purpose of flexibility exercises in the cool-down. [1]

(ii) Example answers:

- To allow the build-up of waste products such as lactic acid to be broken down and cleared from the muscles.
- To allow the blood to be redirected back to other internal organs.
- To allow the person's body temperature to decrease gradually and return to normal.
- To gradually ease the person's way out of the strenuous exercise in the workout.

Award [0] for an answer not worthy of credit.
Award [1] for clearly understanding the purpose of pulse-lowering activities in the cool-down.
(2 × [1]) [2]

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11

22 (a) (i) This is a long distance swimming event therefore most energy will be supplied by the **aerobic energy production** system. The working muscles will require the respiratory and circulatory systems to **increase oxygen delivery** to meet the energy demands of the 800 m race. **Muscular endurance** will be very important for the 800 m freestyle event. The person's muscles involved in the swimming will have to be able to **keep repeating**, e.g. the leg kick and arm cycle, **without tiring**.

Award [0] for an answer not worthy of credit.
Award [1] for identifying the correct component of physical fitness for the training programme.
Award [2] for a clear and competent explanation as to why that component of physical fitness should be included in the training programme.
(2 × [2]) [4]

(ii) The type of exercise must be **swimming freestyle**. This is because the event is a 800 m freestyle swim event and therefore swimming is **specific to the event**.
Award [0] for an answer not worthy of credit.
Award [1] for identifying the correct type of exercise for the training programme.
Award [2] for a clear explanation as to why that type of exercise is suitable. [2]

(iii) Example answers:

- **Continuous steady pace** training would be the most suitable training method for this training programme as they would swim for an extended period of time at a desired/maintained intensity. CSP will develop aerobic fitness
- **Interval training** would be a suitable training method as the swimmer could work at intense periods of 80-90% MHR followed by less intense periods of work or rest.

Award [0] for an answer not worthy of credit.
Award [1] for identifying a correct training method for the training programme.
Award [2] for a clear explanation as to why the training method is suitable. [2]

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(iv)
- **Frequency** – The person should increase their training to three swims per week but not go above five swims per week during the eight weeks. The three swims will allow fitness for the 800 m freestyle swim to develop but also allow sufficient time to recover between swims. Applying this progressive overload will further develop fitness but still allow for recovery.
- **Intensity** – The person needs to make the training harder by increasing the distance they are completing in each session. They are currently swimming 800 m in the total session but their aim is to swim a 800 m race, therefore some of their training must be above race distance. Their sessions should increase to cover for example to 1500–2500m. Or the person could increase the distance per rep to closer to the race distance, e.g. reps of 400 m or 800 m.
  If the person increases one or more of these variables they should improve over the 8 weeks and their body will gradually adapt to the overload. This should lead to their times in the pool decreasing, giving them a better chance of qualifying.

Award [0] for an answer not worthy of credit.
Award [1] for demonstrating a moderate understanding in the application of the principle of progressive overload.
Award [2] for clearly demonstrating competent understanding in the application of the principle of progressive overload.
(2 × [2]) [4]

(b) (i)

Phase of the training programme	Repetitions Maximum
Weeks 1–3	**25RM**

[1]

(ii) To develop muscular endurance the Repetition Maximum must be between 13–25 RM or 50–69% of 1 RM.
As this is the first phase of the training programme, 25 RM was chosen as the weight to be lifted as it is much lighter than 16 RM.
It is better to start with this lighter weight and change to lower RMs which will be much heavier weights.

Award [0] for an answer not worthy of credit.
Award [1] for a limited but acceptable explanation as to how the RM chosen will develop muscular endurance.
Award [2] for an acceptable explanation as to how the RMs chosen will develop muscular endurance at the beginning of a weights programme.
Award [3] for a clear, competent and sound explanation as to how the RM chosen will develop muscular endurance at the beginning of a weights programme with a lighter RM. [3]

(iii)

Phase of the training programme	Number of Repetitions
Weeks 1–3	**23**

[1]

		AVAILABLE MARKS
(iv)	To develop muscular endurance the repetitions must be between 13–25. With the RM selected as 25 RM for weeks 1–3 of the programme the most suitable repetitions are 23. 15 repetitions would be too low for 25 RM. Award [0] for an answer not worthy of credit. Award [1] for a limited but acceptable explanation as to how the repetitions chosen will develop muscular endurance. Award [2] for a clear understanding of the appropriateness of the number of repetitions for the RMs in weeks 1–3. [2]	19
	Total	**100**