GCSE
PHYSICAL EDUCATION
8582/1

Paper 1 The human body and movement in physical activity and sport

Mark scheme

June 2022

Version: 1.0 Final Mark Scheme

226G8582/1/MS

Mark schemes are prepared by the Lead Assessment Writer and considered, together with the relevant questions, by a panel of subject teachers. This mark scheme includes any amendments made at the standardisation events which all associates participate in and is the scheme which was used by them in this examination. The standardisation process ensures that the mark scheme covers the students' responses to questions and that every associate understands and applies it in the same correct way. As preparation for standardisation each associate analyses a number of students' scripts. Alternative answers not already covered by the mark scheme are discussed and legislated for. If, after the standardisation process, associates encounter unusual answers which have not been raised they are required to refer these to the Lead Examiner.

It must be stressed that a mark scheme is a working document, in many cases further developed and expanded on the basis of students' reactions to a particular paper. Assumptions about future mark schemes on the basis of one year's document should be avoided; whilst the guiding principles of assessment remain constant, details will change, depending on the content of a particular examination paper.

Further copies of this mark scheme are available from aqa.org.uk

Level of response marking instructions

Level of response mark schemes are broken down into levels, each of which has a descriptor. The descriptor for the level shows the average performance for the level. There are marks in each level.

Before you apply the mark scheme to a student's answer read through the answer and annotate it (as instructed) to show the qualities that are being looked for. You can then apply the mark scheme.

Step 1 Determine a level

Start at the lowest level of the mark scheme and use it as a ladder to see whether the answer meets the descriptor for that level. The descriptor for the level indicates the different qualities that might be seen in the student's answer for that level. If it meets the lowest level then go to the next one and decide if it meets this level, and so on, until you have a match between the level descriptor and the answer. With practice and familiarity you will find that for better answers you will be able to quickly skip through the lower levels of the mark scheme.

When assigning a level you should look at the overall quality of the answer and not look to pick holes in small and specific parts of the answer where the student has not performed quite as well as the rest. If the answer covers different aspects of different levels of the mark scheme you should use a best fit approach for defining the level and then use the variability of the response to help decide the mark within the level, ie if the response is predominantly level 3 with a small amount of level 4 material it would be placed in level 3 but be awarded a mark near the top of the level because of the level 4 content.

Step 2 Determine a mark

Once you have assigned a level you need to decide on the mark. The descriptors on how to allocate marks can help with this. The exemplar materials used during standardisation will help. There will be an answer in the standardising materials which will correspond with each level of the mark scheme. This answer will have been awarded a mark by the Lead Examiner. You can compare the student's answer with the example to determine if it is the same standard, better or worse than the example. You can then use this to allocate a mark for the answer based on the Lead Examiner's mark on the example.

You may well need to read back through the answer as you apply the mark scheme to clarify points and assure yourself that the level and the mark are appropriate.

Indicative content in the mark scheme is provided as a guide for examiners. It is not intended to be exhaustive and you must credit other valid points. Students do not have to cover all of the points mentioned in the Indicative content to reach the highest level of the mark scheme.

An answer which contains nothing of relevance to the question must be awarded no marks.

0 1	Which **one** of these components of fitness is measured by the Ruler Drop Test? **[1 mark]**

Marks for this question: AO1 = 1

Answer D – Reaction time (1)

0 2	Which **one** of these is the correct pathway of air? **[1 mark]**

Marks for this question: AO1 = 1

Answer A – Mouth/nose – trachea – bronchi – bronchioles – alveoli (1)

0 3	Which **one** of these is the **main** function of a flat bone? **[1 mark]**

Marks for this question: AO1 = 1

Answer D – Protection of vital organs (1)

0 4	Which **one** of these blood vessels transports oxygenated blood back to the left atrium? **[1 mark]**

Marks for this question: AO1 = 1

Answer C – Pulmonary vein (1)

0 5	Which **one** of these pairs of muscles are used when **breathing in** during exercise? **[1 mark]**

Marks for this question: AO1 = 1

Answer D – Sternocleidomastoid and pectorals (1)

0 6 . 1 Define muscular endurance.

Use an example of a sporting action in your answer.

[2 marks]

Marks for this question: AO1 = 1, AO2 = 1

Award **one** mark for a definition and **one** further mark for an example.

AO1 (sub-max 1 mark)

- Ability of the muscle or muscle group to undergo repeated contractions, avoiding fatigue (1)
- Ability of the muscles or muscle group to contract over a period of time (1)

AO2 (sub-max 1 mark)

- Press ups (1)
- Sit ups (1)
- Bicep curls (1)
- Swimming strokes (1)
- Holding a Plank

Accept any suitable response.

Maximum 2 marks

0 6 . 2 Justify why muscular endurance is an important component of fitness needed for a games player to perform effectively.

[4 marks]

Marks for this question AO3 = 4

Award **one** mark for each of the following up to a maximum of **four** marks.

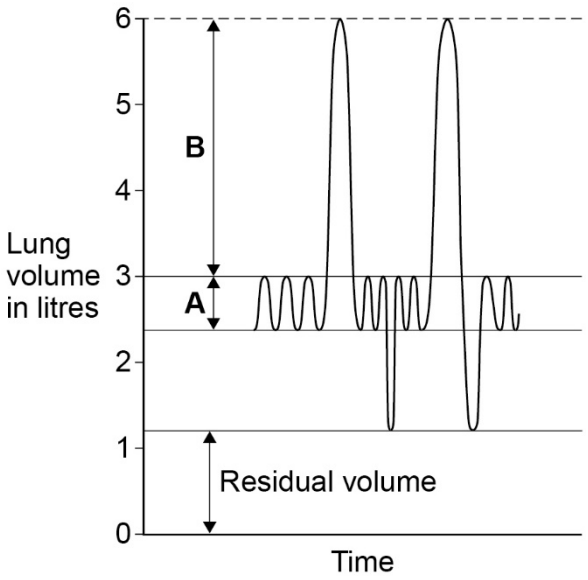
- Games are usually played over a long period of time (1)
- Muscular endurance allows the delay of the onset of fatigue (1)
- Performers are able to perform at optimal levels for longer (1)
- Muscular endurance allows a games player to increase their capacity to train for longer periods of time (1)
- This will result in increased levels of cardiovascular endurance (1)
- Reduced recovery times during phases of play enabling the games player to be more competitive throughout the game (1)

Accept any other suitable response.

Maximum 4 marks

0 7 **Figure 1** shows a spirometer trace for a person at rest.

Figure 1



0 7 . 1 Identify lung volumes **A** and **B** in **Figure 1**.

[2 marks]

Marks for this question AO2 = 2

Award **one** mark for each of the following up to a maximum of **two** marks.

- **A** = Tidal (volume) (1)
- **B** = Inspiratory reserve (volume) (1)

Maximum 2 marks

0 7 . 2 In **Figure 1**, what would happen to lung volume **A** during exercise?

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for stating what happens to lung volume **A** during exercise.

- It increases (1)
- Gets bigger or larger (1)

Maximum 1 mark

0 7 . 3 Justify your answer to **Question 7.2**.

[2 marks]

Marks for this question AO3 = 2

Award **one** mark for each of the following up to a maximum of **two** marks.

- Depth of breathing increases (due to the chest cavity expanding) (1)
- More oxygen needed (in order to sustain exercise) (1)
- Removal of carbon dioxide (1)

Maximum 2 marks

0 7 . 4 Define inhalation and describe how it takes place at rest.

Refer to the intercostal muscles, rib cage and diaphragm in your answer.

[4 marks]

Marks for this question AO1 = 1, AO2 = 3

Award **one** mark for each of the following points up to a maximum of **four** marks.

AO1 (sub-max 1 mark)

- Inhalation (inspiration) is the intake of air into the lungs (1)

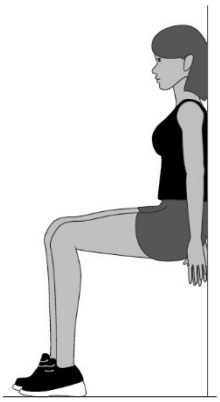
AO2 (sub-max 3 marks)

- Diaphragm contracts and flattens (moves downwards) (1)
- Intercostal muscles contract (1)
- Rib cage moves up and out or chest cavity becomes larger (1)
- Reducing the pressure inside the lungs (so air is drawn in) (1)
- Molecules (of air) move from high pressure to low pressure (1)

Maximum 4 marks

0 8 **Figure 2** shows a person performing a wall sit.

Figure 2



0 8 . 1 Identify the type of muscular contraction taking place in the legs in **Figure 2**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the type of muscular contraction taking place in the legs in **Figure 2.**

- Isometric (1)

Maximum 1 mark

0 8 . 2 Justify your answer to **Question 8.1**.

[1 mark]

Marks for this question AO3 = 1

Award **one** mark for justifying the type of muscular contraction in **Figure 2.**

- The muscle length stays the same (1)
- The contraction is constant and is pushing against a load ie the floor or wall (1)

Maximum 1 mark

0 9 . 1 Name **two** major muscles that allow the foot to move at the ankle.

[2 marks]

Marks for this question AO1 = 2

Award **one** mark for each of the following points up to a maximum of **two** marks.

- Gastrocnemius (1)
- Tibialis anterior (1)
- Soleus (1)

Maximum 2 marks

0 9 . 2 Name **two** bones found at the elbow.

[2 marks]

Marks for this question AO1 = 2

Award **one** mark for each of the following points up to a maximum of **two** marks.

- Humerus (1)
- Radius (1)
- Ulna (1)

Maximum 2 marks

0 9 . 3 Name the type of synovial joint at the elbow.

[1 mark]

Marks for this question AO1 = 1

Award **one** mark for naming the type of synovial joint at the elbow.

- Hinge joint (1)
- Hinge (1)

Maximum 1 mark

0 9 . 4 Name **three** structures of a synovial joint that help to prevent injury.

[3 marks]

Marks for this question AO1 = 3

Award **one** mark for each of the following up to a maximum of **three** marks.

- Synovial membrane (1)
- Synovial fluid (1)
- Joint capsule (1)
- Bursae (1)
- Cartilage (1)
- Ligaments (1)

Maximum 3 marks

1 0 Michael is starting a 12-week training programme.

1 0 . 1 State **four** reasons why Michael should test his levels of fitness **before** starting his 12-week training programme.

[4 marks]

Marks for this question AO1 = 4

Award **one** mark for each of the following up to a maximum of **four** marks.

- To identify his strengths and weaknesses (1)
- To show his starting level of fitness (1)
- To inform his training requirements (1)
- To compare him against norms of a group/national averages (1)
- To motivate him (1)
- To set goals/targets (1)
- To help with the monitoring of his improvement (1)
- To provide variety to his training programme (1)

Accept any other suitable response.

Maximum 4 marks

1 0 . 2 Identify **four** long-term effects of exercise.

[4 marks]

Marks for this question AO1 = 4

Award **one** mark for each of the following up to a maximum of **four** marks.

- Body shape may change (1)
- Build muscle strength (1)
- Improve muscular endurance (1)
- Improve speed (1)
- Improve suppleness (1)
- Build cardiovascular endurance (1)
- Improve stamina (1)
- Increase in the size of the heart (hypertrophy) (1)
- Lower resting heart rate (bradycardia) (1)
- Decrease risk of heart attack/or equivalent (1)
- Decrease levels of anxiety or stress (1)

Accept any other suitable response.

Maximum 4 marks

1 0 . 3 Explain how Michael would apply the FITT principle to bring about an improvement in his fitness levels.

[3 marks]

Marks for this question AO2 = 3

Award **one** mark for each of the following up to a maximum of **three** marks.

- Frequency – Michael could increase the number of training sessions eg from two to three times per week (1)
- Intensity – Michael could increase the intensity of his training eg by training with a heavier weight, running faster or equivalent (1)
- Time – Michael could increase the time he trains eg from 20 to 30 minutes (1)
- Type – Michael could change the type of training from one training type to another eg from continuous to interval training (1)

NB Do not credit components of FITT without application to how they bring about improvements in Michael's fitness levels.

Maximum 3 marks

1 0 . 4 State **two** parts that Michael should include in a warm up before a training session.

[2 marks]

Marks for this question AO1 = 2

Award **one** mark for each of the following up to a maximum of **two** marks.

- Gradual pulse-raising activity (1)
- Stretching (1)
- Skill based practices (1)
- Mental preparation (1)

Maximum 2 marks

1 0 . 5 Explain **four** reasons why Michael should warm up before taking part in a training session.

[4 marks]

Marks for this question AO3 = 4

Award **one** mark for each of the following up to a maximum of **four** marks.

- It raises body temperature to increase elasticity of muscles to help prevent pulled, strained or torn muscles (1)
- Muscle efficiency is increased and a more intense muscle contraction can be achieved which will improve his performance (1)
- It increases blood flow to his working muscles, allowing more oxygen to be distributed helping with the production of energy (1)
- A gradual increase in his heart rate allowing increased oxygen intake to enable the muscles to work efficiently reducing fatigue (1)
- It triggers metabolic changes to make more fats and carbohydrates available for energy production (1)
- It stimulates his central nervous system to improve coordination, reaction time and quicker movements (1)
- His body adapts to the environmental surroundings enabling him to be better prepared for his training session (1)
- It gives him a more positive attitude towards exercising, which leads to higher levels of motivation or focus (1)

Accept any other suitable response.

Maximum 4 marks

1 1 . 1 Define circumduction.

Use an example of a sporting action in your answer.

[2 marks]

Marks for this question AO1 = 1, AO2 = 1

Award **one** mark for a definition and **one** further mark for an example.

AO1 (sub-max 1 mark)

- Turning or circular motion around a joint (which occurs in more than one plane) (1)

NB Do not accept definitions for rotation.

AO2 (sub-max 1 mark)

- Performing a serve in tennis (1)
- Bowling a cricket ball (1)
- Backstroke swimming (1)

Maximum 2 marks

1 1 . 2 Name the **type** of joint where circumduction can take place.

[1 mark]

Marks for this question AO1 = 1

Award **one** mark for naming the type of joint where circumduction can take place.

- Ball and socket joint (1)
- Ball and socket (1)

Maximum 1 mark

1 2 . 1 What is the role of the valves in the veins?

[1 mark]

Marks for this question AO1 = 1

Award **one** mark for stating the role of the valves in the veins.

- To prevent blood flowing backward (1)

Maximum 1 mark

1 2 . 2 Identify **two** features of the structure of arteries. Explain how each feature helps the arteries to perform their function.

[4 marks]

Marks for this question AO1 = 2, AO2 = 2

Award up to **one** mark for each feature and a further **two** marks for their functions.

Feature AO1 (sub-max 2 marks)

- Small lumen (1)
- Thick muscular walls (1)

Function AO2 (sub-max 2 marks)

- Small lumen allows blood to travel quickly away from the heart (1)
- Thick muscular walls allow blood to travel under high pressure (1)

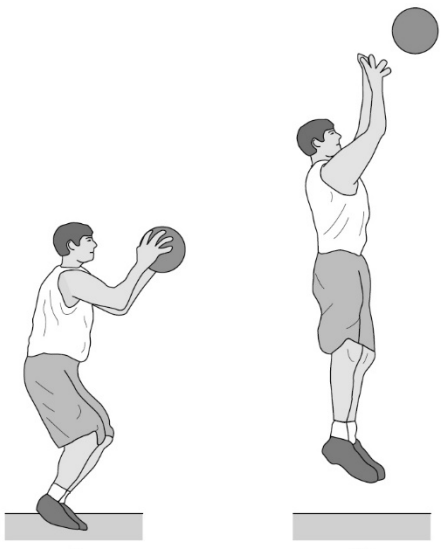
NB No feature = 0 marks

Maximum 4 marks

1 3 **Figure 3** shows a basketball player in two different positions (**A** and **B**) as they perform the jump shot.

Use **Figure 3** to help you answer **Questions 13.1** to **13.3**.

Figure 3



1 3 . 1 Identify the joint action taking place at the **knee** as the basketball player moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the joint action taking place at the **knee** as the basketball player moves from **A** to **B**.

- Extension (1)

Maximum 1 mark

1 3 . 2 Identify the main agonist at the **knee** as the basketball player moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the main agonist at the **knee** as the basketball player moves from **A** to **B**.

- Quadriceps (1)

NB Do not accept quads.

Maximum 1 mark

1 3 . 3 Identify the type of muscle contraction that is taking place at the **knee** as the basketball player moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the type of muscle contraction that is taking place at the **knee** as the basketball player moves from **A** to **B**.

- Concentric (1)

Maximum 1 mark

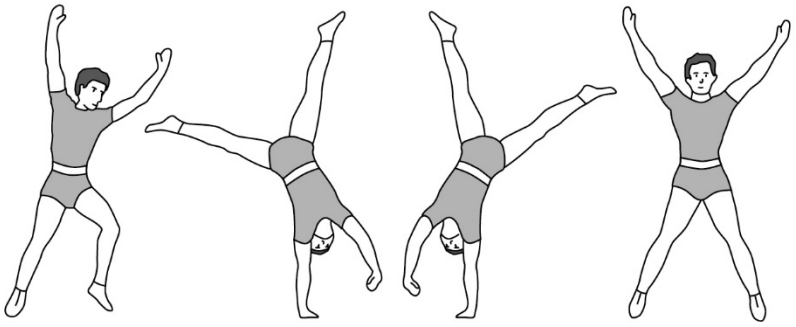
1	4

Figure 4 shows a gymnast performing a cartwheel.

Identify the plane and axis when the gymnast in **Figure 4** is performing a cartwheel.

[2 marks]

Figure 4



Marks for this question AO2 = 2

Award **one** mark for identifying the plane and **one** mark for identifying the axis when the gymnast in **Figure 4** is performing a cartwheel.

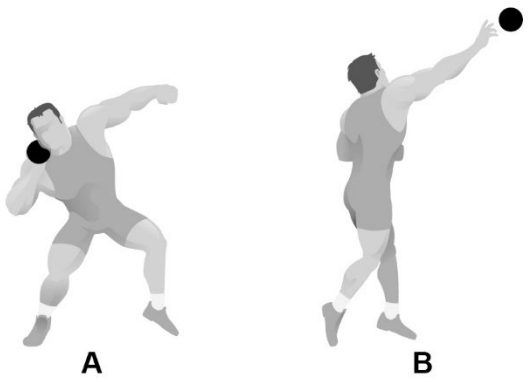
- Plane Frontal (1)
- Axis Sagittal (1)

Maximum 2 marks

1	5

Figure 5 shows a shot putter in two different positions (**A** and **B**) as they release the shot.

Figure 5



1 5 . 1 Identify the class of lever used at the **elbow** as it moves from **A** to **B**.

[1 mark]

Marks for this question AO2 = 1

Award **one** mark for identifying the type of lever used at the elbow as it moves from **A** to **B**.

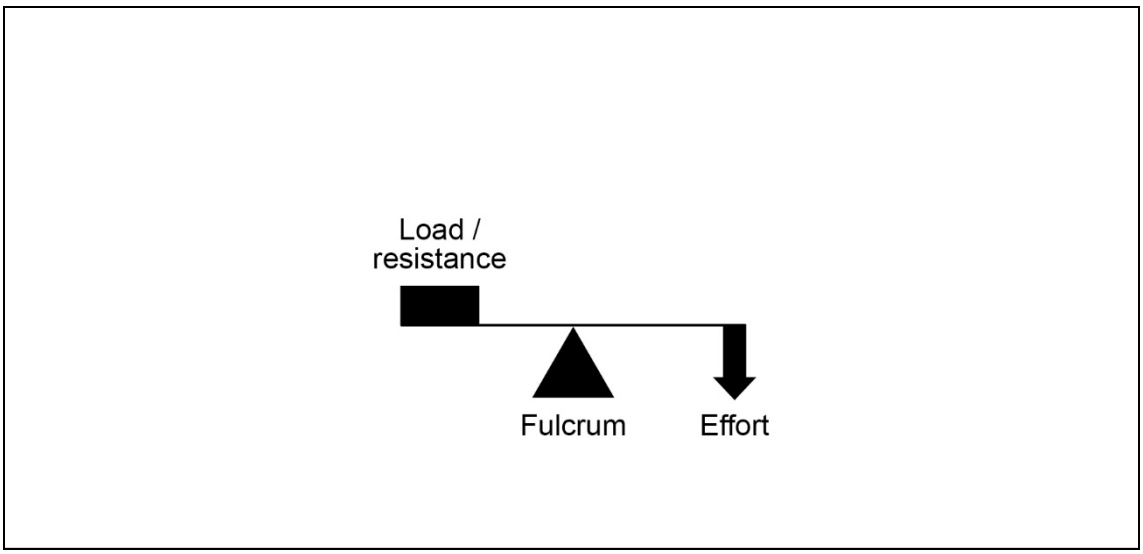
- First class lever (1)

Maximum 1 mark

1 5 . 2 Draw a fully labelled diagram to show the class of lever identified in **Question 15.1**.

[2 marks]

Marks for this question AO2 = 2



Award **one** mark for each of the following

- A correctly drawn diagram (1) – arrows pointing the correct direction, resistance above the line, fulcrum below the line, effort above or below the line.
- A correctly labelled diagram (1) – accept resistance instead of load and R/L F and E.

NB Do not award marks for drawing a first-class lever if they do not identify it in **Question 15.1**.

Maximum 2 marks

1	6	Justify the importance of speed **and** flexibility for a footballer. **[6 marks]**

Marks for this question: AO1 = 1, AO2 = 2, AO3 = 3

Level	Marks	Description
3	5–6	Knowledge of speed and flexibility is accurate and generally well detailed. Application to a footballer is mostly appropriate, clear and effective. Justification is thorough, reaching valid and well-reasoned conclusions as to the effectiveness for both components of fitness. The answer is generally clear, coherent and focused, with appropriate use of terminology throughout.
2	3–4	Knowledge of speed and flexibility is evident but is more detailed for one than the other. There is some appropriate and effective application to footballers, although not always balanced and presented with clarity. Any justification is clear but reaches valid and well-reasoned conclusions for one component of fitness more than the other. The answer lacks coherence in places, although terminology is used appropriately on occasions.
1	1–2	Knowledge of speed and flexibility is limited. Application to footballers is either absent or inappropriate. Justification is poorly focused or absent, with few or no reasoned conclusions for either component of fitness. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
0	0	No relevant content.

Possible content may include:

AO1 – Knowledge of speed and flexibility eg
- Speed – the maximum rate at which an individual is able to perform a movement or cover a distance in a period of time, putting the body parts into action as quickly as possible.
- Flexibility – the range of movements possible at a joint.

AO2 – Application to a footballer eg
- A footballer requires speed to enable them to beat the opposition to the ball or space.
- A footballer requires speed to enable them to cover or get into space quickly.
- A footballer requires flexibility to help prevent injuries.
- A footballer requires flexibility to exert more power through the ball.
- A footballer requires flexibility to stretch for the ball.
- A footballer requires flexibility to make effective tackles.

AO3 – Justification of the importance of speed and flexibility for a footballer, eg

Speed
- Speed is important for defenders to stop attackers running past them to the ball or to get into space.
- Speed is important for attackers when either running into space or dribbling the ball to gain an advantage over the defensive team.

- Short distance speed (5–10 metres) is vital in closing down the opposition or quickly getting away from an opposition player.
- Speed is vital if a team wishes to play counter attacking football, enabling them to make a fast break against a broken defence.

Flexibility

- Flexibility is the ability to use power through the full range of motion of a joint, therefore a footballer will be able to exert more force through the ball.
- They will be able to kick the ball further to clear their defence, make long cross field passes, play the ball up front by-passing the midfield.
- They will be able to kick the ball with more power which will allow them to take long shots at goal, with more force increasing the chances of scoring.
- Flexibility will enable a footballer to stretch further, increasing the chances of winning the ball in a lunge or slide tackle.
- Flexibility will enable a footballer to have a greater range of movement at a joint therefore they may be able to have a better technique when performing skills such as the overhead kick.
- Flexibility will allow the goalkeeper to stretch further and increase their chances of saving a shot.
- Flexibility will assist in the prevention of injury as the muscles are more elastic and less likely to pull or tear.
- Flexibility increases mobility and decreases the stiffness in muscles and tendons helping to reduce post-exercise stiffness.
- Flexibility helps increase stride length enabling a footballer to run quicker.

Credit other suitable responses relevant to the question.

Maximum 6 marks

1	7	Analyse how **both** aerobic **and** anaerobic exercise can be used in interval training to help improve performance in a team game. **[9 marks]**

Marks for this question: AO1 = 2, AO2 = 2, AO3 = 5

Level	Mark	Descriptor
3	7–9	Knowledge of aerobic and anaerobic exercise, and interval training is accurate and generally well detailed. Application to a team game is mostly appropriate, clear and effective. Analysis is thorough, reaching valid and well-reasoned conclusions about how both aerobic and anaerobic exercise can be used in interval training to help improve performance. The answer is generally clear, coherent and focused, with appropriate use of terminology throughout.
2	4–6	Knowledge of aerobic and anaerobic exercise, and interval training is evident but is more detailed for one than the other. There is some appropriate and effective application to a team game, although not always presented with clarity. Any analysis is clear but reaches valid and well-reasoned conclusions for some points more than others. The answer lacks coherence in places, although terminology is used appropriately on occasions.
1	1–3	Knowledge of aerobic and anaerobic exercise, and interval training is limited. Application to a team game is either absent or inappropriate. Analysis is poorly focused or absent, with few or no reasoned conclusions. The answer as a whole lacks clarity and has inaccuracies. Terminology is either absent or inappropriately used.
0	0	No relevant content.

Possible content may include:

AO1 – Knowledge of aerobic and anaerobic exercise and interval training eg

- Aerobic – with oxygen. When exercise is not too fast and is steady, the heart and lungs can supply all the oxygen that the working muscles need.
- Glucose + oxygen -> energy + carbon dioxide + water.
- It is used over longer periods of time.
- Anaerobic – without oxygen. When exercise duration is short and at high intensity, the heart and lungs cannot supply blood and oxygen to muscles as fast as the respiring cells need them.
- Glucose -> energy + lactic acid.
- It is used over shorter periods of time.
- Interval training – periods of training/work that are followed by periods of rest, eg work, rest, work, rest.
- Interval training can be altered to meet specific fitness demands.

AO2 – Application to a team game eg

- Team games involve periods of work and rest therefore interval training is a very appropriate method of training for a team player.
- Interval training can be altered to different team games by altering the time working and the time resting.

- Interval training can also be altered by changing the intensity of the work and making it sports specific.
- Team games involve different intensities of exercise therefore both the aerobic and anaerobic zones are used throughout the duration of the games.

AO3 Analysis of how aerobic and anaerobic exercise can be used in interval training to help improve performance in a team game eg

Aerobic

- Games are usually of a long duration and the aerobic system is used for low to moderate intensity work including jogging into position and walking between phases of play.
- Interval training can be tailored by working for long periods of time (1 minute +) at a moderate intensity to replicate the game duration and intensity eg run at a moderate pace for 3 minutes and rest for 60 seconds and repeat 5 ×.
- Different interval work methods can be used to create variety or to make the training specific to an activity. These may include hill repeats, stair running, plyometrics, ladders, circuit training etc.
- Interval training can be adapted to replicate the different situations in a variety of games.
- The aerobic system in activities such as football, hockey and basketball is used as part of the recovery process from high intensity anaerobic work.
- This will supply energy and help the performer to remove lactic acid from the muscles.
- This reduces fatigue and enables the team player to perform for both longer periods of time and recover for the next burst of intensive exercise.
- If a team player has a developed aerobic system they will be able to work for longer periods of time therefore improving their performance eg repeatedly jogging into position or sustaining long rallies.

Anaerobic

- Most team players employ the anaerobic system throughout the game eg sprinting or dribbling in football, vertical jumping in basketball or sprinting to get into position in netball.
- Interval training will be varied and will replicate the demands of the game eg high intensity interval training (HITT) for up to 1 minute. This may be sprinting for 10 seconds with 30 seconds rest 10 ×.
- Team players will then be using or training the anaerobic energy system. This produces lactic acid as a waste product and can only be used for short intervals in time.
- After HITT such as sprinting in a team game, the performer will have to revert to the aerobic system to help remove lactic acid and pay back any oxygen debt.
- If a team player has a developed anaerobic system they will be able to work with more intensity for longer therefore improving their performance eg repeatedly make fast breaks, track player's runs or continually jump in volleyball and basketball.
- Tedium and boredom may be prevented by altering or manipulating the demands on the anaerobic or aerobic system.
- Team games have different requirements so a more suitable method of training may be more appropriate eg continuous training to improve the cardiovascular system.
- Not all team games require HITT as they are not used in a game situation eg volleyball setter.

Credit other suitable responses relevant to the question.

Maximum 9 marks

Question	AO1	AO2	AO3
1	1		
2	1		
3	1		
4	1		
5	1		
6.1	1	1	
6.2			4
7.1		2	
7.2		1	
7.3			2
7.4	1	3	
8.1		1	
8.2			1
9.1	2		
9.2	2		
9.3	1		
9.4	3		
11.1	4		
11.2	4		
10.3		3	
10.4	2		
10.5			4
11.1	1	1	
11.2	1		
12.1	1		
12.2	2	2	
13.1		1	
13.2		1	
13.3		1	
14		2	
15.1		1	
15.2		2	
16	1	2	3
17	2	2	5
Total	**33**	**26**	**19**