



Rewarding Learning

ADVANCED
General Certificate of Education
2025

**Sports Science and the
Active Leisure Industry**

Unit A2 2

The Application of Science
to Sports Performance

[AAL21]

FRIDAY 23 MAY, AFTERNOON

**MARK
SCHEME**

General Marking Instructions

Introduction

Mark schemes are intended to ensure that the GCE examinations are marked consistently and fairly. The mark schemes provide markers with an indication of the nature and range of candidates' responses likely to be worthy of credit. They also set out the criteria which they should apply in allocating marks to candidates' responses.

Assessment objectives

Below are the assessment objectives for GCE Sports Science and the Active Leisure Industry.

Candidates must:

- demonstrate knowledge and understanding of sports science and the active leisure industry (AO1);
- apply knowledge, understanding and skills through different contexts appropriate to sports science and the active leisure industry (AO2); and
- analyse and evaluate evidence to make reasoned and valid judgements about sports science and the active leisure industry (AO3).

Quality of candidates' responses

In marking the examination papers, examiners should be looking for a quality of response reflecting the level of maturity which may reasonably be expected of a 17-year-old or 18-year-old which is the age at which the majority of candidates sit their GCE examinations.

Flexibility in marking

Mark schemes are not intended to be totally prescriptive. No mark scheme can cover all the responses which candidates may produce. In the event of unanticipated answers, examiners are expected to use their professional judgement to assess the validity of answers. If an answer is particularly problematic, then examiners should seek the guidance of the Supervising Examiner.

Positive marking

Examiners are encouraged to be positive in their marking, giving appropriate credit for what candidates know, understand and can do rather than penalising candidates for errors or omissions. Examiners should make use of the whole of the available mark range for any particular question and be prepared to award full marks for a response which is as good as might reasonably be expected of a 17-year-old or 18-year-old GCE candidate.

Awarding zero marks

Marks should only be awarded for valid responses and no marks should be awarded for an answer which is completely incorrect or inappropriate.

Types of mark schemes

Mark schemes for tasks or questions which require candidates to respond in extended written form are marked on the basis of levels of response which take account of the quality of written communication.

Other questions which require only short answers are marked on a point for point basis with marks awarded for each valid piece of information provided.

Levels of response

Tasks and questions requiring candidates to respond in extended writing are marked in terms of levels of response. In deciding which level of response to award, examiners should look for 'best fit' bearing in mind that weakness in one area may be compensated by strength in another. In deciding which mark within a particular level to award to any response, examiners are expected to use their professional judgement.

Quality of written communication

Quality of written communication is taken into account in assessing candidates' responses to all tasks and questions that require them to respond in extended written form. These tasks and questions are marked on the basis of levels of response. The description for each level of response includes reference to the quality of written communication.

For conciseness, quality of written communication is distinguished within levels of response. An example follows:

Level 1: Quality of written communication is basic.

Level 2: Quality of written communication is good.

Level 3: Quality of written communication is excellent.

In interpreting these level descriptions, an example is provided below. Examiners should refer to the specific guidance given within the mark scheme for each question:

Band 1 (Basic): The candidate makes only a limited selection and use of an appropriate form and style of writing. The organisation of material will lack clarity and coherence. There is little use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Band 2 (Good): The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with clarity and coherence. There is some use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning clear.

Band 3 (Excellent): The candidate successfully selects and uses the most appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is widespread and accurate use of appropriate specialist vocabulary. Presentation, spelling, punctuation and grammar are of a sufficiently high standard to make meaning clear.

1 (a) Some examples of suitable points to be explained by the candidate:**(i)** Vasodilation:

- The automatic opening up of blood vessels to active muscle tissue.
- During exercise blood is redistributed to the muscles.
- Vasomotor control diverts blood to the skeletal muscle tissue where it is needed.
- Vasomotor control stimulates nerves in the muscle walls of arteries and arterioles resulting in vasodilation of blood vessels, increases blood flow to active skeletal muscle.
- This aids performance during exercise as blood flow increases to the working muscles. Oxygen facilitates energy production and the performer can work for longer.
- The vascular shunt mechanism uses vasodilation to redistribute blood flow to where it is most needed during exercise.

Award [1] for brief definition. Award [2] for full definition.

All other valid points will be given credit.

(1 × [2])

(AO1, AO2)

[2]

(ii) Vasoconstriction:

- The constriction of blood vessels to non-active tissue as a response to an increase in exercise.
- During exercise blood is redistributed away from the organs (stomach, kidney, liver) where the majority of blood is at rest.
- Vasomotor control inhibits nerves in the muscle walls of arteries/arterioles resulting on vasoconstriction of blood vessels ; reducing blood flow to non-active tissue.
- The vascular shunt mechanism uses vasodilation to redistribute blood flow away from non-active tissue.

Award [1] for key phrase and up to [2] for full description.

All other valid points will be given credit.

(1 × [2])

(AO1, AO2)

[2]

(b) Some examples of suitable points to be explained by the candidate:**(i)** Haemoglobin:

- Red blood cells contain an iron rich protein called Haemoglobin (Hb).
- Haemoglobin carries oxygen in the red blood cells around the body.
- Haemoglobin combines with oxygen to form oxyhaemoglobin.
- Each haemoglobin molecule can carry four oxygen molecules.

Award [1] for the key phrase and up to [2] for the full explanation.

All other valid points will be given credit.

1 × [2]

(AO2)

[2]

(ii) Myoglobin:

- Myoglobin (Mb) is an oxygen-binding protein located primarily in the muscles.
- It functions as an oxygen-storage unit, providing oxygen to the working muscles.
- Myoglobin can store one molecule of oxygen.

Award [1] for the key phrase and up to [2] for the full explanation.
All other valid points will be given credit.

1 × [2]

(AO2)

[2]

(c) Some examples of suitable points to be explained by the candidate:

- Altitude is the measurement of elevation, altitude training takes place around 2000m–3000m above sea level.
- To compensate for the decrease in oxygen, the athlete's body produces erythropoietin/EPO naturally.
- EPO triggers the production of more red blood cells.
- There is an increased concentration of haemoglobin in the blood therefore blood can carry more oxygen.
- There is an increased concentration of myoglobin in the muscle therefore the muscles are more efficient at using oxygen to supply energy.
- Increased mitochondria and capillarisation increases the efficiency of the aerobic energy system.
- Enhanced oxygen transport overcomes oxygen debt.
- Increased tolerance to lactic acid/delayed OBLA, reducing fatigue.
- High altitude training will increase VO_2 max and improve endurance.

Award [1] for key phrase and up to [2] for full description.

All other valid points will be given credit.

(2 × [2])

(AO2)

[4]

12

2 (a) (i)(ii)

Some examples of suitable points to be explained by the candidate:

Transfer of learning means the influence one skill has on the learning and performance of another. The process is extremely important in the acquisition of movement skills because practically all learning is based on some form of transfer.

Positive transfer:

- Positive transfer occurs when the knowledge and performance of one skill will help the learning of a new skill.
- Positive transfer tends to occur when the skills have a similar shape or form, e.g. overarm throwing technique for javelin and shoulder pass in netball.
- There must be similarity in the structure of the skill components.
- Positive transfer can be enhanced if these similar elements are shown to learners. Learning situations need to allow for positive transfer. Variability of practice, such as two-touch football, would create the conditions experienced in a real game and help improve passing skills.
- The environmental conditions need to be similar to the real situation. For example, passing skills in hockey should for the most part be practiced in a changing environment.

Bilateral transfer:

- Bilateral transfer occurs when learning and performance is transferred from one side of the body to the other. For example, when a basketball player who can do a lay up with the right hand learns to do it with the left hand.
- Bilateral transfer will enhance performance as it makes performers more versatile, e.g. a soccer player learns to strike with their right and then their left foot.

Retroactive transfer:

- Retroactive transfer occurs when a newly learned skill influences a previously learned skill.
- This can be positive as skills overlap in many sports, e.g. jump to catch a high ball in gaelic football enhances rebound skills in basketball.

Award [1] for identification of method and up to [2] for full description.

All other valid points will be given credit.

(2 × [3])

(AO1, AO2)

[6]

(b) Some examples of suitable points to be explained by the candidate:

(i) Closed skills:

- Closed skills are not affected by the environment.
- They are usually self-paced and occur in fixed or predictable situations.
- The same technique is used each time.
- Suitable sporting examples include a gymnastics routine or a dive.

(ii) Fine skills:

- Fine skills involve small muscle movements.
- They involve precise movements and generally involve high levels of hand eye co-ordination.
- Suitable sporting examples include a snooker shot or a darts throw.

(iii) Externally-paced skills:

- The timing of externally-paced skills are controlled by the environment.
- They include a decision and a reaction/stimulus and a response.
- These skills tend to be near the open end of the environmental continuum.
- Suitable sporting examples include a defender in soccer closing down a forward forcing the forward to shoot or pass or a tennis opponent lobbing the ball forcing the tennis player to run to back of the court to return.

Award [1] for key phrase and up to [2] for full description with example.
All other valid points will be given credit.

(3 × [2])

(AO2)

[6]

AVAILABLE
MARKS

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3 (a) Some examples of suitable points to be identified by the candidate:

- Cognitive
- Perceptual
- Motor
- Psychomotor

Award [1] for the identification of each type of skill.

All other valid points will be given credit.

(3 × [1])

(AO1)

[3]

(b) Some examples of suitable points to be explained by the candidate:

- Extrinsic motivation is the direction and intensity of one's effort coming from sources outside an individual.
- A coach can aim to extrinsically motivate a young performer by giving tangible rewards
- Tangible rewards are physical incentives such as trophies, medals and certificates given to recognise and motivate young athletes.
- A coach can aim to extrinsically motivate a young performer by giving intangible rewards
- Intangible rewards are non-physical motivations that drive young athletes, such as praise, recognition and approval of effort.
- Communication is key to maintaining motivation. Team selection and levels of performance may vary as the season progresses which will have an impact on the athlete's motivation. Coaches must use feedback to communicate clearly with players to continue their level of effort despite not being selected.
- Awarding tangible and intangible rewards can boost a young athlete's self-esteem and provide encouragement to maximise performance
- Extrinsic motivation focuses on performance outcomes by winning the game or performing at an exceptional level.
- Setting goals can motivate an individual to perform better.
- A coach may set short term or long term goals (performance, outcome or process) to focus a young athlete
- Goal setting should follow the SMARTER principle.

Award [1] for definition and up to [4] for full outline.

All other valid points will be given credit.

(AO1, AO3)

[5]

(c) **The quality of written communication is assessed in this question.**

Indicative content:

Command style:

- This is a didactic style where the teacher makes all the decisions.
- Instructions and objectives are clear.
- Control and discipline are maintained.
- Information can be given quickly if time is limited.
- Large groups can be catered for easily.
- No decision making or input from the learner.
- Possible lack of understanding.
- Limited social interaction with teachers or other learners.
- Limited individual feedback is given.
- Appropriate for cognitive stage of learning

Reciprocal style:

- Appropriate for associative/autonomous stage of learning
- Performers work in pairs and take turns observing and giving feedback to each other based on established performance criteria.
- Encourages active involvement and interaction of performers.
- Develops communication and decision making skills.
- Coach has less control than command styles.
- Relies on learner's standard of knowledge and ability to communicate.
- This style can be more time consuming to plan and manage effectively.
- Promotes listening skills.

Problem solving:

- Coach sets a problem/challenge and the learner devises a suitable solution.
- It is an open-ended approach, encouraging creativity while developing the cognitive and performance element of the learner.
- There is no correct outcome, time is not a restriction and the performers are experienced.
- Performers draw on their acquired knowledge.
- Encourages creativity and decision making skills.
- Development of the learner's responsibility for their own learning.
- Increased motivation and self-confidence.
- Appropriate for the associative/autonomous stage of learning

Other acceptable styles: practice, guided discovery

All other valid points will be given credit.

Level 1 ([1]–[3])

Overall impression: Basic

- Basic knowledge and understanding of how a range of teaching styles can be used to maximise performance in sport. The candidate may provide basic examples.
- Demonstrates a basic ability to discuss the range of teaching styles used to enhance athlete performance. The candidate may provide limited relevant examples relating to how a coach can use methods to enhance learning and performance in sport.
- Quality of written communication is basic. The candidates make a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 ([4]–[6])

Overall impression: Good

- Good knowledge and understanding of how a range of teaching styles can be used to maximise performance in sport. The candidates will give some relevant examples.
- Demonstrates a good ability to discuss the range of teaching styles used to enhance athlete performance. Candidates will provide some relevant explanations of the methods used by the coach to enhance athletic performance.
- Quality of written communication is good. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is appropriate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([7]–[8])

Overall impression: Excellent

- Excellent knowledge and understanding of how a range of teaching styles can be used to maximise performance in sport. The candidate will provide fully developed examples and show excellent understanding of each one.
- Demonstrates an excellent ability to discuss the range of teaching styles used used to enhance athlete performance. Candidates will be able to discuss to an excellent level and elaborate with thorough explanation.
- Quality of written communication is excellent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is an extensive and accurate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[0] is awarded for a response not worthy of credit.
(AO1, AO3)

[8]

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MARKS

4 (a) Some examples of suitable points to be explained by the candidate:

- (i) Extension of the shoulder:
 Definition: Movement of the arm posteriorly/backward in the sagittal plane.
 Type of joint: Ball and socket.
 Articulating bones: scapula and humerus.
 Agonist: Deltoid.
- (ii) Flexion of the elbow:
 Definition: Bending of the elbow when forearm moves towards the shoulder.
 Type of joint: Hinge
 Articulating bones: Humerus, ulna and radius.
 Agonist: Biceps brachii
- (iii) Hyperextension of the spine:
 Definition: Bending the spine backwards beyond normal range of motion.
 Type of joint: Cartilaginous
 Articulating bones: vertebrae
 Agonist: Erector Spinae

Award [1] for the definition, type of joint, articulating bones and the agonist of each movement pattern.

All other valid points will be given credit.

(3 × [4])

(AO1, AO2)

[12]

(b) (i) Some examples of suitable points to be explained by the candidate:

- Type I – Slow oxidative/slow twitch.
- Type IIa – Fast oxidative/fast twitch.
- Type IIb- Fast Glycolytic/fast twitch.

Award [1] for identification of each fibre type.

All other valid points will be given credit.

(2 × [1])

(AO1)

[2]

(ii) **The quality of written communication is assessed in this question.**

Indicative Content:

- Impact exercise will stimulate calcium deposition and result in increased bone density. Stronger bones are less prone to fracture or injury.
- Increased stability of joints to prevent dislocations through strengthened ligaments, tendons and muscles.
- Increased volume and thickness of cartilage will enhance it's ability to withstand impact and absorb shock.
- Increased muscle tone improves posture.
- Hypertrophy of muscle increases maximal and dynamic muscle strength.
- Increased speed and power of muscular contraction as a result of high intensity training.
- A stronger, leaner body (mesomorph) can perform more efficiently in contact sports than an untrained participant.

- Ligaments (fibrous tissue that connects bone to bone) become stronger and can cope with high forces and explosive movements involved in sprinting.
- Synovial fluid is circulated in joint more efficiently leading to better joint lubrication.
- Improved muscle buffering capacity to lactic acid. Allows body to tolerate lactic acid during high intensity exercise.
- Increase muscle mass will enhance phosphocreatine (PC) stores.
- Sprint training can improve the efficiency of the ATP/PC system.
- Mitochondrial density will increase within the muscle.
- Increased mitochondrial density leads to a greater capacity to generate ATP.
- Sprint training can improve the elasticity of the muscle, e.g. flexibility, mobility or plyometric exercises.
- Quicker recruitment of fast twitch muscle fibres (type IIa and type IIb). Type IIa muscle fibres can take on the characteristics of type IIb, e.g. faster contractile speed.

Discussion points:

- Overuse injuries can occur from repetitive training, e.g. shin splints
- Increased likelihood of damage to ligaments for, e.g. an anterior cruciate ligament tear is a common sporting injury.
- Increased likelihood of damage to tendons for, e.g. ruptured achilles tendon injuries have ended some sporting careers.
- Wear and tear of cartilage is common in many sports
- Muscular injuries such as pulls and tears often occur in sport, e.g. hamstring tear in soccer.

All other valid points will be given credit.

Level 1 ([1]–[4])

Overall impression: Basic

- Basic knowledge and understanding of the muscular and skeletal adaptations a sprinter will experience after undertaking a 12 week training programme. The candidate may provide basic examples.
- Demonstrates a basic ability to assess the positive and negative effects of high intensity exercise on the musculoskeletal system. The candidate may provide basic explanations but does not examine in detail. Limited practices are outlined.
- Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 ([5]–[7])

Overall impression: Good

- Good knowledge and understanding of the muscular and skeletal adaptations a sprinter will experience after undertaking a 12 week training programme. The candidate will give some relevant examples.
- Demonstrates a good ability to assess the positive and negative effects of high intensity exercise on the musculoskeletal system. The candidate will provide some explanations of the risks involved. Some practices are outlined.

- Quality of written communication is good. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is appropriate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([8]–[10])

Overall impression: Excellent

- Excellent knowledge and understanding of the muscular and skeletal adaptations a sprinter will experience after undertaking a 12 week training programme. The candidate will provide fully developed examples and shows excellent understanding.
- Demonstrates an excellent ability to the positive and negative effects of high intensity training on the musculoskeletal system. The candidate will provide thorough explanation and will use a variety of relevant examples. A number of practices are outlined.
- Quality of written communication is excellent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is an extensive and accurate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[0] is awarded for a response not worthy of credit.
(AO1, AO3)

[10]

24

5 (a) Some examples of suitable points to be explained by the candidate:

(i) Illegal performance enhancing drug:

Anabolic steroids:

- Anabolic steroids are a synthetic hormone similar to testosterone.
- Help build muscle mass for explosive events.
- Muscle hypertrophy.
- The athlete can train harder and recover quicker from high intensity sessions, enabling the athlete to get the most out of their training.
- Recovery rate of any injury is increased as anabolic steroids help the muscle repair.

Human Growth Hormone(HGH):

- HGH is a naturally occurring peptide hormone secreted by the pituitary gland.
- Recombinant HGH increases bone growth, lean body mass, organ growth and decreases fat mass.
- Improves anaerobic sprint capacity, strength and power.

Other acceptable drugs: cocaine

Award [1] for key phrase and up to [3] for full description.

All other valid points will be given credit.

(1 × [4])

(AO2)

[4]

(ii) Risks:

Anabolic Steroids:

- Increased aggression, mood swings 'roid rage'.
- Increased depression.
- Increased risk of cardiovascular complications, heart failure, valve malfunctioning.
- Male athletes can suffer testicular atrophy, reduced sperm count, infertility, baldness and breast development.
- Female athletes can suffer from growth of facial hair, unpredictable menstruation and deepening of the voice.
- High risk of hepatitis B & C and HIV from infected needles.
- Risk of kidney disease, liver disease and cancer also increased.
- Increased blood clot formation.
- Damage to athlete's reputation.
- Damage reputation of sport.
- Disqualification/ban from sport.
- Strip of medals/titles.
- Loss of financial support in form of earnings, grants, sponsorships or endorsements.

Human Growth Hormone:

- Disease in the pituitary gland.
- Swelling of hands and feet, joint pain, fluid retention and excessive sweating.
- Acromegaly (abnormal growth of the hands, face and feet)
- Breast enlargement in men.
- Bone tumours.
- Cardiovascular complications.
- Decreased life expectancy.
- Damage to athlete's reputation.
- Damage reputation of sport.
- Disqualification/ban from sport.
- Strip of medals/titles.
- Loss of financial support in form of earnings, grants, sponsorships or endorsements.

Award [1] for key phrase and up to [2] for full description.

All other valid points will be given credit.

(2 × [2])

(AO2)

[4]

(b) The quality of written communication is assessed in this question.

Indicative Content:

Gaseous exchange in the lungs:

- Gaseous exchange in the lungs is known as external respiration
- Oxygen and carbon dioxide exchange between the alveoli in the lungs and the blood capillaries that surround the alveoli.
- Gaseous exchange occurs between areas of high partial pressure and low partial pressure.
- The difference between these pressures creates a diffusion gradient.
- The partial pressure of oxygen is higher in the alveolar air compared to the partial pressure in the blood capillaries.
- Oxygen diffuses into blood capillaries at a faster rate than at rest.
- The partial pressure of carbon dioxide is higher in the blood capillaries than in the alveoli.
- Carbon dioxide diffuses from the blood capillaries into the alveoli.

Gaseous exchange in the muscles:

- Gaseous exchange in the muscles is known as internal respiration.
- Oxygen and carbon dioxide exchange between the muscle and the blood.
- Gaseous exchange occurs between areas of high partial pressure and low partial pressure.
- The difference in these pressures creates a diffusion gradient.
- Oxygen is carried in the haemoglobin of the blood.
- There is a high partial pressure of oxygen in the blood and this diffuses across to the capillaries surrounding the muscle.
- Oxygen binds with myoglobin in the muscle.
- As a waste product of exercise there is a high partial pressure of carbon dioxide in the muscle. It diffuses across into the blood which has a lower partial pressure of carbon dioxide.

All other valid points will be given credit.

Level 1 ([1]–[4])**Overall impression: Basic**

- Basic knowledge and understanding of the processes involved in gaseous exchange in the lungs and muscles during exercise. The candidate may provide basic examples.
- Demonstrates a basic ability to discuss the processes involved in gaseous exchange in the lungs and muscles during exercise. The candidate may provide basic explanations but does not examine in detail.
- Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 ([5]–[8])**Overall impression: Good**

- Good knowledge and understanding of the processes involved in gaseous exchange in the lungs and muscles during exercise. The candidate will give some relevant examples.
- Demonstrates a good ability to discuss the processes involved in gaseous exchange in the lungs and muscles during exercise. The candidate will provide some explanations.
- Quality of written communication is good. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is appropriate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([9]–[12])**Overall impression: Excellent**

- Excellent knowledge and understanding of the processes involved in gaseous exchange in the lungs and muscles during exercise. The candidate will provide fully developed examples and shows excellent understanding.
- Demonstrates an excellent ability to discuss the processes involved in gaseous exchange in the lungs and muscles during exercise. The candidate will provide thorough explanation and will use a variety of relevant examples.
- Quality of written communication is excellent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is an extensive and accurate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[0] is awarded for a response not worthy of credit.
(AO1, AO3)

[12]

(c) The quality of written communication is assessed in this question.

AVAILABLE
MARKS

Indicative Content:

Technological examples:

Hawkeye, Goal line technology, microphones, video assistant referee (VAR), television match official (TMO), microchip ball, timing systems, drug testing, clothing, footwear, nutritional and media campaigns to respect officials.

Positive:

- Use of technology by officials ensures the correct decisions are made.
- Rules can be applied fairly and consistently.
- Players are more confident in the decision making process.
- It helps officials on and off the pitch to communicate better. It provides support for officials on the field of play who may require a second opinion.
- There is less pressure on officials to make the final judgement.
- The recording of times and distance are more accurate.
- Creates excitement in a crowd when waiting for decisions to be confirmed.

Negative:

- Officials are an integral part of sport. Some sports are at risk of becoming over reliant on technology.
- Reliance on technology could undermine the official's authority and control over the game. Players are more likely to challenge official's decisions.
- Officials using technology can still be wrong. Subjective judgement is central to the role of the official.
- The technology used must be operating effectively, be accurate and have a high level of reliability.
- Stoppages in play to review calls hinder the development of momentum within a game. The use of technology in some sports can slow down the speed of the game.
- Some calls cannot be verified by a replay system. They may be 'too close to call' and sports officials must rely on their own judgement.
- Cost can limit the use of technology at different levels within a sport.
- Replay decisions can be publicly visible on large screens. This can add pressure to the decision making process.

All other valid points will be given credit.

Level 1 ([1]–[5])

Overall impression: Basic

- Basic knowledge and understanding of the advantages and disadvantages of using technology to assist officials in their decision making. The candidate may provide basic examples.
- Demonstrates a basic ability to discuss the advantages and disadvantages of using technology to assist officials in their decision making. The candidate may provide basic explanations but does not evaluate the use of technology effectively.
- Quality of written communication is basic. The candidate makes a limited selection and use of an appropriate form and style of writing. The organisation of material may lack clarity and coherence. There is little use of specialist vocabulary. Presentation, spelling, punctuation and grammar may be such that intended meaning is not clear.

Level 2 ([6]–[11])

Overall impression: Good

- Good knowledge and understanding of the advantages and disadvantages of using technology to assist officials in their decision making. The candidate will give some relevant examples.
- Demonstrates a good ability to discuss the advantages and disadvantages of using technology to assist officials in their decision making. The candidate will provide some examples and evaluate the use of technology by officials.
- Quality of written communication is good. The candidate makes a reasonable selection and use of an appropriate form and style of writing. Relevant material is organised with some clarity and coherence. There is appropriate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are sufficiently competent to make meaning evident.

Level 3 ([12]–[16])

Overall impression: Excellent

- Excellent knowledge and understanding of the advantages and disadvantages of using technology to assist officials in their decision making. The candidate will provide fully developed examples and shows excellent understanding.
- Demonstrates an excellent ability to discuss the advantages and disadvantages of using technology to assist officials in their decision making. The candidate will provide a thorough explanation and will use a variety of relevant examples.
- Quality of written communication is excellent. The candidate successfully selects and uses an appropriate form and style of writing. Relevant material is organised with a high degree of clarity and coherence. There is an extensive and accurate use of specialist vocabulary. Presentation, spelling, punctuation and grammar are of a high standard and ensure that the meaning is clear.

[0] is awarded for a response not worthy of credit.
(AO1, AO3)

[16]

36

Total

100

**AVAILABLE
MARKS**