Rewarding Learning

ADVANCED
General Certificate of Education
2015

Sports Science and the Active Leisure Industry

Unit A2 2

assessing

The Application of Science to Sports Performance

[A2LB1]

FRIDAY 29 MAY 2015, 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)** Define the term bradycardia and explain **two** structural adaptations that enable it to occur.

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

Definition:
"Bradycardia is a decreased resting heart rate/RHR below 60 bpm"

Structural:
- Cardiac muscle hypertrophy
- If no increase in cellular size/demand for oxygenated blood
- Increased vascularisation
- Dimensions of atria and ventricles increase (left ventricle 15%–20%).

Award [1] mark for key definition and up to [3] marks for the full explanation.
All other valid points will be given credit
(AO1, AO2) [4]

(b) Identify **two** functional adaptations to the cardiovascular system as a result of both aerobic and anaerobic training.

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

(i) Aerobic training:
- Lowering resting heart rate, heart has to pump less times, more efficient
- Increased stroke volume due to increase in size of heart
- Increased End Diastolic Volume
- Decreased End Systolic Volume
- Increased vascular elasticity
- Increased vascular shunting
- Increased venous return during exercise
- Increased strength of ventricular contractions
- Increased efficiency of O_2 to working muscles/increased VO_2 Max
- Recovery period, following maximal exercise, heart rate will decrease more rapidly
- Elevation of lactate threshold.

(ii) Anaerobic training:
- Stronger ventricular contractions
- Decreased End Systolic Volume
- Increased cardiac output during exercise.

Award up to [2] marks for identification for aerobic training.
Award up to [2] marks for identification for anaerobic training.
All other valid points will be given credit.
(2 × [2])
(AO1) [4]

(c) Identify **two** adaptations to the muscular system and **two** adaptations to the skeletal system of an athlete as a result of prolonged aerobic training.

AVAILABLE MARKS

Any **two** from muscular adaptations and any **two** from skeletal adaptations:

(i) Muscular adaptations:
- Increase in type I characteristics
- Capillarisation within muscles
- Increased ability to utilise O_2
- Increase in myoglobin in the muscle
- Increase in mitochondria size/density in the muscle
- Increase in enzyme efficiency
- Increase in localized muscular endurance
- Decrease in subcutaneous fat levels, increase in lean muscle mass
- Potential to store greater levels of muscle glycogen
- Muscles become more resistant to fatigue
- Type II fibres take on type I characteristics.

(ii) Skeletal adaptations:
- Increase in bone density
- Increase in ligament strength/elasticity, they stretch slightly to allow a greater range of movement
- Increase in tendon strength/elasticity, tendons thicken and can withstand greater force
- Increased production of synovial fluid
- Increased thickness of articular cartilage
- Damage to joint/structure
- Skeletal tissue becomes stronger, exercise imposes stress on bone which reinforces the criss-cross matrix and improves the tensile stress of the bone.

Award up to [2] marks for identification of muscular adaptations.
Award up to [2] marks for identification of skeletal adaptations.
All other valid points will be given credit.
(2 × [2])
(AO1) [4]

12

AVAILABLE MARKS

2 **(a)** Skeletal muscle fibres are not all uniform, they can differ in both structure and function.

Identify the **three** types of skeletal muscle fibres and describe the structural characteristics that enable these muscle fibres to work during different sporting activities.

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

Slow twitch fibres/type 1/slow oxidative fibre
- Red in colour, small in diameter
- Good at working with oxygen
- Bigger and a higher number of mitochondria
- Increased level of myoglobin
- Significant capilaristion/increased capillary density
- Slowest nerve transmission
- Increased levels of triglyceride
- Increased levels of oxidative enzymes
- Aerobic in nature
- Resistant to fatigue
- Support sub-maximal contractions, e.g. endurance based athletes, runners, cyclists, long distance swimmers.

Type IIa/FOG/fast oxidative glycolytic
- Pinkish in colour
- Good at working with limited O_2 supplies
- Larger than type I in diameter
- Relatively vascular
- Significant quantities of myoglobin
- Less mitochondria than type I
- Higher level of lactic acid tolerance
- Intermediate rate of fatigue
- Support near maximal contractions, e.g. middle distance athletes/games players.

Type IIb/FTG
- White in colour
- Poor at working with O_2/good at working without O_2
- Large diameter
- Low levels of capilliary density
- Low levels of myoglobin
- Low levels of mitochondria
- Higher levels of PC/muscle glycogen
- Fastest nerve transmission
- Recruited last
- Alactic in nature
- Fatigues quickly
- Can generate maximal power, e.g. 100 m sprinter.

Award [1] mark for each muscle fibre type identified (3 × [1])
Award up to [2] marks for a description of the structural characteristics of each muscle fibre.
All other valid points will be given credit.
(3 × [3])
(AO1, AO2) [9]

(b) Describe **two** types of muscle contraction and explain their use in a physical sporting movement.

AVAILABLE MARKS

Any **two** from:

- **Isometric** (equal length) or static muscle contraction
- There is generally no movement resulting from this contraction
- Example – Ski squat, arm wrestling, tug-o-war

- **Isotonic** – concentric muscle contraction
- Equal control. The muscles contract at a speed controlled by the individual. This produces positive movement (shortening of length), which closely replicates the sporting situation to which the training is applied
- Speed of contraction results from muscles working in opposing pairs – agonist/antagonist – agonist shortens, antagonist lengthens to allow movement
- Example – Bicep curl: bicep is the agonist (prime mover) and the tricep is the antagonist

- **Isokinetic** – concentric muscle contraction
- The point at which the force acts or moves at a constant speed. Specialist machines are required
- Example – cybex machines, resistance adjusts to match the maximum force that can be exerted by the joint – at different angles during the flexion/extension phase

- **Polymetrics** – eccentric muscle contractions
- It has been found that if maximum effort is put into an exercise whilst a muscle is lengthening, then the muscle exerts a much bigger force. This is eccentric or negative exercise
- Examples – bounding exercise, running downhill

Award up to [2] marks for the description of the types of muscle contractions and up to [2] marks for the explanation of their use in a physical sporting movement.

All other valid points will be given credit.

(2 × [2])

(AO2) [4] 13

AVAILABLE MARKS

3 **(a)** Define the term VO_2 max and identify individual characteristics that can affect it.

Definition
"Maximum volume of oxygen that can be taken and used per minute per kg of bodyweight and measured in litres per minute per kg of body mass".

Some examples of suitable points to be examined by the candidate:
- Gender
- Age
- Fitness level
- Type of activity undertaken/Altitude training
- Percentage of Type 1 fibres
- Gaining weight/Losing weight
- Health/Asthma
- Environment.

Award [1] mark for key phrase and up to [2] marks for the identification of the factors.
All other valid points will be given credit.
(AO1) [3]

(b) Explain the physiological adaptations that will enhance an athlete's VO_2 max as a result of aerobic training.

Some examples of suitable points to be explained by the candidate:
- Improved efficiency of the cardiovascular system, increased stroke volume, increased maximal cardiac output
- Increased end diastolic volume, decreased end systolic volume
- Increased pulmonary diffusion
- Improved ability of the muscles used to utilise oxygen
- Increased rate of diffusion at the tissue
- Improved efficiency of the muscles used to regenerate energy

Award [1] mark for key phrase and up to [4] marks for a full explanation.
All other valid points will be given credit
(AO2) [4]

(c) As elite athletes prepare for major competitions, many will be seeking to maximise their impact with training sessions at high altitude.

Assess the use of altitude training as a way to improve performance in endurance events.

The quality of written communication is assessed in this question.

Indicative Content
Altitude training:
- Altitude is the measurement of elevation, approximately over 2000 m/8000 feet above sea level
- Atmospheric pressure decreases as altitude increases. This has significant implications for athletes because a fall in partial pressure can lead to a shortage of oxygen (hypoxia)
- An athlete's training programme normally includes 3 phases, acclimatisation, primary training and recovery
- The athlete's body produces erythroproietin/EPO/hEPO naturally

AVAILABLE MARKS

- The body's response to the changes at altitude occur immediately
- Simulated low oxygen environments (Hypoxic) at sea level through the use of altitude tents, hypoxic apartments and hypoxic chambers
- Best solution for athletes is to live at altitude and train at sea level, best modern approach, LHTL approach, e.g. live at 6000 m, train at 2000 m.

Perceived benefits:
- Increased number and concentration of red blood cells (haematocrit)
- Increased concentration of haemoglobin, myoglobin
- Enhanced oxygen transport
- Increased tolerance to lactic acid/delayed OBLA
- Upon returning to sea level, benefits remain approximately 6–8 weeks.

Drawbacks:
- Expensive method of training for some athletes
- Altitude sickness, dizziness, headaches, nausea
- Detraining effect, decreased availability of oxygen makes training harder, difficult to train at the same intensity, could lead to loss of fitness level
- Benefits may be lost quicker than anticipated back at sea level
- Psychological impact – boring
- Lonely living in these conditions, absence of family and friends.

All other valid points will be given credit

Above is the indicative content for this question. The level descriptions are outlined below.

Level 1 ([1]–[3])
Overall impression: Basic
- Basic knowledge and understanding of the use of altitude training as a method to improve performance in endurance events. The candidate may simply list basic examples.
- Demonstrates a basic ability to assess the method of training, limited benefits and drawbacks of altitude training are addressed. Candidates will give some explanation, with limited evaluation.
- 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 ([4]–[6])
Overall impression: Good
- Good knowledge and understanding of the use of altitude training as a method to improve performance in endurance events. The candidate may simply list relevant examples.
- Demonstrates a good ability to assess the method of training, some benefits and drawbacks of altitude training are addressed. The candidate will give some relevant 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 ([7]–[8])
Overall impression: Excellent

- Excellent knowledge and understanding of altitude training as a method to improve performance in endurance events. The candidate will include fully developed examples and show excellent understanding of each one.
- Demonstrates an excellent ability to assess the method of training, detailed benefits and drawbacks are discussed to an excellent level and elaborated using 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.

(AO3) [8]

AVAILABLE MARKS

15

AVAILABLE MARKS

4 (a) In order to develop new skills, athletes progress through a series of learning phases. Some performers progress through each stage quickly, mastering skills, while others take more time.

Identify and describe the **three** stages of learning that athletes would have to progress through before they become elite performers.

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

Cognitive Phase:
- Performances in this stage are inconsistent. They lack fluency and success is not guaranteed
- Attention is all on the skill and cannot be directed elsewhere, relevant cues must be highlighted by the coach
- Learning occurs through trial and error/lots of mistakes at this stage
- Correct performances must be reinforced through demonstration – visual guidance or through manual guidance, if appropriate
- The performer is getting to know what needs to be done
- Success rate: 2 or 3 out of 10.

Associative Phase:
- Performances in this stage are beginning to become more consistent (motor programmes are forming) though still error prone
- Some of the simpler elements are well learnt; they look fluent; and some of the spare attention is focused elsewhere on more complex or subtle cues and actions
- The performer can associate their movements with the mental picture they have of the skill
- Feedback should encourage the performer to feel what a good performance is like – kinaesthesis
- The performer should begin to detect and correct errors
- Success rate: 5–7 out of 10.

Autonomous Phase:
- Performances in the final stage are skilled, fluent, consistent and aesthetically pleasing
- Motor programmes are well learnt and stored in long-term memory; therefore reaction time is shorter
- Skills appear to be automatic as attention is focused elsewhere (e.g. on opponents, tactics, the next move or pass or shot and on employing disguise or fakes to fool opposition)
- Performers judge their own performances and make changes without external feedback from a coach
- To remain in this phase constant practice is required to keep reinforcing the motor programmes
- Success rate: 9 out of 10.

Award [1] for each stage of learning identified (3 × [1])
and up to [3] marks for an explanation of each stage of learning (3 × [3])
All other valid points will be given credit.
(AO1, AO2) [12]

AVAILABLE MARKS

(b) As a coach, it is important to be able to use a variety of teaching styles to maximise the performance of the athletes.

(i) Select **two** teaching styles a coach could use when working with athletes or teams.

- Command style
- Reciprocal style
- Discovery style
- Problem-solving style.

Award [1] mark for each teaching style selected.
AO1 [2]

(ii) Justify **when** and **why** these styles would be the most suitable for the coach.

The quality of written communication is assessed in this question.

Indicative content
Command style:

- 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
- If the coach has limited experience/lacks confidence
- Possible lack of understanding by the learner
- If the coach has a limited knowledge of the activity/skill being taught
- Little social interaction with teacher or other learners
- Limited individual feedback is given
- Little allowance for individual creativity and responsibility
- Demotivation as learner may become disengaged.

Reciprocal style:

- Instructions and objectives are clear
- Social interaction and communication skills are developed
- Learner develops some responsibility for their own learning
- Some individual feedback is received from the teacher and/or partner
- Learner develops self-confidence and motivation levels may increase
- Teacher can still maintain overall control
- May be difficult with beginners
- Learner may lack sufficient communication skills to be effective
- Learner may not be able to analyse movement and therefore provide incorrect feedback
- Difficulty in monitoring large groups to ensure they are all on-task.

Discovery style:

- Encourages creativity and decision making skills
- Development of the learner's responsibility for their own pace
- Development of a greater understanding of the task
- Increased motivation and self-confidence
- Improves communication skills and promotes groups interaction.
- Time-consuming

AVAILABLE MARKS

- Limited development if learners have poor communication skills
- Progress of large groups is difficult to monitor
- Learning is not uniform with all learners.

Problem-solving:

- Teacher sets a problem and the learner devises a suitable solution
- It is an open-ended approach, encouraging creativity while developing the cognitive and performance elements of the learner
- There is no correct outcome, time is not a restriction and the performers are experienced
- Performers draw on their acquired knowledge
- Development of the learner's responsibility for their own learning
- Increased motivation and self-confidence
- Time-consuming.

Laissez-faire:

- The coach makes few decisions. There are little organised attempt to influence or teach
- Implicit in this style is that the players take ownership and make the decisions
- Effective in situations where the players/athletes are highly skilled, motivated and capable of working on their own
- Laissez-faire leadership is not ideal for situations where the players/athletes lack knowledge or experience they need to complete tasks and make decisions
- Some players/athletes are not good at setting their own deadlines or problem solving
- Players/athletes can go off task, this can happen due to lack of guidance or feedback from the coach.

All other valid points will be given credit

Above is the indicative content for this question. The level descriptions are outlined below.

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

- Basic knowledge and understanding of the justification of the choice of teaching styles selected. The candidate may simply list basic examples.
- Demonstrates a basic ability to explain the choice of teaching style the coach could use. Candidates will give some explanation of the factors relevant to the teaching styles selected.
- 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 justification of the choice of teaching styles selected. The candidate may include a few relevant examples.
- Demonstrates a good ability to explain the choice of teaching style the coach could use. The candidate will be able to justify when and why

these styles would be most suitable and elaborate with appropriate explanation.

- 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 justification of the choice of teaching styles selected. The candidate will include fully developed examples and show excellent understanding of each one.
- Demonstrates an excellent ability to explain the choice of teaching style the coach could use. The candidate will be able to justify when and why these styles would be most suitable. The candidate will be able to discuss to an excellent level various styles used 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) [10]

AVAILABLE MARKS

24

AVAILABLE MARKS

5 **(a)** Technological developments in sport have had a massive influence on improved sporting performance.

Explain how technological developments in the following areas have had an impact on sports performance.

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

(i) Sports Clothing:

- Improvement in design and manufacturing of clothing for sport. Availability and variety of sports clothing offering a wide range to suit various sports
- Developments enhance the athlete's performance as a result of specific features, e.g. Shark suits, smart shirts, skins, speed suits. Clothing is more comfortable, breathable, waterproof, prevents heat loss, less friction
- Footwear is constantly being developed, lighter, cushioned impact, support, sport specific.

(ii) Equipment design:

- New materials have contributed to advances in sport, super light strong metals in bikes and tennis racquets, the use of fibre glass in cricket bats
- Improvements make it safer in some sports, better landing mats used in pole vaulting, high jump and gymnastics. Helmets in cycling, lighter but designed to higher safety specification
- More research into sporting movement have led to the equipment changing, along with the development of new materials, changes in the safety padding in some sports to make them lighter and more flexible.

Award [1] mark for key phrase, [2] marks for explanation and up to [4] marks for full explanation.
(2 × [4])
All other valid points will be given credit.
(AO2) [8]

(b) To gain an advantage over other competitors or players, some athletes have resorted to illegal methods of enhancing performance.

Identify an illegal method used to enhance performance. Describe how this method would help to improve an endurance athlete's performance and assess the risks associated with the use of this method.

The quality of written communication is assessed in this question.

Indicative content

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

- Blood doping, the artificial way of increasing the number of red blood cells/haemoglobin
- More haemoglobin, greater oxygen carrying capacity
- Blood doping can significantly increase VO_2 max
- Blood transfusion, using the athlete's own blood or matching blood type to someone else

AVAILABLE MARKS

- EPO (Erythopoietin) a naturally occurring hormone produced by the kidney that stimulates red cell production but taking EPO which is artificially administered/rEPO (Recombinant Erythopoietin) which is genetically engineered EPO
- Artificially raising the blood cell level and enhancing the body's oxygen carrying capacity
- Narcotic analgesics – 'pain killers' used to reduce pain and mask injury
- Narcotic analgesics – drugs used are morphine, heroin, methadone
- Possible side effects of narcotic analgesics include respiratory problems, nausea and are highly addictive.

Risks associated with taking illegal substances

- Can lead to an increased risk of heart attack/stroke/thrombosis/ pulmonary edema
- Elevating the athlete's blood pressure
- Mismatching/wrong sample of blood, dangerous for the athlete
- Increased viscosity of the blood
- Overloading the circulatory system
- Hepatitis, HIV and blood related infections
- Can lead to kidney damage and may cause infection if injected
- Mood changes, personality changes, aggression, addiction
- Increased cholesterol
- A major risk for the athlete is disqualification and titles withdrawn
- Life ban and loss of earnings, career ruined, loss of sponsorship
- Use of EPO can lead to flu-like symptoms, fever, intense fatigue, shivering, pain in the muscles and joints, making it difficult to train and can have an effect on the athlete's performance
- EPO can raise the red blood count
- Extra stress placed upon the body.

All other valid points will be given credit.

Above is the indicative content for this question. The level descriptions are outlined below.

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

- Basic knowledge and understanding of a method an endurance athlete would use and basic explanation given. The candidate may simply list basic examples.
- Demonstrates a basic ability to describe how an athlete's performance would improve as a result of using the illegal substance. The candidate will provide some examples but does not assess the risks associated with taking the illegal substance.
- 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 a method an endurance athlete would use and a relevant explanation given. The candidate may include some relevant examples.

AVAILABLE MARKS

- Demonstrates a good ability to describe how an athlete's performance would improve as a result of using the illegal substance. The candidate will be able to assess the associated risks.
- 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 a method an endurance athlete would use and provides an excellent explanation given. The candidate will include fully developed examples and show excellent understanding of the method used and the risks.
- Demonstrates an excellent ability to describe how an athlete's performance would improve as a result of using the illegal substance. The candidate will be able to describe the impact on the athlete's performance of using the illegal substance and assess the risks associated with taking the illegal drug 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, AO2, AO3) [12]

(c) Athletes and coaches are continually searching for ways to gain a competitive advantage to improve athletic performance. Pressure to win has led to performers adopting virtually any means to gain an edge, sometimes illegally.

Discuss the strategies organisations have implemented in order to counteract the use of illegal performance enhancing drugs in sport.

The quality of written communication is assessed in this question.

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

- WADA (World Anti-Doping Agency) has been set up to attempt to bring together the various international and national governing bodies to sort out the drug problem
- IOC established a medical control system responsible for drug testing since the 1968 Games
- IOC Medical Commission involves establishing all routines and the practical aspects of testing, collecting, transporting and analysis of samples in accredited laboratories and imposing bans
- IOC can legislate against what is on their banned list. The IOC have a lead role, their list is adopted by most other sports
- Publishing up-to-date lists for athletes, coaches and governing bodies. There are over 150 banned substances on the IOC's list
- Governing bodies ensuring that athletes receive much better levels of

AVAILABLE MARKS

medical support and advice
- Education programmes for coaches and athletes about the dangers of using drugs as well as about the specific rules, regulations, policies and punishments
- Random and out of season drug testing
- Recent initiatives include the "Whereabouts rule" in which the athlete nominates, in advance, one hour in every day when a random test can be organised
- The 'Athlete Passport' is an on-going collection of an individual's urine and blood profile which has so far been collected and tested during the international performance of an athlete's lifespan. Samples are stored and then made available for retro-testing when appropriate
- Use of both positive and negative role models
- Reducing the supply, links with police and customs to reduce the amount and trafficking of drugs in sport
- Reduce the demand of drugs through effective education programmes
- Review and update policies, consistently implement and apply the policies and procedures at all levels of sport.

Difficulties:
- There are huge investments in drug development that appear on the market and are used prior to appearing on the banned list of drugs. Money has been invested to use better technology for testing
- A major problem is the cost of an effective drug-testing programme both in and out of season
- Greater need for a unified governing body's policy
- IOC list differs from some world Governing bodies doping lists
- Punishment must be seen to be effective for drug abuse. There is a problem over law suits/court action after being banned
- IOC has no real power over out-of-competition testing or testing in home countries
- There are problems over the validity of testing and test procedures
- Masking agents and bridging techniques conceal possible drug abuse
- There is a lack of funding into drug control by International Sports Bodies
- The feeling is for some that if the Olympics cannot cope, then no one can
- There is a major problem associated with the narrow line between what is legal and not legal
- With the advances in technology, ethically challenged doctors and chemists continue to come up with more advanced ways of avoiding detection.

All other valid points will be given credit.

Above is the indicative content for this question. The level band descriptions are outlined below.

Level 1 ([1]–[5])
Overall impression: Basic
- Basic knowledge and understanding of the strategies that organisations use to counter act the use of illegal drugs in sport. The candidate may simply list basic examples.
- Demonstrates a basic ability to discuss the strategies implemented by organisations to combat the use of illegal drugs in sport. Candidates will

	AVAILABLE MARKS
give limited explanations of the strategies used. • 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 strategies that organisations use to counter act the use of illegal drugs in sport. The candidate may include some relevant examples. • Demonstrates a good ability to discuss the strategies implemented by organisations to combat the use of illegal drugs. The candidate will be able to discuss a variety of strategies used and elaborate with appropriate explanation. • 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 strategies that organisations use to counter act the use of illegal drugs in sport. The candidate will include fully developed examples and show excellent understanding of each one. • Demonstrates an excellent ability to discuss the strategies implemented by organisations to combat the use of illegal drugs. The candidate will be able to discuss to an excellent level various strategies used 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, AO2, AO3) [16]	36
Total	**100**