

Mark Scheme
Summer 2013

GCE Physical Education (6PE03/01)

Unit 3: Preparation for Optimum
Sports Performance

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General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.
- Mark schemes will indicate within the table where, and which strands of QWC, are being assessed. The strands are as follows:
 - i) ensure that text is legible and that spelling, punctuation and grammar are accurate so that meaning is clear*
 - ii) select and use a form and style of writing appropriate to purpose and to complex subject matter*
 - iii) organise information clearly and coherently, using specialist vocabulary when appropriate.*

Question Number	Answer	Mark
1(a)	<p>Guidance – answers require 'outline' – don't just accept a list – needs reason e.g. carbo-loading and creatine loading must have justification Only award marks for points on the mark scheme</p> <ol style="list-style-type: none"> 1. Adequate fuel/calories to match the intensity and duration of exercise/mix of aerobic and anaerobic activity 2. Ensure that fuel stores are full before performance (carbo-loading/creatine loading) 3. Fuel stores are supplemented/topped up during activity 4. Timing of diet pre exercise/timing of food intake before exercise/adjusting timing of diet 5. Fuel stores needs to be replenished <u>after exercise</u> /window of opportunity 6. Supplementation is undertaken to ensure that the body can <u>utilise all the nutrients required (Other than fuels)</u> 7. Need to ensure adequate hydration levels to last through out duration of exercise/ monitor hydration levels 8. Adequate amounts of protein are consumed to enable necessary growth and repair of muscle fibres 9. Consider the environmental conditions of the competitions e.g. temperature and humidity would affect hydration planning <p><u>Do not accept</u> Balanced diet – ensuring all food groups are covered – not relevant in short term prep e.g. do not accept eating vitamins and minerals to stay healthy</p> <p>Availability of food in a new environment</p> <p>Do not accept statements such as 'eating enough carbs so that they can be made into glucose and provide energy – - there is no link to planning or maximising performance</p> <p>Do not accept eating enough/plenty of carbs – this is too vague – we need a context to a definition of high or plenty e.g. above 70% CHO diet.</p>	(4)

Question Number	Answer	Mark
1(b)	<p>Guidance - 1 mark for each supplement identified and 1 mark for explanation/benefits – so sub max 4 for identifying the 4 supplements and sub max 4 for the benefits ONLY ACCEPT WHAT IS ON MARK SCHEME</p> <ol style="list-style-type: none"> 1. Carbohydrate /energy bars/energy drinks <ul style="list-style-type: none"> • Key fuel for aerobic energy systems/aerobic activities • Maximises bodies glycogen store • Reduces effects of aerobic fatigue 2. Sports drinks (accept all variations e.g. Isotonic drinks/hypertonic) <ul style="list-style-type: none"> • Maintain fluid level/hydration • Maintain bodies electrolyte level to maintain muscle contraction/Maintaining sodium/potassium levels 3. Creatine <ul style="list-style-type: none"> • Maximises bodies creatine stores • Maximises range of the ATP-PC system/increase ATP production/ATP re-synthesis • Enhances power 4. Amino acids /Protein/protein shake/milk/casein/whey protein <ul style="list-style-type: none"> • Growth and repair • Athletes who predominately use power/strength 5. Sodium Bicarbonate/sodium loading <ul style="list-style-type: none"> • Buffers rise in lactic acid /change in Ph level • Extends ability to work in anaerobic phase/tolerate higher levels of lactic acid/lactate • Maintaining electrolyte levels 6. Vitamins/named vitamin <ul style="list-style-type: none"> • Improve catabolic and metabolic reactions • Anti-oxidant benefits • Boost to immunity levels 7. Minerals/named mineral e.g. calcium <ul style="list-style-type: none"> • Improve catabolic and metabolic reactions • Boost to immunity levels 8. Ginseng <ul style="list-style-type: none"> • Reduces fatigue/boosts performance levels 9. Caffeine <ul style="list-style-type: none"> • Increased fat metabolism • Stimulant/reduces fatigue/maintain concentration/improves reaction time 10. Nitrous oxide/nitrates/beetroot juice <ul style="list-style-type: none"> • Causes arteries to dilate / delivers more blood to the muscles/increase oxygen delivery • Reduces blood pressure <p><i>Only accept 1 mineral and explanation and 1 vitamin with explanation Do not accept drugs or illegal substances e.g. steroids/EPO/diuretics</i></p>	(8)

Question Number	Answer	Mark
2	<p>Guidance – <i>only accept what is on the mark scheme</i> <i>1 mark for the definition and up to 3 marks for the strategies.</i> <i>We can accept a list of strategies – Sub max 3 marks.</i></p> <p>Definition</p> <ol style="list-style-type: none"> 1. Inability to perform at an optimum level/sudden impairment or failure of sports performers due to over anxiety/over arousal/pressure/ accept link to catastrophe theory <p>Strategies</p> <ol style="list-style-type: none"> 1. Set own achievable goals 2. Use imagery/run through situation in head to create feeling of self-confidence/visualisation/mental rehearsal 3. Use of positive self talk 4. Practice relaxation techniques/PMR/breathing techniques 5. Use of music to create stable state 6. Centering techniques 7. Simulation training/training in pressured situations 8. Attribution re-training – increases self confidence 9. Selective attention raining/cue utilisation training <p><i>Do not accept</i> <i>Definition – losing confidence</i> <i>Strategies – do not accept coping skills/hypnosis</i></p>	(4)

Question Number	Answer	Mark
<p>3</p>	<p>Guidance – <i>answers must include an explanation of home advantage plus up to 3 marks for potential effects (sub max 3)</i></p> <p><i>Don't give marks for repeating the question e.g. playing at home = an advantage is in the question!</i></p> <p><i>Explanation must link to an likely <u>improvement in performance/result</u> because that individual/team is playing at home</i></p> <p><i>e.g. 'home advantage with elite performers can increase arousal and therefore increase performance' - would gain 1 mark</i></p> <p><i>Point 4 is about the crowd effect on both home and away team</i></p> <p><i>Point 7 is about the negative effect the home crowd can have on the home team.</i></p> <ol style="list-style-type: none"> 1. Playing at home should mean you win the majority of games/events/do better/perform more effectively 2. This advantage is especially relevant to indoor sports. 3. This phenomenon is often seen in the success of the host nations of major global games, such as the Olympics. 4. Large, supportive crowds may help the home team in terms of motivation/arousal and the amount of effort they put in/negative effect on performance of away team 5. Proximity effect, where crowds that are close to the action (as in basketball) are said to increase the audience's influence/increase social facilitation 6. Accustomed to environment/pitch conditions e.g. climate/practice in same conditions/past performance accomplishments <p>Negative effects</p> <ol style="list-style-type: none"> 7. too much pressure from home crowd/hostile crowd/ leads to dip in performance/over arousal/catastrophe 8. opposition may use as a motivation/silencing the home crowd <p><i>Do not accept team cohesion or bonding</i></p>	<p>(4)</p>

Question Number	Answer	Mark
4	<p>Guidance – full marks requires identification and explanation of three benefits.</p> <p><i>Look for identification and then a full explanation to get 2 marks – some points may be repeated in the explanations</i> <i>A 'list' of benefits could only get a max of 3 marks - Use 1 + 1 (benefit + explanation)</i> <i>Look at point 3 need to make link between compression clothing and speeding up of waste product removal – many candidate will also say that increased blood flow removes waste products this is an explanation only for point 2</i></p> <ol style="list-style-type: none"> 1. Compression effect --creates a constant pressure on the working muscles, -- stimulatory effect on blood flow. 2. Increased blood flow/increased venous return- helps feed the muscle with both oxygen and energy, 3. Speeds up the removal of waste products - which has a positive impact on recovery/prevent lactic acid build up 4. Assists thermoregulation - - material wicks moisture away from the skin 5. Insulates the body – helps maintain localised temperature/reduce injury 6. Reducing fluid loss/reduces sweat loss/rate--increase evaporation 7. Reduces muscle vibration – reduces injury 8. Reduce the possibility of delayed onset muscle soreness/DOMS –speed up recovery 9. Psychological /placebo effect – raises self-esteem/confidence 10. Streamline /more aerodynamic 11. Reducing injury - due to increased blood flow/ increase localised temperature /increase in muscle elasticity 12. Greater force/power production/advantage to anaerobic athletes <p>REMEMBER – have they identified- have they explained <i>Not accept</i> <i>Reducing sweat rate on its own without explanation</i> <i>Muscle alignment/muscle held in place</i> <i>Waste product removal does not prevent injury</i></p>	(6)

Question Number	Answer	Mark
5	<p>Guidance <i>Look for identification and then a full explanation of benefit to get 2 marks – some points may be repeated in the explanations A 'list' of adaptations could only get a max of 4 marks</i></p> <p><i>Use 1 + 1 (adaptation in bold + benefit)</i></p> <ol style="list-style-type: none"> 1. Increases in stroke volume – increase blood flow/speed up delivery of energy and oxygen and removal of waste products 2. increase in cardiac hypertrophy – increase in chamber/left ventricle size/increase in heart muscle 3. Increase in cardiac output – increase blood flow/speed up delivery of energy and oxygen and removal of waste products 4. Reduction in resting heart rate RHR/bradycardia/reduction in exercise/working heart rate/Less stress on cardiovascular system/ delays fatigue 5. Increased production of EPO/red blood cell production/increased levels of haemoglobin/myoglobin – greater oxygen carrying capacity 6. Increase in number of capillaries/vascularisation of vessels leads to an increased gas exchange 7. Increase in mitochondria - improves rate of energy production 8. reduction in body fat/increase in lean body mass/increased fat metabolism – more efficient movement/use of energy/reduction in chance of CHD 9. increased lactate threshold/able to remove lactic acid quicker – able to work anaerobically for longer/fatigue less quick 10. Increase VO₂ max – ability to use oxygen more efficiently/increase in the capability of the cardio-vascular system 11. Type 2 fibres more aerobic/Type 2b develop Type 2a characteristics/ Type 2a develop more type 1 characteristics – able to work more aerobically delays anaerobic threshold 12. Increase in plasma volume/blood volume/blood become thinner – reduced blood viscosity/increased thermo regulation/ ease of blood transportation 13. Increase strength of respiratory muscles – respiratory 	(8)

	<p>muscles less likely to fatigue</p> <p>14. Increased vascular shunting – increase blood flow o the working muscles</p> <p>15.Increased venous return - greater blood flow back to the heart/increased stroke volume/ faster removal of CO²</p> <p><i>Do not accept</i> <i>More type 1 fibres being recruited – the number or the ratio of the fibres is fixed - only their properties can be altered not the number</i></p>	
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Question Number	Answer	Mark
6	<p>Guidance – 1 mark for definition and then sub max 4 for reasons</p> <p>Definition</p> <p>Ritual – pregame routine/specific routine /'formal or ceremonial action'/ part tradition and part superstition/A pre rehearsed routine that performers <u>always follow</u> before they play sport</p> <p>Why used</p> <ol style="list-style-type: none"> 1. Reduce anxiety/decrease in anxiety/puts athlete back in control/feeling of familiarity 2. unites performers and crowd / provides social approval from others 3. generates respect and courtesy 4. strengthens social bonds, enhancing group cohesion/team cohesion 5. demonstrates respect for, or submission to, opponents/intimidates opponents 6. affiliation to a cultural heritage 7. raises our levels of arousal – an emotional and physical tool/improves focus/gets performer into optimal zone 8. superstition <p><i>Don't accept – mentally prepare for an event –on its own is too vague but would accept alongside pre game routine</i> <i>A ritual is used before during and after an event – question refers to preparation</i></p>	(5)

Question Number	Answer	Mark
7(a)	<p>Guidance – candidates need to name three sports science support areas and explain what they do</p> <p>We will allow them to choose 3 separate roles from any of those listed (next to numbered points below)</p> <p>Cannot give odd number marks on this – need to correctly suggest and describe for 2 marks per science area identified</p> <p>Physiology</p> <ol style="list-style-type: none"> 1. Physiologists/fitness/strength and conditioning coach <ul style="list-style-type: none"> • look at types of training required/analysis/energy demands • physiologist would set up training programmes • use of heart rate and threshold knowledge 2. Physiotherapist/sports therapy <ul style="list-style-type: none"> • look after injured athletes/repairs • manage rehabilitation programmes • sports massage/strapping 3. Nutritionists/dietician <ul style="list-style-type: none"> • work to identify energy demands linked to diet/ weight management/ nutrition recovery strategies /managing diet linked to training phases <p>Psychology</p> <ol style="list-style-type: none"> 4. Sports Psychology/psychologist/psychiatrist <ul style="list-style-type: none"> • raise motivation and • help manage arousal levels • Set goals with teams and individuals <p>Technical</p> <ol style="list-style-type: none"> 5. Biomechanics <ul style="list-style-type: none"> • Technical/Biomechanics looks at technique/movement analysis • Clothing/equipment/reducing drag/friction/body suits • Make movement more efficient 6. Performance analyst/notational analysis/video analyst <ul style="list-style-type: none"> • help coach/managers with player analysis/player statistics • GPS/Prozone analysis 7. Podiatrist <ul style="list-style-type: none"> • makes orthotics /gait analysis <p><i>Check that the sports science area identified is correctly applied to the explanation</i></p> <p>Don't accept – brief statement that athletes have psychologists and physiologists Do not accept lists of sports science techniques and strategies</p>	

	e.g. preparation camps/hypoxic chambers	(6)
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Question Number	Answer	Mark
7(b)	<ol style="list-style-type: none"> 1. Margin of winning so narrow that athletes are looking for competitive edge/ success in modern sport can now mean 100th of a second or a millimetre therefore everything is done to achieve success 2. Rewards for winning are now so high/ increase money/sponsorship deals 3. All aspects of performance need improving by marginal gains/improve every aspect by 1% 4. most elite squads now have access to a team of sports scientists and facilities that allow performers to perform at a higher level 5. the new UKSI's/other nations institutes offer these services 6. placebo/psychological factors 7. more precision to training programmes 8. more funding available to fund sports science 9. every other nation is doing it/shop window need to out compete other nations 10. reduce injury/need to recover more quickly 11. pushes the boundaries of knowledge and technology in sport – giving performers the competitive edge 	(5)

Question Number	Indicative content
8	<p>Guidance – the questions asks about the role technology plays in the monitoring training are the candidates covering this in their answers?</p> <p>If candidates are only listing/describing types of technology – cannot score any higher than Level 2</p> <p>Ensure that quality of written communication is considered when confirming marks. Read through once to decide band, and read through second time to finalise the mark.</p> <ol style="list-style-type: none"> 1. Technology examples in terms of monitoring fitness/use of ICT in planning and tracking training programme 2. Use of technology in technical analysis of skill/biometric measurements 3. Using video/computer animation to work on technique/video analysis 4. Examples of internal monitoring/heart rate/ lactate linked to threshold and training zones 5. Examples of external monitoring to include force and acceleration measurement 6. Muscle activity analysis/electromyography 7. Use of photography/stroboscope to analyse movement 8. Altering training environment/altitude effects/use of hypoxic chambers/ live low train high 9. Using TV/media development such as Hawkeye/prozone to look for strengths and weakness/planning to tackle opponents 10. Technology now plays a key part in academy/institute of sport approach 11. Elite teams now have large teams backing them up 12. Use of ergogenic aids 13. Use of technology to develop equipment and clothing/reduce drag 14. Some reluctance of some sports such as football to fully embrace technology eg goal line technology 15. Some sport technology has become over dominant eg swim suits 16. Use of technology will depend on wealth of performer/developing countries/sports suffer 17. Much emphasis now on statistics in sports planning and preparation/ losing some of spontaneity in sport/natural talent 18. Use of technology to develop equipment and clothing Counter argument 19. Poorer/developing actions- no longer a level playing field

		20. When does technology end and cheating start – e.g. LZR swim suits now banned
Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-4	An answer that mostly fails to address the question and contains many inaccuracies and irrelevancies. Very little evidence of synoptic analysis with statements that demonstrate a lack of understanding. A poorly structured answer. Incorrect spelling, punctuation and grammar. Incorrect use of terminology. Many inaccuracies.
Level 2	5-8	An answer that fails to address many parts of the question. There is little evidence of synoptic analysis with sweeping statements that may contain some relevant information but generally remain unsupported by evidence or accurate examples and suggest limited understanding. Irrelevant points and repetition may be used to pad out the answer. A poorly structured answer in which there may be errors in spelling, punctuation and grammar. Incorrect use of terminology. A significant proportion of material is irrelevant.
Level 3	9-12	An answer that describes the use of technology in monitoring training - but may not differentiate between short term and long term. There is little evidence of analysis although some basic understanding of how each of the disciplines can be used. Relevant points may be supported by examples but only partially developed – there may be some inaccuracy in dates and names. Limited attempt at a conclusion. A basic structure is evident. Some incorrect use of terminology. There may be errors in spelling, punctuation and grammar. A number of inaccuracies.
Level 4	13-15	Attempts to answer the question – though may still lack depth and or develop discussion of the use of technology in monitoring training in both short and long term preparation, but answer may be biased towards one phase or the other. Some analysis and debate is evident, although this may be lacking both in depth and balance - will be mainly concerned with the positive impact .The answer makes an attempt to address the key issues raised in the question. An obvious attempt to structure the essay. Fundamentally sound use of terminology. Generally clear and concise with limited inaccuracies. Satisfactory spelling, punctuation and grammar
Level 5	16-18	An answer that discusses the use of technology monitoring training in both short and long term elite sports preparation - making some reference to the impact on performance. A good understanding is demonstrated through some detailed analysis and may challenge use of technology in sport. Factual information and accurate examples, many taken from global games, are used in support of points made. Will include a conclusion and an attempt at synthesis – but this may be more descriptive. A well structured answer with predominantly accurate use of spelling, punctuation and grammar. Correct use of terminology. Clear and concise but may occasionally make an irrelevant comment.
Level 6	19-20	An answer that debates in detail the use of a variety approached to monitoring training through technology in both the short and long term phases of preparation of elite sports performers. There is in-depth understanding of how technology can be used to improve performance and monitor progress. Includes correct use of technical language and factual information throughout, demonstrating a clear understanding of the subject matter. A range of accurate practical examples predominantly taken from global games supports the vast majority of points. A range of contemporary and original statements are included. There is a clear attempt at syntheses through a reasoned conclusion this should include a discussion of the merits and limitations of such a change in emphasis. A well structured answer with continuous prose. Predominantly accurate use of spelling, punctuation and

	grammar. Correct use of terminology. Clear, concise and relevant throughout.
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Question Number	Indicative content
9	<p>Guidance – <i>good answers will cover both preparation and competition – athletes can only manage the effects of the environment – they will need to weigh up which factors may have the most influence on their performance or which factors they can have most control over.</i></p> <p>Ensure that quality of written communication is considered when confirming marks. Read through once to decide band, and read through second time to finalise the mark.</p> <ol style="list-style-type: none">1. Climate – temperature, humidity and wind2. Altitude – height above sea level3. Type of playing surface4. Indoor or outdoor5. Developing the strategy of acclimatisation6. Time zone and day night rhythm7. How environmental differences will affect the choice of kit and equipment8. The way performers try and simulate the competitive environment in their training9. Use of hypoxic/climatic chambers10. Most elite athletes have a support network that manage the environmental factors11. Elite squads will collect lots of data on the environmental factors in sports such as sailing or cricket this has big impact on tactic selection12. Performers are having less influence over the climate13. Technology means that sport can be played almost anywhere in air conditioned stadiums e.g. in Qatar or stadiums with roofs e.g. Millennium Stadium/Wimbledon14. Environment can be linked to social factors – key is impact on confidence level of performer

Level	Mark	Descriptor
	0	No rewardable material
Level 1	1-4	An answer that mostly fails to address the question and contains many inaccuracies and irrelevancies. Very little evidence of synoptic analysis with statements that demonstrate a lack of understanding. A poorly structured answer. Incorrect spelling, punctuation and grammar. Incorrect use of terminology. Many inaccuracies.
Level 2	5-8	An answer that fails to address many parts of the question. There is little evidence of synoptic analysis with sweeping statements that may contain some relevant information but generally remain unsupported by evidence or accurate examples and suggest limited understanding. Irrelevant points and repetition may be used to pad out the answer. A poorly structured answer in which there may be errors in spelling, punctuation and grammar. Incorrect use of terminology. A significant proportion of material is irrelevant.
Level 3	9-12	An answer that describes a limited number of environmental factors that performers need to consider there will be a bias towards geographical factors. There is little evidence of analysis although some basic understanding of how each of the disciplines can be used. Relevant points may be supported by examples but only partially developed – there may be some inaccuracy in dates and names. Limited attempt at a conclusion. A basic structure is evident. Some incorrect use of terminology. There may be errors in spelling, punctuation and grammar. A number of inaccuracies.
Level 4	13-15	Attempts to answer the question – though may still lack depth and or develop discussion of a wider range of environmental factors that performers need to consider - will be mainly concerned with the negative impact of environmental factors. The answer makes an attempt to address the key issues raised in the question. An obvious attempt to structure the essay. Fundamentally sound use of terminology. Generally clear and concise with limited inaccuracies. Satisfactory spelling, punctuation and grammar.
Level 5	16-18	An answer that discusses a wide range of environmental factors that need to be considered e use of technology - making direct reference to the impact on performance. A good understanding is demonstrated through some detailed analysis and may challenge use of technology in sport Factual information and accurate examples, many taken from global games, are used in support of points made. Will include a conclusion and an attempt at synthesis – but this may be more descriptive. A well structured answer with predominantly accurate use of spelling, punctuation and grammar. Correct use of terminology. Clear and concise but may occasionally make an irrelevant comment.
Level 6	19-20	An answer that debates in detail a variety of environmental factors that performers need to consider There is in-depth understanding of how technology and ergogenic aids can be used to help manage environmental factors. Includes correct use of technical language and factual information throughout, demonstrating a clear understanding of the subject matter. A range of accurate practical examples predominantly taken from global games supports the vast majority of points. A range of contemporary and original statements are included. There is a clear attempt at syntheses through a reasoned conclusion this should include a discussion of the merits and limitations of such a change in emphasis. A well structured answer with continuous prose. Predominantly accurate use of spelling, punctuation and grammar. Correct use of terminology. Clear, concise and relevant throughout.

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