

General Certificate of Education (A-level)
June 2012

Physical Education

PHED3

(Specification 2580)

Unit 3: Optimising performance and evaluating contemporary issues within sport

Post-Standardisation

Mark Scheme

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Section A

Question 1

Discuss the suggestion that altitude training always improves performance in endurance events and explain the factors that contribute to a performer's VO₂ max. (14 marks)

Explanation of altitude training

- A. Over 2000m/8000 feet above sea level
- B. Usually for at least 30 days/month/3 phases named acclimatisation, primary training, recovery
- C. Partial pressure of oxygen is lower/less oxygen available
- D. Body produces erythropoietin/EPO/hEPO
- E. Alternative methods now available, eg hypoxic tents/altitude tents/oxygen tents/apartments/train low, live high

Improves Performance

- F. Increased number/concentration/red blood cells
- G. Increased concentration of haemoglobin/myoglobin/increased haematocrit
- H. Increased capacity to carry oxygen
- I. Increased tolerance to lactic acid/buffering/delayed OBLA
- J. Benefits last for up to 6 to 8 weeks.

Hinders performance

- K. Altitude sickness
- L. Training at same intensity difficult/detraining may occur/loss of fitness
- M. Benefits lost within few days back at sea level/up to few days
- N. Psychological problems linked to travel/time away from home

VO₂ Max factors

- O. VO₂ max definition <u>maximum volume of oxygen that can be</u> <u>utilised per minute/unit of time</u>
- P. Relative VO₂ max definition takes into account body weight/ ml.kg⁻¹.min⁻¹
- Q. Lifestyle lack of exercise/smoking/poor diet/fitter/equiv
- R. Training continuous/aerobic/fartlek improves VO₂ max/stamina/ endurance training
- S. Age VO₂ max decreases with age
- T. Physiology number of slow twitch fibres/capillary density/number of mitochondria/haemoglobin content/surface area of alveoli/red blood cell count/efficiency of heart or equivalent
- U. Physiology any other example named in point T
- V. Genetics inherited factors of physiology limit possible improvement
- W. Gender men generally have approx. 20% higher VO₂ max than women
- X. Body composition higher percentage of body fat decreases VO₂ max/poor diet reduce VO₂ max/overweight/obese

A. Thousands of metrestoo vague

Answer must be linked specifically linked to altitude training rather than effects of a general training programme

Do not accept "Cost/ Expensive/time for travel/jet lag/tired from travel"

L. DO NOT ACCEPT 'training harder', 'more tired'

O. accept in place of utilised 'used', 'consumed', 'taken up' but DO NOT ACCEPT 'taken in', 'breathed in'.

Factor must be explained not just named. Accept answers that are explained in the correct context, which may not name a specific factor.

Q. can be awarded for general discussion of lack of exercise.

R. refers to specific types of training

24 point mark scheme

Band Range	Band descriptors	
Level 4 12-14 mks	 Addresses all areas of the question, demonstrates a wide range of depth and knowledge Expresses arguments clearly and concisely Few errors in spelling, punctuation and grammar, correct use of technical language 	16/17/18 points – 12 marks 19+ points – 13 marks + QWC – max 14 marks
Level 3 8-11 mks	 Addresses most areas of the question, demonstrates a clear level of depth and knowledge Attempts to express arguments clearly and concisely Few errors in spelling, punctuation and grammar, correct use of technical language although sometimes inaccurately 	11/12 points – 8 marks 13/14 points – 9 marks 15 points – 10 marks + QWC – max 11 marks
Level 2 4-7 mks	 Addresses some aspects of the question but lacks sufficient depth and knowledge Limited attempt to develop any arguments or discussions, normally vague or irrelevant Errors in spelling, punctuation and grammar, limited use of technical language 	6/7 points – 4 marks 8/9 points – 5 marks 10 points – 6 marks + QWC – max 7 marks
Level 1 1-3 mks	 Addresses the question with limited success Major errors in spelling, punctuation and grammar, little use of technical language 	1/2 points – 1 mark 3/4/5 points – 2 marks + QWC – max 3 marks
Level 0 0 mks	Addresses no aspect of the question	

Question 2

Elite athletes must develop and maintain extremely high levels of fitness to maximise their chances of winning.

Elite athletes may use the results from lactate sampling and their respiratory exchange ratio (RER) to ensure their training is effective.

02 Explain the terms lactate sampling **and** respiratory exchange ratio. (4 marks)

4 marks for 4 of:

A.	Sub max of 2 marks (Lactate sampling) – taking blood samples (to measure the level of lactic acid)	
В.	Ensures training is at the correct <u>intensity</u> /monitor improvements over time	B. Do NOT accept "training at the right
C.	Provides accurate/objective measure	level" – too vague.
D.	Measures OBLA/lactate threshold/occurs at 4 mmols Sub max of 2 marks	_
E.	(Respiratory Exchange Ratio) – ratio of carbon dioxide released compared to oxygen used by the body	Point F can be awarded
F.	Estimates use of fats <u>and</u> carbohydrates used during exercise/ calculates energy expenditure	with H if fats and carbs are mentioned
G.	Tells if performer working aerobically/anaerobically/energy system used	F. Do NOT accept
H.	RER close to 1 performer using carbohydrates/close to 0.7 using fats/respiratory quotient	'energy sources used'

03 How may hyperbaric chambers aid injury rehabilitation? (3 marks)

3 marks for 3 of:

- A. Reduces pressure at injured area/reduces swelling
- B. (Chamber) delivers oxygen at high pressure
- C. Approximately 2.5 more times than normal/100% pure oxygen
- D. Haemoglobin/red blood cells fully saturated with oxygen
- E. Excess oxygen dissolved in plasma
- F. Oxygen reaches parts of body that not normally saturated
- G. Increased white blood cell activity at injury site
- H. Increased blood supply/formation of new blood cells

No marks for evaluation of the method

Answers must be related to hyperbaric chambers, NOT oxygen tents

C and D – 'more oxygen' too vague

D. Accept answers which indicated equivalent of fully saturated

Using your knowledge of energy systems, outline **and** explain the relationship between energy sources and intensity of exercise. (7 marks)

7 marks for 7 of:

- A. At low level of exercise energy comes from a mixture of fats <u>and</u> carbohydrates;
- B. Broken down aerobically/using oxygen/aerobic system;
- C. <u>Glycolysis/Anaerobic Glycolysis</u> glucose broken down/pyruvic acid/pyruvate formed
- D. Beta oxidation breaks down fats/tri-glycerides/free fatty acids
- E. <u>Krebs Cycle</u> oxidation of acetyl-coenzyme-A/Citric acid production
- F. <u>Electron transport/transfer chain</u> water formed/hydrogen ions/protons used
- G. At high levels of intensity carbohydrates are only energy source/as intensity increases, more carbohydrates used;
- H. At high intensity fat use limited by oxygen availability/no fats used anaerobically/lack of oxygen;
- Slower energy release from fats/quick release of energy from carbohydrates;
- J. (Carbohydrate break down) Lactic Acid System/Lactate anaerobic system
- K. No oxygen used/anaerobic
- L. <u>Glycolysis/Anaerobic Glycolysis</u> glucose broken down/pyruvic acid/pyruvate formed/lactate/lactic acid formed

If students do not make reference to energy source and intensity, but simply explain all the energy systems – no marks. The answer must show an understanding of attempting to relate their knowledge rather than simply outlining all the energy systems.

If ATP-PC system outlined, check other systems are used in the correct context

Accept correctly annotated diagrams but only if energy sources are discussed.

C, D, E & F must be identified and explained (any one point from explanation is sufficient to gain the mark)

C & L (Glycolysis) can be awarded twice if explained in the correct context linked to increase of intensity of exercise

The final stage of an endurance race often involves a sprint finish.

Using Newton's Second Law of Motion, explain how an athlete is able to accelerate towards the finish line. (3 marks)

3 marks for 3 of:

- A. Mass of runner is constant
- B. Force = Mass x Acceleration
- C. Greater the force exerted on the floor, the greater the acceleration/momentum/proportional
- D. Force governs direction
- E. Force provided by muscular contraction
- F. Ground reaction force

B. Not f=ma – full terms only

E. do not accept 'legs' F. must be in context/ not GRF

The Sliding Filament Hypothesis suggests muscular contraction occurs in the sarcomeres of the muscle fibres.

06 Explain how actin and myosin filaments in the sarcomere bind together causing muscular contraction. (4 marks)

4 marks for 4 of:

A. Fila	ments u	nable	to	bind	due	to	tro	pom	<u>yosin</u>
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- B. Receipt of nerve impulse/action potential/electrical impulse/wave of depolarisation
- C. Sarcoplasmic reticulum (releases)
- D. Calcium (ions released)
- E. (Calcium) Attach to troponin (on actin filaments)
- F. Causes change of shape of troponin/moves tropomyosin
- G. Exposes myosin binding site (on actin filament)/ ATP
- H. Cross bridge formation
- I. Powerstroke occurs/Ratchet Mechanism/Reduce H zone/z lines closer together

Correct order must be implied/need to be in the correct sequence

A. If tropomyosin & troponin named – no mark

I. Do NOT accept general description of movement

Section B

Question 5

07 Using appropriate psychological theories, explain why performers may have different levels of optimal arousal and outline various somatic stress management techniques that can be used to control anxiety levels.
(14 marks)

Arousal Theories

A. Drive Theory

- B. As arousal increases so does likelihood of dominant response/habit
- C. Experienced players perform better with higher levels of arousal/ the more experienced players in a team require higher levels of arousal
- D. Novice players perform better with lower levels of arousal

E. Inverted U Theory

- F. As arousal increases so does performance but only to certain level
- G. Optimal arousal occurs at moderate levels
- H. (Personality of performer) extroverts higher levels of arousal/introverts lower levels of arousal
- (Nature of the Task) complex or fine skills lower need lower levels of arousal/simple or gross skills need higher levels of arousal
- J. (Skill of performer) experienced higher levels of arousal/novices lower levels of arousal

K. Zone of Optimal Functioning

L. Some performers have a wider range of optimal arousal levels/different band widths of optimal arousal

Stress management techniques

- M. Biofeedback
- N. Measuring physiological responses
- O. eg heart rate/breathing rate/sweat production/skin temperature/muscle tension/blood pressure/galvanic skin response
- P. Learn to recognise and control anxiety responses

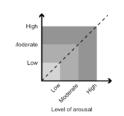
Q. Centring/Breathing control

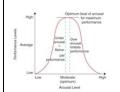
- R. Deep breathing/diaphragmatic breathing
- S. Breath in through nose expand abdomen fully breath out through mouth
- T. May involve repeating key words/mantra

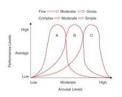
U. Muscle relaxation/Progressive Muscle Relaxation

- V. Often combined with effective breathing control
- W. Focus on specific muscle groups/working inwards from the periphery
- X. Contract muscles hold relax

Theories must be named to be credited with marks Annotated graphs may support the answer







Techniques must be named to be creditworthy

I. Accept relevant sporting examples if used in correct context

Accept first four explained techniques even if cognitive technique included – ignore any further descriptions, including somatic techniques

24 point mark scheme

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Level 3 8-11 mks	 Addresses most areas of the question, demonstrates a clear level of depth and knowledge Attempts to express arguments clearly and concisely Few errors in spelling, punctuation and grammar, correct use of technical language although sometimes inaccurately 	11/12 points – 8 marks 13/14 points – 9 marks 15 points – 10 marks + QWC – max 11 marks
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Level 1 1-3 mks	 Addresses the question with limited success Major errors in spelling, punctuation and grammar, little use of technical language 	1/2 points – 1 mark 3/4/5 points – 2 marks + QWC – max 3 marks
Level 0 0 mks	Addresses no aspect of the question	

Question 6

The creation of a successful team rarely happens by chance.

O8 Identify and explain Carron's antecedents (factors) that contribute to the cohesiveness of a group.
(3 marks)

3 marks for 3 of:

A.	Environment/situational factors – size of group/time/facilities/age or equivalent	Factor must be named and at least one
B.	<u>Member/personal factors</u> – ability/motivation/satisfaction/similarity of group or equivalent	explanation point given to be credited with mark.
C.	<u>Leadership factors</u> – style/behaviour/personality/relationship with group or equivalent	
D.	<u>Team factors</u> – task/motivation/stability/ability/shared experiences or equivalent	
E.	Four correct factors named but no explanation	E. awarded if no other marks awarded.

Fiedler suggested that the preferred style of leadership depends on the favourableness of the situation.

Outline the characteristics of a favourable situation **and** name the style of leadership that should be used when this occurs. (4 marks)

4 marks for 4 of:

A. Task-centred/task-orientated/autocratic leadership style Sub max 1 mark	
B. Leader respected by group	NOT 'cohesiveness of
C. Leader has good relationship with group	the group'
D. Group highly motivated	
E. Group high ability/highly successful	
F. Clear task/goal/roles	F. NOT 'easy task'
G. Good support network	
H. Good resources/equipment/facilities	

Question 7

Different methods of assessment can be used to measure anxiety levels and also to identify potential successful performers.

10 What are the disadvantages of using observation as a method to assess anxiety?

(3 marks)

3 marks for 3 of:

	Subjective/not objective	A. Do not accept –
	Reliant on skill of the observer	'unreliable/not valid'
C.	Time consuming/expensive/needs to be completed several times	
D.	Observer needs to know normal behaviour patterns of performer for comparison	
E.	May need several observers (at the same time)	
F.	If performer knows observation is occurring they may behave differently/become more anxious/increased state anxiety/experience evaluation apprehension/social inhibition	F. being observed insufficient for mark. Needs effect on performer.

Discuss the suggestion that personality questionnaire can be an effective predictor of performance. (4 marks)

4 marks for 4 of:

 A. Named personality test – EPI, (Cattell) 16PF, SCAT, STA1, POMS, Achievement Motivation (Nach & Naf questionnaires) Sub-max of 2 marks

Agree

- B. Credulous approach
- C. Personality traits linked to specific types of sports/characteristics of elite performance, eg calm under pressure/not aggressive/equiv
- D. Used as part of talent identification programmes
- E. Iceberg profile (Profile of mood states)
- F. Linked into high levels of vigour

Sub-max of 2 marks

Disagree

- G. Sceptical approach
- H. No clear link between success/choice of sport and personality type
- I. Research often contradicts each other
- J. Personality can change due to situation

Conclusion

K. Neither approach has proved conclusive/no clear evidence to make accurate predictions.

A. NOT CSAI 2

The focus of the question is 'can personality predict success' rather than evaluating the method of using self-report questionnaires

Question 8

Effective captains use a variety of methods to motivate their teams.

12 Explain the characteristics of effective goal setting.

(3 marks)

3 marks for 3 of:

- A. (Specific) linked to performer/sport/position
- B. (Measurable) objective/not subjective
- C. (Agreed/accepted) involve the performer in setting the goals
- D. (Realistic/achievable) with performers ability/not demotivating
- E. (Time phased/long and short term goals) set time for evaluation
- F. (Exciting/challenging) motivate the performer
- G. (Recorded) written for future reference/improves ownership
- H. (Outcome goal) based on end result, eg winning the match
- I. (Performance goal) based on performers own ability level, eg linked to personal best time/completing specific percentage pass
- J. (Process goal) based on performers techniques/tactics, eg extending the arms when passing/completing a specific role within tactical formation

Must be explanation for each term.
Accept suitable examples for explanation

No marks for SMART, SMARTER, SCAMP

How would a captain use knowledge of self-serving bias to motivate their team? (4 marks)

4 marks for 4 of:

A.	(self-serving bias) correct use of attributions to protect self-esteem/
	self-efficacy/self-confidence/avoid learned helplessness

- B. Attributing success to internal stable factors/ability
- C. Attributing success to internal unstable factors/effort
- D. Attribute failure to controllable factors
- E. Attributing failure to internal unstable factors/effort
- F. Attributing failure to external stable factors/task difficulty
- G. Attributing failure to external unstable factors/luck

B – G. Accept description of dimension or example

Section C

Question 9

Outline the possible causes of spectator violence, such as hooliganism, at sporting events **and** explain how the law aims to protect spectators. (14 marks)

Causes of spectator violence

- A. Display of masculinity
- B. Gang culture/sense of belonging/identity/peer pressure/tribalism
- C. Crowd mentality/loss of individual identity/diminished responsibility
- D. Nature of the sport
- E. Alcohol/drugs
- F. Local rivalry/derby game/importance of the event
- G. Racism/nationalism/political groups/religion
- H. Adrenalin rush/excitement of violence/outlet for aggression
- Events during the match/reaction to players/referee decisions/current score/outcome of the event/final result/ provocation
- J. Reaction of working class to middle class 'taking-over' the game
- K. Media hype
- L. Nature of the stadium/poor crowd control/poor security

Law to protect spectators

- M. Games played at specified time/kick-off times imposed by police
- N. Pubs banned from opening prior to game
- O. All seater stadiums/health & safety requirements
- P. Violent/racist individuals prosecuted
- Q. Specific laws, eg trespassing on the pitch/field of play
- R. Individuals banned from grounds
- S. Individuals banned from travel abroad/passports confiscated
- T. Increased police/security at events/use of CCTV
- U. Players fined/prosecuted for inciting crowd violence/gestures to crowd/racist comments
- V. Police share information about known individuals
- W. Ticket touts/black market ticket sales

Focus of question is on the law rather than NGB's & clubs protecting spectators

Do not accept: No alcohol at grounds Clubs fined/points deducted Use of role model Campaigns Segregation of fans

23 point mark scheme

Band Range	Band descriptors	
Level 4 12-14 mks	 Addresses all areas of the question, demonstrates a wide range of depth and knowledge Expresses arguments clearly and concisely Few errors in spelling, punctuation and grammar, correct use of technical language 	14/15/16 points – 12 marks 17+ points – 13 marks + QWC – max 14 marks
Level 3 8-11 mks	 Addresses most areas of the question, demonstrates a clear level of depth and knowledge Attempts to express arguments clearly and concisely Few errors in spelling, punctuation and grammar, correct use of technical language although sometimes inaccurately 	10 points – 8 marks 11/12 points – 9 marks 13 points – 10 marks + QWC – max 11 marks
Level 2 4-7 mks	 Addresses some aspects of the question but lacks sufficient depth and knowledge Limited attempt to develop any arguments or discussions, normally vague or irrelevant Errors in spelling, punctuation and grammar, limited use of technical language 	5/6 points – 4 marks 7/8 points – 5 marks 9 points – 6 marks + QWC – max 7 marks
Level 1 1-3 mks	 Addresses the question with limited success Major errors in spelling, punctuation and grammar, little use of technical language 	1/2 points – 1 mark 3/4 points – 2 marks + QWC – max 3 marks
Level 0 0 mks	Addresses no aspect of the question	

Question 10

Many of the sporting values and technical developments that underpin modern sport were established in the 19th century.

How might a performer break the contract to compete during a sporting contest? (3 marks)

3 marks for 3 of:

A. Display gamesmanship/not sportsmanship/not fair pla B. Break the rules of the sport/injure other players/aggre behaviour	
C. Not following the etiquette of the sport, eg shaking ha D. Drugs/doping E. Not try their best to win, eg match fixing/weaker team F. Disrespect officials and their decisions	nds/racism This is contract to
	'Cheating' too vague for all points

Explain the social factors that contributed to the emergence of mass spectator sport in the 19th century. (4 marks)

4 marks for 4 of:

- A. Reduction of working hours/better wages (which allowed) increased time to attend matches/pay for leisure activities
- B. Improvements in railways/transport (which allowed) easier access to events/able to attend matches played further away
- C. Improved communication/media/newspapers/better literacy/more people could read (which allowed) promotion role models/celebrities/awareness of events
- D. Emergence of middle classes (which allowed) opportunity for business/agents/social control/need to entertain the masses/encourage better social morals or equiv.
- E. Creation of governing bodies/development of rational recreation (which allowed) organised competitions/leagues/international events/standardised rules/regulations/codification/regular fixtures
- F. Creation of teams from factories/churches/ex-public school boys (which allowed) local opportunity for spectators/creation of sense of community
- G. Emergence of professional teams/broken time payments (which allowed) exciting spectacle/higher standard of play/local team to support
- H. Urbanisation (which caused) need for alternative to traditional sporting activities due to lack of space/large population close together made spectating necessary/loss of mob games/growth of towns/cities
- Commercialisation (which caused) opportunities to develop professional teams/spectator team identity or equiv/develop new stadiums

Answer must have some link to impact of named factor rather than just a list of points

A. Accept time or money, both not needed

Do not accept; Sponsorship Television

Better technology – too vaque

E. Answer has to make reference to the impact on sport

UK Sport coordinates a talent identification programme to help achieve its aim of developing elite performers.

17 What are the characteristics of an effective talent identification programme?

(3 marks)

3 marks for 3 of:

- A. Widespread testing programme/equal opportunities/testing at different age groups/schools
- B. Knowledgeable/<u>high quality</u> scouts/<u>high quality</u> coaches able to spot talent
- C. Physiological/psychological/skills testing/high quality testing facilities
- D. Database for comparison
- E. Co-ordinated approach between organisations
- F. Structured competition/progression routes/representative structure/ development squads

Do NOT accept 'training', 'facilities', 'funding'.

B. Do NOT accept reference to high quality coaches. Must link to ability to identify talent.

18 Explain other strategies that UK Sport has implemented to develop elite performers.

(4 marks)

4 marks for 4 of:

- A. Co-ordinated approach with NGBs/four home unions or named sporting organisation
- B. Provide centres of excellence/UKSI/English Institute of Sport or equiv.
- C. World Class Performance Programme/Pathway
- D. (Operates at 3 levels) Talent Development Podium
- E. (World Class Events) major events hosted in UK
- F. (Research and Innovation) develops new technology for training and equipment
- G. (People Development) develops high quality coaches/leaders/ organisers or equiv
- H. (Ideals) develops partnerships with other countries
- I. Sports Science/Sports Medicine/Performance Lifestyle/Athlete Career Education
- J. (Equality) promotes equal access/fairplay/high standards of conduct/doping controls
- K. (International Influence) developing links with international organisations/federations
- L. (International Development/International Leadership Programme) promoting sport in other countries to improve participation
- M. Distributing/uses National Lottery funding/Athlete Personal Awards

D. No need to explain levels but all 3 needed for the mark

Do not credit general answers, eg facilities, funding, coaches, etc.

Sponsorship and commercialisation are an integral part of elite sport.

Discuss the suggestion that sponsorship and commercialisation have improved the nature of the sporting experience for the spectator. (7 marks)

7 marks for 7 of:

Sub max of 4 marks

Agree

- A. Players/teams of higher standard/increased excitement of watching role models
- B. Better quality facilities/stadium/team merchandise to create team loyalty/change of pitch colour to make spectating easier/bigger stadiums
- C. Increased number of competitions/opportunities to watch events
- D. Funding to provide entertaining experience/other activities not just the sporting event/educate spectators/expert analysis
- E. Variations of the sport format provide alternative viewing experience
- F. Rules changed to create extra excitement/interest
- G. Funding for improved technology at the ground, eg large video screens for playback/at home, eg interactive technology/HD/3D
- H. Need for more correct decisions/less incorrect decisions by officials/Hawkeye/increased excitement waiting for correct decision

Sub max of 4 marks

Disagree

- . Traditional nature of sport changed/viewing experience altered
- J. Breaks in play for adverts/commercials/decisions of officials
- K. Less tickets available/tickets allocated to sponsors/hospitality tickets/higher ticket prices
- L. Match fixing
- M. Start times/kick-off times arranged to maximise viewing figures
- N. Minority sports receive less coverage/major sports dominate the television schedules/pay-per-view restricts access to watch
- O. Companies create monopoly of merchandise/catering in stadiums/ expensive team merchandise changed regularly

Answer must clearly indicate which aspect is being discussed

B. Must relate to spectators, NOT the players

Do NOT accept; Less/more deviancy Lower attendance at the event More funding available