



**General Certificate of Education (A-level)  
June 2013**

**Physical Education**

**PHED1**

**(Specification 2580)**

**Unit 1: Opportunities for and the effects of  
leading a healthy and active lifestyle**

**Final**

***Mark Scheme***

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## PHED1 Mark Scheme – June 2013

### Applied Exercise Physiology

#### Question 1

- 1 (a) How may improved fitness, brought about by regular training on a treadmill, benefit the health of an individual? (1 mark)

<p>A. Reduce weight/fat/obesity/cholesterol;                  B. Strengthen heart/reduce chance of heart attack/coronary risk factors;                  C. Improve social/physical/mental wellbeing</p>	<p>Requires specific benefit to gain credit                  Increase longevity/better health/feel good – too vague                  B – any improved physiological factor credited                  C – need 2 out of 3 factors</p>
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- 1 (b) (i) As the runner in **Figure 1** exercises, his chemoreceptors will detect any increase in carbon dioxide levels.

Explain how this causes an increase in the runner's breathing rate. (3 marks)

<p>A. Nerve impulses to respiratory (control) centre/medulla/autonomic nervous system;                  B. Phrenic/sympathetic nerve/impulses <u>to</u> breathing muscles                  C. Diaphragm/ intercostal muscles;                  D. <u>Deeper</u> breathing/increase tidal volume;                  E. Use of sternocleidomastoid/scalenes/pectoralis minor/rectus abdominus muscles</p>	<p>A. Do <b>not</b> accept RCC                   D – Do not accept 'Faster breathing' as is in question</p>
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- 1 (b) (ii) The arterio-venous oxygen difference (a-vO<sub>2</sub> diff) of the runner in **Figure 1** will increase during exercise.

What do you understand by the term a-vO<sub>2</sub> diff **and** why does it increase during exercise? (2 marks)

<p>A. Difference between oxygen content of arterial and venous blood/how much O<sub>2</sub> is extracted and used by muscles;                  B. <u>More</u> oxygen is <u>extracted</u> by the muscles/lungs;                  C. Oxygen is used/needed for energy/ATP production/respiration;</p>	<p>Sub max 1 mark                  B – Needs eq – accept needed/used by muscles</p>
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- 1 (c) Explain the causes of the Bohr shift **and** how it increases oxygen delivery to the working muscles. (3 marks)

<p>A. Exercise increases temperature;                  B. Exercise causes increased CO<sub>2</sub> /acidity in blood/lower pH/increased H ion concentration;                  C. Curve shifts to right;                  D. More oxygen <u>disassociates</u> from haemoglobin/ reduced affinity for oxygen;</p>	
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- 1 (d) Describe how running affects the venous return mechanism. (3 marks)

<p>A. Venous return increases                  B. (Skeletal pump) – increased muscle contractions compress veins and push blood towards heart;                  C. One way valves in veins/to prevent backflow;                  D. (Respiratory pump) – greater breathing movements alter pressure in thorax compresses veins - assist flow back to heart;                  E. Running – heart beating faster - suction pump of heart.</p>	<p>Do not accept 'changes'  Cause and effect</p>
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**Question 2**

- 2 (a) Complete **Table 1** to identify the main agonist, the type of muscle contraction and the joint action at the **hip joint** during the isotonic movement from Position **A** to Position **B**. (3 marks)

	<b>Hip</b>	<p>Accept first term only                  A. Accept Latin names of individual muscles -biceps femoris/ semitendinosus/ semimembranosus/ gluteus maximus                  B. no alternatives                  C. Accept extension to flexion</p>
<b>Main agonist</b>	A. Gluteals/hamstrings;	
<b>Type of muscle contraction</b>	B. Eccentric;	
<b>Joint action</b>	C. Flexion;	

- 2 (b) Balance is an important aspect of weight-training.

What do you understand by the term balance? (2 marks)

<p>A. Maintaining/keeping <u>stable</u> at <u>equilibrium</u>                  B. <u>Centre of gravity/mass</u> over base of support;                  C. Static or Dynamic.</p>	<p>A and B – Required terms</p>
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2 (c) Some people exercise to control their weight.

Define the term obesity **and** suggest **one** limitation for any definition of this term. (2 marks)

<p>A. Obese = 20%/30% + body fat / BMI &gt;30/40;                  B. Limited because measurement is inaccurate/                  subjective/difficult to measure/could have big                  muscles/large frame/physique</p>	<p>Definition must be                  objective – 'lots of                  fat'/overweight' =                  wrong</p>
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2 (d) (i) Using the information in **Table 2**, how would cardiac output at rest be calculated? (2 marks)

<p>A. Correct numbers (70 x 70)/written equation <math>Q = SV \times HR</math>;                  Correct units – (4900) mls/min or (4900) mls.min<sup>-1</sup>                  or (49) dm<sup>3</sup>/min or (49) dm<sup>3</sup>.min<sup>-1</sup> or (49) L/min                  or (49) L.min<sup>-1</sup></p>	<p>A – formula or maths                  B – units</p>
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2 (d) (ii) Use Starling's law of the heart to explain how stroke volume increases during activity. (3 marks)

<p>A. Increased venous return;                  B. Greater diastolic filling/preload;                  C. Cardiac muscle stretched/elastic;                  D. Greater/stronger/more powerful/ force of                  contraction;                  E. Increased ejection fraction;</p>	<p>A – do not accept                  'more blood back to                  heart'                  E – do not accept                  'increase stroke                  volume' – in question</p>
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**Skill Acquisition**

**Question 3**

**3 (a) (i)** How does intrinsic motivation differ from extrinsic motivation? (1 mark)

<p>A. Intrinsic from within/inside <b>and</b> extrinsic from outside                  B. Intrinsic = drive/urge from within</p>	<p>If say 'intrinsic from within and extrinsic is not' = too vague</p>
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**3 (a) (ii)** Explain why intrinsic motivation is thought to be a better form of motivation than extrinsic motivation. (3 marks)

<p>A. Intrinsic motivation gives performer a sense of <u>control</u> over performance;                  B. (Excessive) extrinsic may reduce/lead to loss of (intrinsic) motivation/play for prize, not love of game;                  C. Performers demand increasing extrinsic rewards/some rewards unimportant/lose their value                  D. Failure to achieve extrinsic reward may lead to loss of (intrinsic) motivation/if no reward, give up;                  E. Extrinsic motivation controls or manipulates behaviour/overly reliant                  F. (Excessive) need for extrinsic – too much pressure/ win at all costs/leads to cheating;</p>	<p>'Extrinsic is no good' is too vague as it is in the question                  A – Concerned with self</p>
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**3 (b)** Games players may find that their skill performance reaches a plateau.

Suggest possible solutions that a coach could use to minimise a learning plateau.

(4 marks)

<p>A. Distributed sessions/rest/recovery periods;                  B. Resetting of goals/tasks more challenging/competition against opposition;                  C. Offering extrinsic rewards/encouragement/praise/positive reinforcement;                  D. Using mental rehearsal/imagery/visualisation;                  E. Provide feedback/visual guidance;                  F. Use of whole-part-whole/part method/breaking the skill down;                  G. Ensure performer focuses on appropriate cues;                  H. Make practices more varied/more interesting/fun/enjoyment;                  I. Make performer fitter;                  J. Better quality coaching/new coach/change coaching method;                  K. Concept of plateau in performance explained to performer;</p>	<p>C – not motivation – more detail – how to motivate</p>
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**3 (c)** Skilful play within a game relies on effective information processing. According to Adam's closed loop theory, two pieces of information called traces are used to control movement.

**3 (c) (i)** Name these **two** traces. (1 mark)

A. Memory trace <b>and</b> Perceptual trace	Required terms only
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**3 (c) (ii)** Describe how these two traces are used to produce skilled movement. (3 marks)

<p>A. Memory trace (MT) = plan of action/motor programme/ acts as reference standard/ initiates movement;</p> <p>B. MT - based on experience/practice/previous performance;</p> <p>C. Perceptual Trace - directs/controls current movement;</p> <p>D. Learning involves development of PT through feedback;</p> <p>E. Two (memory and perceptual) are compared;</p> <p>F. If they match/correspond - movement continues;</p> <p>G. Mismatch produces error corrections (during performance);</p> <p>H. Adjusted memory trace = new motor programme</p>	
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**Question 4**

**4 (a)** Using examples of passing from a team game, explain the **differences** between motor ability and perceptual ability. (3 marks)

<p>A. Motor ability – movements/actions/performing task/ motor programmes;</p> <p>B. Eg Leg/arm/body actions/muscle contractions;</p> <p>C. Perceptual ability – receiving/recognising/selecting/ deciding on information from senses;</p> <p>D. Eg detecting/seeing where team mates/opposition are positioned;</p>	<p>A – Movements/actions</p> <p>B – Do not credit 'passing'</p> <p>C – is about detecting but not perceiving</p> <p>D – What's detected when passing</p>
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- 4 (b)** Explain the functions of the short-term sensory store **and** the long-term memory when performing the skill of passing. (4 marks)

<p>Short-term sensory store</p> <p>A. Receives information <u>from</u> display/surroundings/ environment/equiv;</p> <p>B. From sensors/sense organs/egs/equiv.</p> <p>C. Too much/lots of information;</p> <p>D. Information is filtered/selective attention;</p> <p>E. Attended information enters short-term memory</p>	Sub max 2
<p>Long-term memory</p> <p>F. Store of past experiences;</p> <p>G. As Motor programme/schema/plan of action/skills/ passes;</p> <p>H. Mental image of movement to be performed;</p> <p>I. Correct information/meaningful/important/rehearsed/relevant information stored;</p> <p>J. Information in to/from Short Term Memory;</p>	Sub max 2

- 4 (c) (i)** What is operant conditioning? (3 marks)

<p>A. Learning based on strengthening the relationship between stimulus and response/S-R bond;</p> <p>B. Increases the likelihood of the desired response reoccurring/equiv</p> <p>C. Trial and error learning;</p> <p>D. Learner associates consequences of previous action with current situation;</p> <p>E. Shaping;</p> <p>F. Manipulation of the environment to get the desired action;</p> <p>G. Appropriate example of shaping – use of targets/lower baskets to give success/make practice easier/etc;</p>	<p>C – required term</p> <p>D – explanation</p> <p>E – required term</p> <p>F – explanation</p>
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- 4 (c) (ii)** Using an example from a team game, explain the term negative reinforcement. (2 marks)

<p>A. Eg: named team game, identified reinforcer and identified criticism</p> <p>B. (Negative reinforcement) – when the adverse stimulus is withdrawn when the desired response occurs;</p> <p>C. Makes required behaviour more likely/strengthens S-R bond;</p>	<p>Sub-max 1</p> <p>Use of punishment is incorrect</p> <p>A – eg in a rugby match, the coach criticises poor play</p> <p>B – eg coach stops criticising when skill is successful</p>
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## Opportunities for Participation

### Question 5

- 5 (a) (i) Outline **two** objectives of teaching military drill in schools in the early 20th century (1902–1904). (2 marks)

<p>A. Improve health <u>and</u> fitness;                  B. Improve discipline/obedience/equiv;                  C. Familiarity with weapons;                  D. Preparation for work/war;</p>	<p>A – Both required                   D – Not military as in the question</p>
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- 5 (a) (ii) What changes occurred in Physical Education in state schools following World War II (1939-1945), and prior to the National Curriculum, to encourage a more movement-based approach? (4 marks)

<p>A. <u>Educational</u> gymnastics/discovery/problem-solving/creativity/child-centred/Heuristic learning/dance/group work;                  B. Moving and growing/planning the programme;                  C. Rebuilding of <u>facilities</u> with apparatus/equipment/playing fields;                  D. Greater range of activities;                  E. De-centralised/greater teacher decisions/flexibility of content and/or delivery style;                  F. Specialised (PE) teachers;                  G. Greater emphasis of skill/health development.</p>	<p>B – required terms                   F – ‘Teachers’ is too vague</p>
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- 5 (b) (i) What are the benefits to students of participating in outdoor and adventurous activities? (3 marks)

<p>A. Appreciation/understanding of the natural environment/issues;                  B. Trust/awareness in others/communication/teamwork/ social skills/co-operation;                  C. Self-reliance/decision-making/leadership/problem-solving/confidence;                  D. Excitement/know own limits/courage/bravery/determination/overcome fear/self-awareness/experience perceived risk;                  E. Cross curricular opportunities/field trips/geography, biology etc;                  F. Acquire new/different skills, eg/survival/map reading/safety/ awareness of danger/lifelong learning;                  G. Improving health/fitness.</p>	<p>A – Aesthetic/philosophic                  B – Others/social                  C – Own decisions                  D – Adrenaline hit                  E – Other subjects                  F – Develop specific skills – improving skills on its own is insufficient</p>
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- 5 (b) (ii) What problems do schools face in offering outdoor and adventurous activities? (3 marks)

<p>A. Lack of time/curriculum pressure;                  B. Lack of finance/transport costs;                  C. Lack of suitable situations/facilities/inner city/location;                  D. Lack of suitably qualified/experienced/motivated staff;                  E. Safety concerns/legislation.</p>	<p>B – Not just lack of transport</p>
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**Question 6**

- 6 (a) What social **and** economic barriers may account for the lower participation rate of women in physical activity? (4 marks)

<p>A. General point about sexual discrimination;                  B. Effects of lack of media coverage/role models/<u>f</u>emale coaches;                  C. Accepted gender role/stereotyping/traditional role/ child care/family commitments                  D. Inappropriate activity/physiological myths/ poor body image;                  E. Sport as a male preserve/keep women out;                  F. Lower (disposable) income/expense;                  G. Less time available;                  H. Less resources/lower funding/prize money/ sponsorship opportunities/fewer facilities/reduced access/fewer female clubs/ opportunities;</p>	<p>Do <b>not</b> accept lack of transport                   C – accept examples of traditional roles                   E – idea that sport is for men                  F – financial limitations                  G – time constraints                  H – lower extrinsic rewards</p>
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- 6 (b) Badminton is a popular physical activity amongst women.

Suggest reasons why female participation rates are relatively high in this activity. (4 marks)

<p>A. Environmental conditions, eg dry, warm, comfortable, indoors                  B. Individual/don't rely on a team                  C. Can be played casually/recreationally/socially/competitively/own pace                  D. Can maintain health and fitness                  E. Increased provision in schools/leisure centres/clubs                  F. Lifetime activity/suitable for all ages;                  G. Non-contact/not as aggressive/ non-strenuous;                  H. Socially acceptable/women traditionally played badminton/positive role models, eg Gail Emms</p>	<p>C – about when and how played                   E – do <b>not</b> accept more facilities/opportunities                   G – is about the physicality of the activity</p>
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- 6 (c)** Badminton clubs organised by the voluntary sector provide opportunities for recreation within the local community.

What are the characteristics **and** goals of the voluntary sector? (4 marks)

<p><b>Characteristics</b></p> <p>A. Run by members/committee/AGM/un-paid volunteers/parents/community;                  B. Possibly on trust/charity basis/limited company;                  C. Financed by members' fees/fund-raising/bar-take/sponsorship/donations/grants/lottery;                  D. Runs on profit-loss/profit not an overriding concern/money placed back into club.</p>	<p>A – not just run by volunteers</p> <p>C – about how money is raised                  D – about what you do with the money</p> <p>Sub max 3</p>
<p><b>Goals</b></p> <p>E. Provide for grass roots of sport;                  F. Tries to increase participation and equal opportunities                  G. Improve performance levels in their sport/look for talent;                  H. Meet up with people with similar interests/social.</p>	<p>Sub max 3</p>

**Question 7**

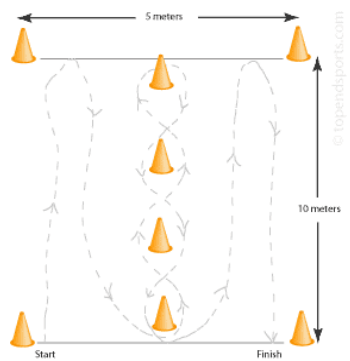
**7** You have been asked to measure the fitness and to improve the skills of a group of AS Physical Education students.

Name and describe **one** suitable test that would measure the students' leg power **and one** test to measure their agility.

Using examples, explain how the different forms of feedback may help a performer to improve their skills. (12 marks)

A. Power – Sergeant/ vertical jump test	A. Standing long/broad jump	A. Margaria (Kalamen) (power/stair) climb Test	A. PWC <sub>170</sub> Test	A. (40) metre sprint
B. Preparation – chalks/licks his/her finger tips/ use measuring device	B. Stand behind line marked on the ground	B. Run up flight of (12) stairs	B. Pedal on exercise bike/ergometer	B. Stand behind line marked on the ground
C. Pre-jump – reaches up as high as possible with one hand and marks wall/ pushes green scale up wall with tips of fingers	C. A two foot take-off	C. (6m) run up before stairs	C. Increase resistance/ power every 2/3 minutes	C. Sprint/run/ move as fast as possible
D. Jumps as high as possible	D. Jump as far as possible, landing on both feet	D. Three stairs at a time	D. Measure heart rate at each increase in power	D. Measure time taken
E. Distance above stretch height = power measure	E. Distance achieved to nearest landing point = power measure	E. Calculate power from time and weight ( $P = \frac{\text{Mass} \times \text{Distance}}{\text{time}}$ )	E. Calculate power output for HR of 170	E. Calculate power output from time and mass/weight

- A. Must be correct name of test – Do **not** accept jump test or stair test or cycling test
- B. C. and D. require detailed description
- E. Idea of how power is actually calculated

<p>F. Illinois agility run          G. 10 metres long / 60 metres in total          H. Subject starts lying down (on their front)          I. Subject sprints <u>and</u> weaves (accept/expect diagram)          J. Time taken/measured in seconds = agility</p> <p>K. Intrinsic/kinaesthetic – from within - performer feels own responses/reinforces          L. Extrinsic – from outside/coach/crowd helps motivate/can correct errors          M. Concurrent – during skill action – can motivate/reinforce;          N. Terminal – following skill performance – can motivate/reinforce/correct;          O. Positive – praise and acknowledgement of a correct or successful action - motivates;          P. Negative – critical comments about how a movement was incorrect or could have been better;          Q. Immediate – feedback given straight after performance to motivate/correct/reinforce;          R. Delayed – feedback that is given some time after the event to reinforce/correct;          S. Knowledge of results (KR) – feedback in the form of information about how successful the movement was in accomplishing the task/feedback about the outcome;          T. Knowledge of Performance (KP) – information given as feedback as to how well the movement was executed, regardless of end result - correct/reinforce</p>		<p>F – correct name only          G – Some idea of distances involved          H – Not standing start</p> <p>I – idea of different techniques used/ change direction too vague          J – some idea of what represents agility</p> <p>Feedback responses require name and description AND how it helps performer - command word is EXPLAIN          Majority motivate/reinforce/correct errors          Eg:          K – intrinsic - from within - feels movement – all three parts required for credit</p> <p>S. Do <b>not</b> accept that KR is knowledge of results          T. Do <b>not</b> accept that KP is knowledge of performance</p>
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Band Range	Band descriptors
<b>10 – 12</b>	<ul style="list-style-type: none"> <li>• Addresses all aspects of question, demonstrating wide range of depth and knowledge</li> <li>• Expresses arguments clearly and concisely</li> <li>• Good use of examples to support answer</li> <li>• Few errors in their spelling, punctuation and grammar, and correct use of technical language</li> </ul>
<b>7 – 9</b>	<ul style="list-style-type: none"> <li>• Addresses most aspects of question, demonstrating clear level of depth and knowledge</li> <li>• Attempts to express arguments clearly and concisely</li> <li>• Uses examples to support answer</li> <li>• Few errors in their spelling, punctuation and grammar, and correct use of technical language, although sometimes inaccurately</li> </ul>
<b>4 – 6</b>	<ul style="list-style-type: none"> <li>• Addresses some aspects of question, but lacks sufficient depth and knowledge</li> <li>• Limited attempt to develop any arguments or discussions, normally vague or irrelevant</li> <li>• Attempts to use examples although not always relevant</li> <li>• Errors in spelling, punctuation and grammar, and limited use of technical language</li> </ul>
<b>1 – 3</b>	<ul style="list-style-type: none"> <li><input type="checkbox"/> Addresses question with limited success</li> <li>• Little or no use of examples</li> <li>• Major errors in their spelling, punctuation and grammar, and little use of technical language</li> </ul>

Number of correct responses	Level achieved	Discriminator	Initial mark	Optional QWC/ coverage	Potential final mark
13+	4	15+ items	11	+1	11 or 12
		13 or 14 items	10	+1	10 or 11
9-12	3	11 or 12 items	8	+1	8 or 9
		9 or 10 items	7	+1	7 or 8
5-8	2	7 or 8 items	5	+1	5 or 6
		5 or 6 items	4	+1	4 or 5
1-4	1	3 or 4 items	2	+1	2 or 3
		1 or 2 items	1	+1	1 or 2
0					0