Version 1

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

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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)*

A. Reduce weight/fat/obesity/cholesterol; B. Strengthen heart/reduce chance of heart attack/coronary risk factors; C. Improve social/physical/mental wellbeing	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

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)*

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	A. Do **not** accept RCC D – Do not accept 'Faster breathing' as is in question

1 (b) (ii) The arterio-venous oxygen difference (a-vO_2 diff) of the runner in **Figure 1** will increase during exercise.

What do you understand by the term a-vO_2 diff **and** why does it increase during exercise? *(2 marks)*

A. Difference between oxygen content of arterial and venous blood/how much O_2 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;	Sub max 1 mark B – Needs eq – accept needed/used by muscles

1 (c) Explain the causes of the Bohr shift **and** how it increases oxygen delivery to the working muscles. *(3 marks)*

A. Exercise increases temperature; B. Exercise causes increased CO_2 /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;	

1 (d) Describe how running affects the venous return mechanism. *(3 marks)*

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.	Do not accept 'changes' Cause and effect

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)*

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

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

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

A. Maintaining/keeping <u>stable</u> at <u>equilibrium</u> B. <u>Centre of gravity</u>/<u>mass</u> over base of support; C. Static or Dynamic.	A and B – Required terms

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)*

A. Obese = 20%/30% + body fat / BMI >30/40; B. Limited because measurement is inaccurate/ subjective/difficult to measure/could have big muscles/large frame/physique	Definition must be objective – 'lots of fat'/'overweight' = wrong

2 (d) (i) Using the information in **Table 2**, how would cardiac output at rest be calculated? *(2 marks)*

A. Correct numbers (70 x 70)/written equation Q = SV x HR; Correct units – (4900) mls/min or (4900) mls.min^{-1} or (49) dm^3/min or (49) dm^3.min^{-1} or (49) L/min or (49) L.min^{-1}	A – formula or maths B – units

2 (d) (ii) Use Starling's law of the heart to explain how stroke volume increases during activity. *(3 marks)*

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;	A – do not accept 'more blood back to heart' E – do not accept 'increase stroke volume' – in question

Skill Acquisition

Question 3

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

A. Intrinsic from within/inside **and** extrinsic from outside B. Intrinsic = drive/urge from within	If say 'intrinsic from within and extrinsic is not' = too vague

3 (a) (ii) Explain why intrinsic motivation is thought to be a better form of motivation than extrinsic motivation. *(3 marks)*

A. Intrinsic motivation gives performer a sense of control 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;	'Extrinsic is no good' is too vague as it is in the question A – Concerned with self

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)

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;	C – not motivation – more detail – how to motivate

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 **and** Perceptual trace	Required terms only

3 (c) (ii) Describe how these two traces are used to produce skilled movement. *(3 marks)*

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

Question 4

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

A. Motor ability – movements/actions/performing task/ motor programmes; B. Eg Leg/arm/body actions/muscle contractions; C. Perceptual ability – receiving/recognising/selecting/ deciding on information from senses; D. Eg detecting/seeing where team mates/opposition are positioned;	A – Movements/actions B – Do not credit 'passing' C – is about detecting but not perceiving D – What's detected when passing

4 (b) Explain the functions of the short-term sensory store **and** the long-term memory when performing the skill of passing. *(4 marks)*

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

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

A. Learning based on strengthening the relationship between stimulus and response/S-R bond; B. Increases the likelihood of the desired response reoccurring/equiv C. Trial and error learning; D. Learner associates consequences of previous action with current situation; E. Shaping; F. Manipulation of the environment to get the desired action; G. Appropriate example of shaping – use of targets/lower baskets to give success/make practice easier/etc;	C – required term D – explanation E – required term F – explanation

4 (c) (ii) Using an example from a team game, explain the term negative reinforcement. *(2 marks)*

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

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)*

A. Improve health <u>and</u> fitness; B. Improve discipline/obedience/equiv; C. Familiarity with weapons; D. Preparation for work/war;	A – Both required D – Not military as in the question

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)*

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.	B – required terms F – 'Teachers' is too vague

5 (b) (i) What are the benefits to students of participating in outdoor and adventurous activities? *(3 marks)*

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.	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

5 (b) (ii) What problems do schools face in offering outdoor and adventurous activities? *(3 marks)*

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.	B – Not just lack of transport

Question 6

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

A. General point about sexual discrimination; B. Effects of lack of media coverage/role models/female 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;	Do **not** 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

6 (b) Badminton is a popular physical activity amongst women.

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

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	C – about when and how played E – do **not** accept more facilities/opportunities G – is about the physicality of the activity

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)*

Characteristics 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.	A – not just run by volunteers C – about how money is raised D – about what you do with the money Sub max 3
Goals 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.	Sub max 3

Question 7

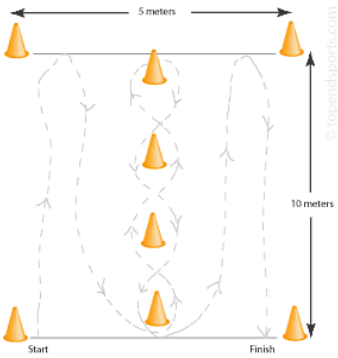
7 You have been asked to measure the fitness and to improve the skills of a group of AS Physical Education students.

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 $_{170}$ 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 = (Mass x Distance) x 9.8 / 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

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  	F – correct name only G – Some idea of distances involved H – Not standing start I – idea of different techniques used/ change direction too vague J – some idea of what represents agility 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
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	S. Do **not** accept that KR is knowledge of results T. Do **not** accept that KP is knowledge of performance

Band Range	Band descriptors
10 – 12	• Addresses all aspects of question, demonstrating wide range of depth and knowledge • Expresses arguments clearly and concisely • Good use of examples to support answer • Few errors in their spelling, punctuation and grammar, and correct use of technical language
7 – 9	• Addresses most aspects of question, demonstrating clear level of depth and knowledge • Attempts to express arguments clearly and concisely • Uses examples to support answer • Few errors in their spelling, punctuation and grammar, and correct use of technical language, although sometimes inaccurately
4 – 6	• Addresses some aspects of question, but lacks sufficient depth and knowledge • Limited attempt to develop any arguments or discussions, normally vague or irrelevant • Attempts to use examples although not always relevant • Errors in spelling, punctuation and grammar, and limited use of technical language
1 – 3	• Addresses question with limited success • Little or no use of examples • Major errors in their spelling, punctuation and grammar, and little use of technical language

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