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GCE Physical Education 6723
Mark Scheme (Final)
Summer 2008

GCE

GCE Physical Education (6723/01)

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Registered Office: One90 High Holborn, London WC1V 7BH

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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.

Question Number	Answer	Mark
1(a)	Describe a cool down for a named sport and explain the reason why each activity within the cool down is performed. Sub max of 4 marks for no named sport. No mark awarded for naming the sport. Max of 3 for description of activities. NB. The marks for explanation must relate <u>specifically to the activity being carried out.</u> Tennis 1. Named gross motor activity at a 2. gradually reducing/varied intensity 3. to continue the delivery of O^2 to the muscles repay EPOC / O2 debt 4. and to aid the complete removal of CO2/lactic acid 5. to aid a faster/more complete recovery 6. To prevent blood pooling / prevent dizziness 7. stretching 8. to facilitate further the removal of waste/bye products 9. to maintain / increase the range of motion / muscle elasticity. 10. dietary supplementation of water/electrolyte, carbohydrates/proteins 11. to speed up the recovery process (which includes – <u>reduce</u> the effects of DOMS)	**(6)**

Question Number	Answer	Mark
1(b)(i)	Identify and describe the **two** different types of isotonic contraction. For description marks candidates must clearly indicate that the muscle is active / contracting. 1. concentric 2. muscle actively shortens during the movement 3. eccentric 4. muscle actively lengthens during the movement.	**(4)**

Question Number	Answer	Mark
1(b)(ii)	Identify a sporting example where a named muscle performs both types of contraction. **Max of 1 mark for appropriate example with inaccurate muscle and contractions** **e.g.** 1. standing jump 2. when lowering to jump the quadriceps contract eccentrically 3. when jumping the quadriceps contract concentrically.	**(3)**

Question Number	Answer	Mark
1(b)(iii)	Identify a sporting movement where an antagonistic pair of muscles each take on the role of the prime mover. Name the muscles and the type of isotonic contraction performed. **Max of 1 mark for appropriate example with inaccurate muscle and contractions** **e.g.** Boxing 1. preparing to throw a punch, the biceps 2. throwing the punch, the triceps 3. contract concentrically.	**(3)**

Question Number	Answer	Mark
1(c)(i)	Identify the **three** types of muscle fibre. 1. Type I/Slow twitch 2. Type IIa/FOG 3. Type IIb/FTG	**(3)**

Question Number	Answer	Mark
1(c)(ii)	List **two** structural characteristics of each fibre type. Describe how these characteristics affect the function of the fibre. Max of 2 marks for each fibre type when structural characteristics are linked to function. Type I / slow twitch 1. high myoglobin content/aids O^2 transfer from the blood so fuelling the muscle fibre / supports endurance activities 2. high density of mitochondria/facilitates greater levels of respiration 3. significant capillarisation/aids blood travel into to the muscle = > O^2 delivery & CO2 removal. Type IIa / FOG 4. high myoglobin content/aids O^2 transfer from the blood so fuelling the muscle fibre 5. greater density of mitochondria than type IIb/uses O^2 more effectively to facilitate a greater work duration	

	6. higher levels of muscle glycogen than type I fibres/increased intensity of work. 7. more muscle glycogen than type I / greater capacity for higher intensity activity Type IIb / FTG 8. low density of mitochondria/do not respire very effectively 9. low level of capillarisation/do not utilise O^2 effectively so less vascular 10. low myoglobin content/less need to catch the O^2 from the blood as there is less blood arriving 11. high levels of PC & muscle glycogen/increased intensity of work. 12. Thick in diameter / increased power	**(6)**

Question Number	Answer	Mark
2(a)(i)	Identify the structural and functional adaptations required by an athlete in order that they might improve their VO_2 max. Max of 4 for structural or functional Structural 1. reduce body fat levels 2. cardiac hypertrophy 3. increased vascularisation of the muscles 4. increased vascularisation of the lungs and heart 5. increased RBC/haemoglobin levels 6. increased no. of myoglobin 7. increased size/density/no. of mitochondria. 8. increased alveoli coverage Functional 9. increase SV/Q 10. increased cardio vascular efficiency 11. greater efficiency of gaseous exchange 12. Increased O2 usage 13. Increased vascular shunting	**(5)**

Question Number	Answer	Mark
2(a)(ii)	Explain why these adaptations would be more effective than simply increasing lung capacity.	

	1. key being volume of O^2 taken in and <u>used</u> 2. at least 75% of inspired O^2 is exhaled which identifies that we can take in sufficient levels but can not make use of it all. 3. Only possible for marginal increases in lung capacity Or similar.	**(2)**

Question Number	Answer	Mark
2(b)	**Macro**, **meso** and **micro cycles** are used by many athletes when planning training programmes. Define the **three** terms and apply them practically to a games player. NB The answer must indicate that the micro cycles make up the meso cycle and the meso cycles make up the macro cycle, not indicating that the three are separate, unrelated cycles. 1. macro cycle is the entire training programme 2. e.g. the season 3. meso cycle is a period within the cycle (usually at least 4 weeks) 4. e.g. pre season 5. micro cycle is a training session or small no. of sessions 6. e.g. a session on set pieces.	**(6)**

Question Number	Answer	Mark
2(c)(i)	Ventilation is largely reliant on differences in pressure. Define the term pressure gradient. What are the consequences of a pressure gradient? Must include definition to achieve both marks 1. is a difference in pressure between two adjacent areas 2. movement of gases/gas moves from areas of high pressure to low pressure. 3. the depth of the gradient is determined by the difference between the two pressure areas 4. steeper gradient = greater gaseous exchange / and opposite	**(2)**

Question Number	Answer	Mark
2(c)(ii)	Identify how the mechanical process of ventilation creates the necessary pressure gradient. 1. during inspiration the contraction of the respiratory muscles increases the size of the lungs/thoracic cavity.	

	2. this produces a drop in pressure within the lungs to a level lower than in the atmosphere 3. creating a pressure gradient / air movement 4. after inspiration is complete the lungs are full which increase the pressure 5. the elastic recoil of the respiratory muscles intensifies this pressure to a level greater than that in the atmosphere 6. creating a pressure gradient movement of air	**(4)**

Question Number	Answer	Mark
2(d)	Define venous return. Identify and describe mechanisms used by the body to aid venous return. Must define venous return to score max marks Max of 5 marks for identifying and describing mechanisms 1. the amount of blood returned to the right atrium / right side of the heart per minute 2. <u>skeletal muscle pump</u> 3. muscles surrounding the veins contract and squeeze the veins 4. increasing the pressure within them which forces open the valve and pushes the blood onward 5. <u>system of valves</u> 6. valves prevent back flow of blood, holding blood like a reservoir until enough blood is present to 7. increase the pressure forcing the next valve in the vein open 8. <u>respiratory pump/thoracic pressure</u> 9. during inspiration pressure decreases within the thoracic cavity 10. this leads to a decrease in pressure within the atria which produces a pressure gradient between the atria and the feeding vessels 11. blood is then drawn into the right atrium from the thoracic veins/vena cava.	**(6)**

Question Number	Answer	Mark
3(a)(i)	Identify **one** fitness test that would be suitable for an aerobic athlete and **one** that would be suitable for an anaerobic athlete. State the component of fitness specifically measured by each test. Test and component of fitness required for each mark.	

	Aerobic athlete e.g. 1. (NCF) multistage fitness test/tests for aerobic capacity/VO2max. Anaerobic athlete 2. standing sergeant jump/power of the lower body.	**(2)**

Question Number	Answer	Mark
3(a)(ii)	Describe the protocol for each test. Must have 3 points of protocol for 3 marks per test. A vaguely named but accurately described test protocol can score marks for protocol (NCF) multistage fitness test 1. 2 markers 20 meters apart 2. run between the markers in time to bleeps on a tape recorder 3. the time between bleeps gradually reduces 4. failure to make 3 consecutive bleeps concludes the test. Standing Sergeant jump 5. measure the vertical reach of an athlete 6. jump and record the highest height reached 7. subtract the 1st reading from the 2nd to provide the height that the athlete has jumped.	**(6)**

Question Number	Answer	Mark
3(b)(i)	Define maximal strength, cardiovascular endurance and reaction time. 1. maximal strength; the greatest force that a muscle can exert / indication of singular action. 2. cardiovascular endurance; the ability of the CV system to deliver blood to the muscles during prolonged activity / deliver the muscles requirements and remove the waste during prolonged activity / working aerobically for a prolonged period of time. 3. reaction time; the time taken from the presentation of a stimulus to the resulting action.	**(3)**

Question Number	Answer	Mark
3(b)(ii)	Using your answer from 3 (b)(i) identify **three** sports, each of which would require one of these as its main component of fitness. Explain why they are important for success within these sports. e.g. 1. maximal strength, Olympic weight lifting 2. the athlete has to out lift opponents, performing 1 repetition 3. cardiovascular endurance, marathon runner 4. the athlete has to run for over 2 hrs and is working aerobically so needs to supply the required O^2 to make the energy 5. reaction times, a goal keeper in football/hockey	

	6. the goal keeper sees the ball and has to move quickly to save it. Or similar NB. The sport must prioritise the fitness component not simply require it.	**(6)**

Question Number	Answer	Mark
3(c)	Define the respiratory volumes and capacities in the table below. **Volume or Capacity** / **Definition** Tidal volume — Volume inspired or expired per breath. Inspiratory reserve volume — Maximum volume inspired after a normal inspiration Expiratory reserve volume — Maximum volume expired after a normal expiration Residual volume — Volume remaining at the end of maximal expiration Total lung capacity — Volumes in the lungs after a maximal inspiration. / TV + IRV + ERV + RV Vital capacity — Maximum volume forcibly expired after maximal inspiration. IRV + ERV Inspiration capacity — Maximum volume inspired from resting expiratory levels IRV + TV Functional residual capacity — Volume in the lungs at resting expiratory levels / after expiration. RV + ERV	**(8)**

Question Number	Answer	Mark
4(a)	Identify the likely adaptations to the cardiovascular system as a result of both aerobic and anaerobic training. Max of 4 scored from either aerobic or anaerobic Aerobic training will produce: 1. cardiac hypertrophy 2. increased vascular elasticity 3. increased End Diastolic Volume 4. decreased End Systolic Volume 5. increased Q 6. increased venous return during exercise	**(6)**

	7. increased SV 8. Increased strength of ventricular contractions 9. lower resting heart rate 10. increased vascularisation 11. increased amount of RBC 12. improved efficiency / Increased VO2max 13. Increased vascular shunting Anaerobic training will produce: 14. a thicker cardiac muscle 15. stronger ventricular contractions 16. decreased End Systolic Volume 17. increased Q during exercise.	

Question Number	Answer	Mark
4(b)(i)	Heart rate is often used to work out a training zone. Define the term training zone and explain how heart rate can be used in this way. Must define the term to score 2 marks 1. a training zone is an intensity of work designed to bring about a specific training effect/adaptation 2. heart rate is an indicator of exercise intensity 3. heart rate – a percentage of the athletes maximum heart rate is targeted during training.	**(2)**

Question Number	Answer	Mark
4(b)(ii)	State Karvonen's equation for a named training zone. Explain the benefits of training in this zone. 3 marks for correct identification of Karvonens theory, 3 marks for named zone and explanation of benefits 1. MHR – RHR = HRR 2. HRR x 0.6 (critical threshold)(or similar accurate zone) 3. + RHR = THR 4. 60%/critical threshold 5. training at this intensity will begin to develop cardiovascular benefits 6. baseline aerobic fitness training.	**(5)**

Question Number	Answer	Mark
4(c)(i)	Define the terms **agonist**, **anatagonist**, **fixator**, and **synergist**. 1. agonist – an active muscle that provides movement / active muscle at an active joint / prime mover 2. antagonist – a passive muscle at a working / active joint 3. fixator – a stabilising muscle at the point of origin to the agonist 4. synergist – a stabilising muscle at the point of insertion / any other stabilising muscle.	**(4)**

Question Number	Answer	Mark
4(c)(ii)	Within a named sporting movement identify the muscles that perform the roles of **agonist**, **anatagonist**, **fixator**, and **synergist**. e.g. Biceps curl 1. agonist – biceps brachii 2. antagonist –e.g. triceps 3. fixator –e.g. deltoid 4. synergist – rectus abdominals	**(4)**

Question Number	Answer	Mark
4(d)	Describe **two** characteristics of circuit training. Identify the benefits associated with this method of training. Characteristics 1. athletes perform different exercises at different stations 2. adaptable to meet the demands of the athlete. 3. working different body parts/performing different skills Benefits 4. can be quick 5. not boring 6. rapid results 7. enables body parts/systems/skills to be overloaded 8. provides multiple fitness benefits	**(4)**