

Mark Scheme (Results) Summer 2008

GCE

GCE Physical Education (6723) paper 01

Unit 3: Exercise and Training (6723)

Question Number	Answer	Mark
1(a)	<p>Sub max of 4 marks for no named sport. No mark awarded for naming the sport. Max of 3 for description of activities.</p> <p>NB. The marks for explanation must relate <u>specifically to the activity being carried out.</u></p> <p>Tennis</p> <ol style="list-style-type: none"> 1. named gross motor activity at a 2. gradually reducing/varied intensity 3. to continue the delivery of O² 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)	<p>For description marks candidates must clearly indicate that the muscle is active/contracting.</p> <ol style="list-style-type: none"> 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)	<p>Max of 1 mark for appropriate example with inaccurate muscle and contractions, eg:</p> <ol style="list-style-type: none"> 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)	<p>Max of 1 mark for appropriate example with inaccurate muscle and contractions, eg:</p> <p>Boxing</p> <ol style="list-style-type: none"> 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)	<p>1 mark for each;</p> <ol style="list-style-type: none"> 1. Type I/Slow twitch 2. Type IIa/FOG 3. Type IIb/FTG 	(3)

Question Number	Answer	Mark
1(c)(ii)	<p>Max of 2 marks for each fibre type when structural characteristics are linked to function.</p> <p>Type I/slow twitch</p> <ol style="list-style-type: none"> 1. high myoglobin content/aids O² 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 = > O² delivery and CO² removal. <p>Type IIa/FOG</p> <ol style="list-style-type: none"> 1. high myoglobin content/aids O² transfer from the blood so fuelling the muscle fibre 2. greater density of mitochondria than type IIb/uses O² more effectively to facilitate a greater work duration 3. higher levels of muscle glycogen than type I fibres/increased intensity of work 4. more muscle glycogen than type I/greater capacity for higher intensity activity. <p>Type IIb/FTG</p> <ol style="list-style-type: none"> 5. low density of mitochondria/do not respire very effectively 6. low level of capillarisation/do not utilise O² effectively so less vascular 7. low myoglobin content/less need to catch the O² from the blood as there is less blood arriving 8. high levels of PC and muscle glycogen/increased intensity of work 9. thick in diameter/increased power. 	(6)

(Total 25 marks)

Question Number	Answer	Mark
2(a)(i)	<p>Max of 4 for structural or functional.</p> <p>Structural:</p> <ol style="list-style-type: none"> 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. <p>Functional:</p> <ol style="list-style-type: none"> 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)	<ol style="list-style-type: none"> 1. key being volume of O² taken in and <u>used</u> 2. at least 75% of inspired O² 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 <p>Or similar.</p>	(2)

Question Number	Answer	Mark
2(b)	<p>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.</p> <ol style="list-style-type: none"> 1. macro cycle is the entire training programme 2. eg the season 3. meso cycle is a period within the cycle (usually at least 4 weeks) 4. eg pre season 5. micro cycle is a training session or small no. of sessions 6. eg a session on set pieces. 	(6)

Question Number	Answer	Mark
2(c)(i)	<p>Must include definition to achieve both marks</p> <ol style="list-style-type: none"> 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)	<ol style="list-style-type: none"> 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)	<p>Must define venous return to score max marks Max of 5 marks for identifying and describing mechanisms</p> <ol style="list-style-type: none"> 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)

(Total 25 marks)

Question Number	Answer	Mark
3(a)(i)	<p>Test and component of fitness required for each mark.</p> <p>Aerobic athlete, eg</p> <ol style="list-style-type: none"> (NCF) multistage fitness test/tests for aerobic capacity/VO_2 max <p>Anaerobic athlete</p> <ol style="list-style-type: none"> standing sergeant jump/power of the lower body. 	(2)

Question Number	Answer	Mark
3(a)(ii)	<p>Must have 3 points of protocol for 3 marks per test. A vaguely named but accurately described test protocol can score marks for protocol</p> <p>(NCF) multistage fitness test</p> <ol style="list-style-type: none"> 2 markers 20 meters apart run between the markers in time to bleeps on a tape recorder the time between bleeps gradually reduces failure to make 3 consecutive bleeps concludes the test. <p>Standing Sergeant jump</p> <ol style="list-style-type: none"> measure the vertical reach of an athlete jump and record the highest height reached subtract the 1st reading from the 2nd to provide the height that the athlete has jumped. 	(6)

Question Number	Answer	Mark
3(b)(i)	<ol style="list-style-type: none"> maximal strength; the greatest force that a muscle can exert/indication of singular action cardiovascular endurance; the ability of the CV system to deliver blood to the muscles during <u>prolonged</u> activity/deliver the muscles requirements and remove the waste during <u>prolonged</u> activity/working aerobically for a <u>prolonged</u> period of time. reaction time; the time taken from the presentation of a stimulus to the resulting action. 	(3)

Question Number	Answer	Mark
3(b)(ii)	<p>eg</p> <ol style="list-style-type: none"> 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 O² 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. <p>Or similar NB. The sport must prioritise the fitness component not simply require it.</p>	(6)

Question Number	Answer	Mark																		
3(c)	<table border="1"> <thead> <tr> <th>Volume or Capacity</th> <th>Definition</th> </tr> </thead> <tbody> <tr> <td>Tidal volume</td> <td>Volume inspired or expired per breath.</td> </tr> <tr> <td>Inspiratory reserve volume</td> <td>Maximum volume inspired after a normal inspiration</td> </tr> <tr> <td>Expiratory reserve volume</td> <td>Maximum volume expired after a normal expiration</td> </tr> <tr> <td>Residual volume</td> <td>Volume remaining at the end of maximal expiration</td> </tr> <tr> <td>Total lung capacity</td> <td>Volumes in the lungs after a maximal inspiration/TV + IRV + ERV + RV</td> </tr> <tr> <td>Vital capacity</td> <td>Maximum volume forcibly expired after maximal inspiration. IRV + ERV</td> </tr> <tr> <td>Inspiration capacity</td> <td>Maximum volume inspired from resting expiratory levels IRV + TV</td> </tr> <tr> <td>Functional residual capacity</td> <td>Volume in the lungs at resting expiratory levels/after expiration. RV + ERV</td> </tr> </tbody> </table>	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)
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Question Number	Answer	Mark
4(a)	<p>Max of 4 scored from either aerobic or anaerobic</p> <p>Aerobic training will produce:</p> <ol style="list-style-type: none"> 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 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 VO_2^{\max} 13. Increased vascular shunting <p>Anaerobic training will produce:</p> <ol style="list-style-type: none"> 14. a thicker cardiac muscle 15. stronger ventricular contractions 16. decreased End Systolic Volume 17. increased Q during exercise. 	(6)

Question Number	Answer	Mark
4(b)(i)	<p>Must define the term to score 2 marks</p> <ol style="list-style-type: none"> 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)	<p>3 marks for correct identification of Karvonens theory, 3 marks for named zone and explanation of benefits</p> <ol style="list-style-type: none"> 1. $MHR - RHR = HRR$ 2. $HRR \times 0.6$ (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)	<ol style="list-style-type: none"> 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)	eg Biceps curl <ol style="list-style-type: none"> 1. agonist - biceps brachii 2. antagonist -eg triceps 3. fixator -eg deltoid 4. synergist - rectus abdominals. 	(4)

Question Number	Answer	Mark
4(d)	Characteristics <ol style="list-style-type: none"> 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 <ol style="list-style-type: none"> 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)

(Total 25 marks)