

Mark Scheme (Results) Summer 2007

GCE

GCE Physical Education (6723) Paper 01

Unit 3: Exercise and Training (6723)

1	(a)	(i)	<p>List seven short term physiological responses to exercise.</p> <ol style="list-style-type: none"> 1. vascular shunting begins 2. reduced viscosity of a muscle 3. > SV / HR 4. > Q 5. > speed of O₂ delivery 6. > venus return 7. > rate of ventilation 8. > rate of diffusion 9. > muscular strength 10. > joint mobility/ >ROM 11. > core temperature 12. > muscular temperature 13. > muscular elasticity and connective tissue. 14. > speed of nerve impulse 15. > reaction time. 16. > potential accumulation of lactic acid 17. thermoregulation begins 18. changes in blood pressure values 19. > metabolic rate / > muscular metabolism 20. secretion of adrenalin. 	(7)
		(ii)	<p>Describe a warm up for a named sport, identifying three stages and activities that would produce the desired responses.</p> <p>Max of 3 for stages. Eg football.</p> <ol style="list-style-type: none"> 1. 1st stage/initial preparation/gross motor activity 2. Jogging or similar CV activity to produce > O₂ delivery 3. 2nd stage/injury prevention/range of motion 4. Stretching - static/ballistic/dynamic 5. 3rd stage/skill practice 6. Skills in isolation 7. Sports specific 8. Skills at game/race pace. 	(6)
	(b)		<p>How do the muscular and skeletal systems work together to produce movement?</p> <ol style="list-style-type: none"> 1. Muscles are attached to bones by tendons 2. Muscles have at least two points of attachments 3. The point of origin is the point of attachment to the anchor bone 4. The point of insertion is the attachment to the bone that moves 5. When contracting the point of insertion is pulled towards the point of origin. 	(3)

	(c)	Identify the three types of skeletal muscle fibre and describe the characteristics of each. <i>Fibres must be named correctly to qualify for the characteristic marks.</i>	(9)
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1. Type 1/slow twitch	2. Type IIa / FOG	3. Type IIb / FTG
4. Good at working with oxygen	5. Good at working with limited O ₂ supplies	6. Poor at working with O ₂ /good at working without O ₂
7. Red in colour	8. Pinkish in colour	9. White
10. Small in diameter	11. Larger than type I in diameter	12. Large diameter
13. Significant capillarisation	14. Relatively vascular	15. Low levels of capillaries
16. Significant quantities of myoglobin	17. Significant quantities of myoglobin	18. Low levels of myoglobin
19. Large/quantities of mitochondria	20. Fewer mitochondria than type I	21. Low levels of mitochondria
22. Recruited first,	23.	24. Recruited last
25. Support sub-maximal contractions ie endurance based athletes - marathon runner	26. Support near maximal contractions/eg middle distance games player	27. Can generate maximal power/such as 100m runner
28.	29. Higher level of lactic acid tolerance	30. Higher levels of PC/ muscle glycogen
31.	32. Not as frequent in humans	33.
34. Slowest nerve transmission	35.	36. Fastest nerve transmission
37. Resistant to fatigue	38. Intermediate rate of fatigue	39. Fatigues quickly

2	(a)	<p>Using examples, define the roles of agonist, antagonist, fixator and synergist.</p> <p>Max of 4 for no eg.</p> <ol style="list-style-type: none"> 1. Agonist - active muscle at an active joint 2. eg biceps brachii in a biceps curl 3. Antagonist - passive muscle at an active joint 4. eg triceps brachii in a biceps curl 5. Fixator - contracts to stabilise the point of origin 6. eg deltoids in a biceps curl 7. Synergist - stabiliser at the point of insertion/muscle that contracts to stabilise the body 8. eg rectos abdominals in a biceps curl. 	(8)
	(b)	<p>(i) List four possible types of movement at the ankle.</p> <ol style="list-style-type: none"> 1. Plantar flexion 2. Dorsiflexion 3. Inversion 4. Eversion 5. Circumduction. 	(4)

	(ii)	<p>Identify and define four other types of movement and provide a sporting example for each.</p> <p><i>NB. The answer must contain both the definition and an example in order to achieve the second mark.</i></p> <ol style="list-style-type: none"> 1. Flexion 2. Reducing the angle at a joint, eg bending the knee in preparation to kick a football 3. Extension 4. Increasing the angle of a joint eg straightening the knee when kicking a football 5. Supination 6. Turning the palm of the hand skywards eg opening the face of a racket in preparation for a top spin shot 7. Pronation 8. Turning the palm of the hand towards the floor, eg closing the face of the racket after a top spin shot 9. Rotation 10. Movement around a pivotal point eg turning at the waist while performing a top spin drive in tennis 11. Abduction 12. Movement away from the midline of the body eg stepping back to play a back foot defensive cricket shot 13. Adduction 14. Movement towards the mid line of the body eg the execution of a golf swing 15. Circumduction 16. A circular movement eg the bowling action in cricket 17. Plantar flexion 18. The pointing of the toes eg the foot position in free style swimming 19. Dorsiflexion 20. The raising of the toes eg the preparation of a standing jump 21. Inversion 22. Turning the sole of the foot inwards eg after an in-swinging pass in football 23. Eversion 24. Turning the sole of the foot outwards eg the foot action in the breast stroke. 	(8)
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	(c) (i)	<p>Give two reasons why athletes may train at altitude.</p> <ol style="list-style-type: none"> 1. In preparation for performance at altitude 2. In an attempt to boost their aerobic training/to achieve necessary physical adaptations 3. A legal way to boost ones RBC count 4. To maintain fitness levels while injured. 	(2)
	(ii)	<p>Many athletes have now adopted the live high train low method in favour of the more traditional live high train high method.</p> <p>Identify three reasons for this change.</p> <ol style="list-style-type: none"> 1. Initial training sessions at altitude necessitate a reduced training intensity/volume 2. This reduction is viewed by many as 'lost time' 3. Training at a low altitude enables the athlete to maintain existing training loads 4. Living at altitude enables the athlete to experience the beneficial adaptations without any negatives 5. Technology/hypoxic tents allow athletes to experience LHTL at home. 	(3)
(Total 25 marks)			

3	(a)	(i)	<p>Identify and define three components of fitness considered important for a named sport.</p> <p>Football:</p> <ol style="list-style-type: none"> 1. speed 2. the ability to move body parts/the body quickly/time taken to cover a distance 3. agility 4. the ability to change direction at speed while in control 5. cardiovascular endurance 6. the ability of the body to supply O₂ to the working muscles and remove CO₂. 	(6)
		(ii)	<p>Name a recognised fitness test for each component of fitness defined in your answer to question (a)(i).</p> <ol style="list-style-type: none"> 1 Speed/30m sprint test 2 Agility/illinois agility test 3. Cardiovascular endurance/12 minute cooper run. 	(3)
	(b)	Cartilage plays a variety of roles within the body.		
		(i)	<p>Identify two types of cartilage and state the characteristics of each.</p> <ol style="list-style-type: none"> 1. White fibro cartilage 2. Tough/strong cushioning substance located at joints likely to experience significant stress 3. White in colour 4. Also joins bones at cartilaginous joints 5. Hyaline cartilage 6. Strong but smooth substance located on the articulating ends of bones at synovial joints 7. Blue in colour 8. Yellow elastic cartilage 9. Pliable 10. Often gives shape 11. Fibro cartilage 12. Very strong sutras 13. In-elastic. 	(4)

	(ii)	<p>State how each characteristic assists movement.</p> <p>White fibrous cartilage:</p> <ol style="list-style-type: none"> 1. very high shock absorption qualities 2. prevents pain and damage to the articulating bones 3. enables us to run and jump without experiencing pain at the knees or the vertebrae. <p>Hyaline cartilage:</p> <ol style="list-style-type: none"> 4. has some shock absorption qualities but primarily aids friction free movement 5. aids the smooth movement. 	(2)
(c)	(i)	<p>Identify the characteristics of interval training and explain why it is such a popular method.</p> <p>Max of 2 for characteristics of interval training.</p> <p>Max of 4 for popularity.</p> <ol style="list-style-type: none"> 1. Training based a W:R ratio 2. Repeated 3. Very adaptable/flexible 4. Different fitness benefits can be obtained 5. Quick/avoids boredom 6. Can be very sport specific 7. The correct intensity can be replicated. 	(5)
	(ii)	<p>Identify two different sporting activities and explain how and why the performers could use interval training.</p> <p>1 mark for identifying two different sporting activities.</p> <p>Activity CV endurance/aerobic activity.</p> <p>How</p> <ol style="list-style-type: none"> 1. W:R ratio of 12:3 minutes at race pace. <p>Why</p> <ol style="list-style-type: none"> 2. Enables the athlete to work on quality/ speed. <p>Activity Speed.</p> <p>How</p> <ol style="list-style-type: none"> 3. W:R ratio of 10 : 90 seconds at max intensity. <p>Why</p> <ol style="list-style-type: none"> 4. Enables repetition at maximal intensity. 	(5)
(Total 25 marks)			

4	(a)	<p>Identify the structural and functional adaptations that result from aerobic training.</p> <p>Max of 6 for either structural or functional.</p> <p>Structural adaptations:</p> <ol style="list-style-type: none"> 1. cardiac hypertrophy 2. thicker myocardium 3. increased levels of myoglobin 4. increased rbc levels 5. > vascularisation of the heart/lungs/working muscles 6. > thickness of hyaline cartilage/and connective tissue 7. increased bone density/laying down of stress lines 8. > alveoli coverage 9. < body fat levels. <p>Functional adaptations:</p> <ol style="list-style-type: none"> 1. > end diastolic volume/ > venous return 2. >SV/Starlings law 3. >Q or constant Q for a given workload 4. stronger ventricular contractions 5. < end systolic volume 6. lower resting heart rate/bradycardia 7. > rate of gaseous exchange 8. >VO₂ Max 9. > CV endurance 10. > localised muscular endurance 11. muscle fibres (type I, IIa & IIb) become better at working with O₂. 	(8)
	(b)	There are three main types of joint within the body.	
	(i)	<p>Identify the three types of joint and state the characteristics of each.</p> <ol style="list-style-type: none"> 1. Fibrous joints/fixed joint/immovable 2. Bones are joined together by in-elastic/very strong fibrous sutures 3. There is no movement 4. Cartilaginous joints/slightly moveable 5. Bones are held in place by strong pads of white fibrous cartilage 6. The cartilage has quite significant elastic properties and so absorbs shock and allows some movement 7. Synovial joints/freely moveable 8. Movement allowed due to the presence of hyaline cartilage and synovial fluid 9. Movement allowed dependent upon the structure of the joint/allows a wide range of movement. 	(6)

	(ii)	<p>Selecting one type of joint explain how it aids the performer. (3)</p> <p>Fibrous joints:</p> <ol style="list-style-type: none"> 1. aids sport by preventing movement and 2. providing protection 3. eg when heading a football the bones of the cranium are held in place, do not move and so protect the brain. <p>Cartilaginous joints:</p> <ol style="list-style-type: none"> 4. elastic qualities help it to absorb shock and 5. allows some movement 6. eg the movement of the true ribs when breathing. <p>Synovial joints:</p> <ol style="list-style-type: none"> 7. joint structure allows movement within permitted planes 8. movement is freely available and pain free 9. eg the ROM at the shoulder. 	
	(c)	<p>State five physiological reasons why ageing leads to a decline in performance. (5)</p> <p><i>Answers must identify the physiological reasoning behind the degenerative process and not simply list components of fitness.</i></p> <ol style="list-style-type: none"> 1. Reduction in the levels of anabolic steroids produced results in the body requiring longer to recover and so can not train as often 2. Reduction in HGH results in less capacity for the body to grow 3. Wear and tear/stress injuries reduces ROM/increases pain 4. Slow down of neural impulses/speed and reaction times decrease 5. Collagen fibres within the lungs reduce their capacity to stretch and so take in less O₂ 6. Collagen fibres within the heart reduce elasticity and so reduce MHR / reduce VO₂ Max 7. Collagen fibres within muscles reduce muscle elasticity and so reduces flexibility 8. Reduced calcium stores make bones more brittle. 	
	(d)	<p>Identify what is meant by a training zone and describe two different methods used to calculate one. (3)</p> <p>Definition:</p> <ol style="list-style-type: none"> 1. A training zone is a region designated by training intensity. <p>Methods:</p> <ol style="list-style-type: none"> 2. heart rate/Karvonens theory 3. RPE scale 4. power output 5. 1 Rep Max & percentages of this. 	
<p>(Total 25 marks)</p> <p>TOTAL FOR PAPER: 50 MARKS</p>			

