Cambridge Technicals

Sport

Unit **1: Body Systems and the effects of physical activity**

Level 3 Cambridge Technical in Sport and Physical Activity
05826 - 05829

Mark Scheme for June 2017

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

All examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the report on the examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Question			Answer	Marks	Guidance
1	b		Tennis	1	
2	c		Scapula	1	
3	c		Biceps femoris	1	
4	a		Increased stroke volume	1	
5	d		Many mitochondria	1	
6	a		Attach muscles to bones	1	
7	b		70ml	1	
8	d		Iliopsoas	1	
9			Ball and socket	1	Synovial = NBD
10			Vascular shunt	1	Accept: vasomotor control Do not accept: Blood shunting / shunting

Question			Answer	Marks	Guidance
11			1. (Protection) The skeleton provides a barrier / protects (vital) organs (from damage due to impact). 2. (Example) Cranium protects brain or ribs protect heart / lungs or vertebral column protects spinal cord. 3. (Movement) the skeleton is **jointed** (to allow movement) **or attachment to muscles** (allows movement) **or** the skeleton provides a **lever system** (for muscles to pull on) 4. (Example) named bone/joint linked to movement of correct part of body e.g. Femur for jumping movements/moving leg 5. (Blood cell production) (red/white) blood cells are formed in (bone) **marrow** 6. (Example) accept any named **long** bone	6	Accept: • Equivalent examples for pts 2,4,6.
12			1. A = cervical (vertebrae) 2. B = thoracic (vertebrae) 3. C = lumbar (vertebrae) 4. D = sacrum/sacral (vertebrae)	4	Accept: • Misspellings if word is recognisable / phonetic

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>13</td><td></td><td></td><td>
<table>
<tr><th>Structure</th><th>Function</th></tr>
<tr><td>1. Cartilage</td><td>2. Reduces friction between bones or stops bones rubbing together</td></tr>
<tr><td>3. Ligament</td><td>4. Attaches bone to bone or stabilise joint</td></tr>
<tr><td>5. Synovial membrane</td><td>6. Secretes/produces/ encases synovial fluid</td></tr>
<tr><td>7. Synovial fluid</td><td>8. Lubricates/cushions joint or synovial fluid absorbs / breaks down debris in joint.</td></tr>
<tr><td>9. Meniscus/menisci</td><td>10. Additional cartilage to stabilise joint</td></tr>
<tr><td>11. Pads of fat</td><td>12. Absorb shock or fill large spaces in joint</td></tr>
<tr><td>13. Bursa</td><td>14. Reduce friction between tissues</td></tr>
<tr><td>15. Joint capsule</td><td>16. Encloses joint</td></tr>
</table>
</td><td>4</td><td>• Mark first two structures only.

• Function <u>must</u> relate to the named structure.</td></tr>
<tr><td>14</td><td></td><td></td><td>1. Increased strength of bones or ligaments
2. Increased range of movement <u>at joints or</u> increase in flexibility <u>at the joints</u>
3. Increased bone density or increased calcium/ mineral storage
4. Reduced risk of osteoporosis or (osteo)arthritis
5. Increased stability of joints
6. Increased thickness of (articular) cartilage
7. Improved posture/body alignment</td><td>2</td><td>• Mark first two only.

Accept:
• Stronger bones

• Stronger bones due to increased bone density = 2 marks (pt 1 and pt 3)

Do not accept:
• Greater flexibility (on its own) / healthy bones = NBD

• Strengthen skeleton = NBD</td></tr>
</table>

Question			Answer	Marks	Guidance
15			Fast twitch glycolytic fibres are used in activities that are of (1) **high** intensity and require a very (2) **strong** force of contraction. This is because the size of the motor neurone is (3) **large** and there are (4) **many** fibres per motor unit.	4	
16	**(a)**		1. Biceps (brachii) 2. Triceps (brachii) 3. (Wrist) flexors 4. (Wrist) extensors	4	**Do not accept:** • Wrist extender • Pronator teres or supinator
16	**(b)**		1. Agonist is triceps (during extension) 2. Antagonist is biceps (brachii) 3. Concentric contraction of triceps 4. Eccentric contraction / relaxation of biceps		**Do not accept:** • Elbow flexion (stem of Q states elbow extension during the performance of the shot)
17			1. Increased heart rate 2. Increased stroke volume 3. Increased cardiac output 4. Increased blood pressure 5. Increased blood temperature 6. Increased blood flow to muscles or vasodilation of blood vessels to muscles 7. Reduced blood flow to non-essential organs/gut/kidneys or vasoconstriction of blood vessels to non-essential organs or vascular shunt activated	3	**Mark first three only** • High blood pressure/ heart rate = NBD (must have sense of increase)
18	**(a)**		1. A = nasal cavity 2. B = larynx 3. C = trachea	3	

Question			Answer	Marks	Guidance
18	**(b)**		1. Diaphragm contracts/flattens during/causing inspiration/air to be breathed in 2. (because) it increases the volume/size of thoracic cavity 3. … decreasing pressure in the lungs 4. Diaphragm relaxes/domes during/causing expiration/air to be breathed out 5. (because) decreases the volume of thoracic cavity 6. … increasing pressure in the lungs 7. Contracts harder / more frequently during exercise 8. … to achieve **greater** increase in volume of thoracic cavity / tidal volume / minute ventilation	4	
19	**(a)**		1. Trained points plotted correctly for 0 – 5 minutes 2. Trained points plotted correctly for 10 – 40 minutes 3. Untrained points plotted correctly for 0 – 5 minutes 4. Untrained points plotted correctly for 10 – 40 minutes	4	• Accept any plot point between 90 and 110 for time of 2 minutes for Trained cyclist. • If plotting is accurate but no indication of trained/untrained then **1 mark max**
19	**(b)**		1. Increased tidal volume 2. Increased vital capacity **or** increased size of lungs **or** increased lung volume/capacity or more alveoli 3. Increased breathing frequency **or** increased respiratory rate 4. Increased strength of respiratory muscles/diaphragm/intercostals	2	Stronger muscles = NBD pt4 Increased minute ventilation = NBD (in the question)
20	**(a)**		(ATP-PC) 1. First few seconds of exercise / up to 10 seconds 2. (Very) high intensity 3. Anaerobic/explosive/strength/speed/power / short bursts needed 4. (Example) Short sprint for ball in football 5. Not enough time for (anaerobic) glycolysis	3	Credit suitable examples. Sub max 1 mark for example (2 marks max if no example). Short duration = NBD

Question			Answer	Marks	Guidance
20	(b)		(Aerobic) 1. At least 2 minutes duration / after start of exercise 2. Low/medium intensity 3. Enough oxygen available 4. Jogging back into position during stoppage in play or keep going for the full 90 mins of a football game	3	Credit suitable examples. Sub max 1 for example (2 marks max if no example). Long duration = NBD Oxygen (on its own) or uses oxygen or when there is oxygen = NBD

Question			Answer	Marks	Guidance
21			**1.** Blood (enters right atrium) from **vena(e) cava(e)** • Blood is de-oxygenated • Blood is carrying CO_2 • Under low pressure or low speed 2. Blood moves into **right ventricle** • Through tricuspid valve • Opened by weight of blood • Right atrium contracts • Overfilling of right ventricle 3. Right ventricle contracts • Tricuspid valve closes to prevent backflow of blood 4. Blood moves into **pulmonary artery** • Through pulmonary valve • Valve closes to prevent backflow 5. Blood travels to **lungs/alveoli** • Through arterioles • To capillaries • Gaseous exchange/diffusion • Blood is (re-)oxygenated / oxygen enters blood • CO_2 is removed • External respiration • Oxygen picked up by red blood cells 6. Blood moves into **pulmonary vein** • Through venules/veins merge together 7. Blood enters **left atrium** • Very low pressure	10	**Level 3 (8–10 marks)** **A comprehensive answer:** Detailed knowledge & understanding. Effective analysis/critical evaluation and/or discussion/explanation/development. Clear and consistent practical application of knowledge. Accurate use of technical and specialist vocabulary. High standard of written communication. **At Level 3 responses <u>are likely</u> to include:** Detailed knowledge and understanding of the double circulatory system. Most points are developed. At the top of this level chambers, heart valves and most blood vessels are identified in the correct order. Changes to blood are covered. At the bottom of this level some heart valves may be omitted but blood vessels and chambers of heart are in correct order and changes in blood gases are probably considered. **Level 2 (5–7 marks)** **A competent answer:** Satisfactory knowledge & understanding. Analysis/critical evaluation and/or discussion/explanation/development attempted with some success. Some success in practical application of knowledge. Technical and specialist vocabulary used with some accuracy. Written communication generally fluent with few errors.

Question			Answer	Marks	Guidance
			8. Blood moves into **left ventricle** • Through bicuspid/mitral valve • Left atrium contracts • Stretching/overfilling left ventricle 9. Left ventricle contracts • Bicuspid/mitral valve closes to prevent backflow into left atrium 10. Blood is pumped into **aorta**/aortic arch • Through aortic valve • At very high pressure/speed 11. Blood travels to tissues/muscle (accept named muscle) • Through arteries • Into arterioles • Into capillaries • Blood pressure/speed is reduced • Gaseous exchange/diffusion • O_2 passes into tissues • CO_2 enters blood • Internal respiration 12. Blood passes into **veins** • Via venules • Blood is now de-oxygenated • Blood is at very low pressure/increasing speed • Valves prevent backflow 13. Blood re-enters right atrium via vena(e) cava(e) • Inferior/superior vena cava • For blood returning from below/above heart • Venous return mechanisms / skeletal muscle pump / respiratory pump		**At Level 2 responses <u>are likely</u> to include:** Satisfactory knowledge and understanding of the movement of blood through the circulatory system. Points made but generally not developed. At the top of this level most chambers and blood vessels are covered in the correct order. An attempt to explain changes in blood gases may be made and at least one heart valve is correctly identified. At the bottom of this level chambers and blood vessels are covered but there may be some errors. Oxygenated / deoxygenated blood / gaseous exchange has been mentioned at some point. **Level 1 (1–4 marks)** **A limited answer:** Basic knowledge & understanding. Little or no attempt to analyse/critically evaluate and/or discuss/explain/develop. Little or no attempt at practical application of knowledge. Technical and specialist vocabulary used with limited success. Written communication lacks fluency and there will be errors, some of which may be intrusive. **At Level 1 responses <u>are likely</u> to include:** Basic knowledge of the movement of blood through the circulatory system. At the top of this level at least 2 chambers of heart and arteries, capillaries and veins are mentioned, but if order of chambers/blood vessels are incorrect then max of 3 marks. To score 1 mark one blood vessel, gaseous exchange or a ventricle has been mentioned. **[0 marks]** No response or no response worthy of credit.

Question			Answer	Marks	Guidance
			14. Double circulatory system • Pulmonary circuit (to lungs) • Systemic circuit (to muscles/tissues)		

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

Education and Learning
Telephone: 01223 553998
Facsimile: 01223 552627
Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

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