

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 2018

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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.

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Annotations used by examinersMultiple Choice Questions

Examiners indicate if answer given is correct or not by indicating '1' or '0' on the right hand side of the question.

All questions other than Multiple Choice and Extended response Question 21

Tick = correct

Cross = incorrect

BOD = benefit of the doubt given

NBD = no benefit of the doubt given / also used where additional material may have been seen but no more marks gained

NR = no response attempted

Extended response - Question 21

Please note that on the extended response question ticks and crosses are not used as it is not 1 tick = 1 mark.

Where applicable:

Id is used to indicate that a knowledge point from the mark scheme indicative content has been used.

Und is used to indicate that a more developed or detailed point has been made (showing greater understanding).

Eg is used to indicate where an example has been used or applied to support or develop the response.

L1 = Level 1 (for 'Levels-marked' questions only) – put at end of response to indicate level awarded

L2 = Level 2 (for 'Levels-marked' questions only) – put at end of response to indicate level awarded

L3 = Level 3 (for 'Levels-marked' questions only) – put at end of response to indicate level awarded

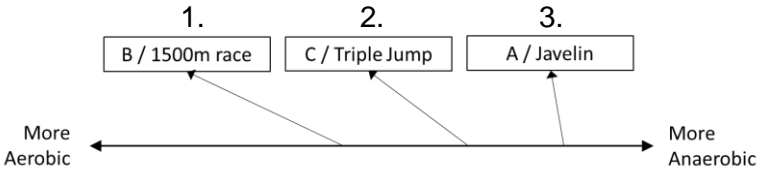
Question		Answer	Marks	Guidance
1		(c) - Rectus abdominus	1	
2		(b) - Stroke volume	1	
3		(c) - Carpals, radius and ulna	1	
4		(a) - Sacrum	1	
5		(c) - Larynx	1	
6		(c) - Phosphocreatine	1	
7		(d) - 48 hours	1	
8		(c) - Turning the palms of the hand up during a biceps curl	1	
9		6 <u>litres/minute</u> or 6l/min or 6l/m	1	Units must be specified. Do not accept lm.
10		Spinal cord	1	Spinal column = NBD
11	(a)	1. A = ulna 2. B = femur 3. C = cranium 4. D = (lumbar) vertebra	4	D – Accept vertebral column D – Do not accept lumbar (on its own) = NBD

Question		Answer	Marks	Guidance												
	(b)	1. B = Long (bone) 2. (Function of femur) movement / support / blood (cell) production / mineral storage 3. D = Irregular (bone) 4. (Function of lumbar vertebra) movement / support / protection	4	Candidate can get function of each bone correct even if type or name of bone is wrong. Mark the first function given for each bone Do not accept stability = NBD												
12		<table border="1"> <thead> <tr> <th>Joint</th> <th>Joint movement</th> <th>Muscle acting</th> </tr> </thead> <tbody> <tr> <td>Wrist</td> <td>Extension</td> <td><u>Wrist extensors</u></td> </tr> <tr> <td>Elbow</td> <td><u>Flexion</u></td> <td><u>Biceps (brachii)</u></td> </tr> <tr> <td>Shoulder</td> <td><u>(Horizontal) abduction</u> <u>Or horizontal extension</u></td> <td>(posterior) deltoid</td> </tr> </tbody> </table>	Joint	Joint movement	Muscle acting	Wrist	Extension	<u>Wrist extensors</u>	Elbow	<u>Flexion</u>	<u>Biceps (brachii)</u>	Shoulder	<u>(Horizontal) abduction</u> <u>Or horizontal extension</u>	(posterior) deltoid	4	Correct answers are in bold and underlined. For shoulder joint movement: Accept <u>abduction</u> or <u>horizontal extension</u>
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13		1. (Articular cartilage) prevents/reduces friction/wear and tear/bone (ends) rubbing / grinding together or allows friction-free/smooth movement 2. (Synovial fluid) lubricates joint or prevents/reduces friction or nourishes cartilage	2	NB. If candidate states that both reduce friction at the joint then 2 marks are awarded.												

Question		Answer	Marks	Guidance
14	(a)	<ol style="list-style-type: none"> (Hip agonist) Gluteus maximus (Hip antagonist) Iliopsoas/iliacus/psoas (Knee agonist) Rectus femoris/vastus intermedius/vastus medialis/vastus lateralis (Knee antagonist) Biceps femoris/ semimembranosus/ semitendinosus 	4	Do not accept: gluteals/quadriceps/hamstrings
14	(b)	<ol style="list-style-type: none"> (Fixator) stabilises (one part of the body) / keeps part of body still or holds body in place ... while another muscle causes movement / another body part moves E.g. erector spinae/rectus abdominus stabilises spine/back/trunk 	2	Accept: Abs/abdominals stabilise the back Do not accept: fixes/fixates (pt1) Supports / retains balance= NBD (pt1)
14	(c)	<ol style="list-style-type: none"> (Eccentric) muscle <u>lengthens</u> or gets longer/elongates (under tension / while resisting a force (e.g. gravity) to control a movement) (Eccentric) e.g. Biceps brachii during downward phase of biceps curl (Isometric) (muscle contracts but) does not change length or (muscle contracts but) no movement is created (Isometric) e.g. Erector spinae or rectus abdominus during plank exercise 	4	Accept other valid examples with associated <u>named</u> muscle/s No mark for example if definition incorrect Do not accept: muscle changes length (pt1)

Question		Answer	Marks	Guidance
15		<ol style="list-style-type: none"> 1. Large (size) 2. Few capillaries 3. High phosphocreatine stores 4. Few mitochondria 5. Low myoglobin 6. Low triglyceride stores 7. Few oxidative enzymes 8. Many fibres <u>per neuron/motor unit</u> 	3	<p>Look for structure rather than function Mark the first three characteristics given Do not accept: white</p> <p>Pt 8 - Many fibres = NBD Pt 8 - large number of motor neurones / large number of microfibrils = NBD Pt 8 <u>larger</u> number of motor neurones = BOD</p>
16	(a)	<p>Blood is pumped out of the right ventricle into the <u>pulmonary artery</u> Blood then travels through arterioles to the capillary network of the <u>lungs</u> Blood returns to the heart through venules, veins and finally the <u>pulmonary vein</u> From this blood vessel it enters the <u>left atrium</u> of the heart.</p>	4	Correct answers are in bold and underlined
	(b)	<p>(untrained individual has ...)</p> <ol style="list-style-type: none"> 1. Weaker/less efficient cardiac <u>muscle</u> 2. Smaller heart <u>muscle</u> or no/lack of hypertrophy of <u>heart</u> 3. Lower stroke volume 4. Lower venous return 	3	<p>Points 1 and 2 must refer to heart muscle, except for hypertrophy which must refer to heart</p> <p>N.B credit if candidate answers by saying “trained athlete has ... and gives opposites of 1-4.</p>

Question		Answer				Marks	Guidance										
17		<table border="1"> <thead> <tr> <th>Component</th> <th>Function</th> </tr> </thead> <tbody> <tr> <td><u>Red blood cells</u></td> <td>Transport oxygen</td> </tr> <tr> <td>Platelets</td> <td><u>Help blood to clot</u></td> </tr> <tr> <td>White blood cells</td> <td><u>Protect against/fight disease/infection</u></td> </tr> <tr> <td><u>Plasma</u></td> <td>Fluid that transports nutrients and blood cells</td> </tr> </tbody> </table>				Component	Function	<u>Red blood cells</u>	Transport oxygen	Platelets	<u>Help blood to clot</u>	White blood cells	<u>Protect against/fight disease/infection</u>	<u>Plasma</u>	Fluid that transports nutrients and blood cells	4	<p>Correct answers are in bold and underlined</p> <p>(WBC) Produces antibodies = BOD (Platelets) Stops bleeding / heals the wound= NBD</p> <p>(WBC) Helps infections/ fights illness = NBD (WBC) Ingest pathogens / engulfs pathogens/ fights pathogens = BOD</p>
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18		A cool down keeps the blood vessels <u>dilated</u> , flushing the muscles with <u>oxygenated</u> blood to remove <u>carbon dioxide</u> that has built up in the muscles.				3	Correct answers are in bold and underlined										
19		A = trachea B = bronchiole C = alveolus/alveoli/alveolar sac				3											
20	(a)	<table border="1"> <thead> <tr> <th>Energy system</th> <th>Type of reaction</th> <th>Chemical or food fuel</th> <th>Amount of ATP produced</th> <th>By-product</th> </tr> </thead> <tbody> <tr> <td><u>Lactic acid</u></td> <td>Anaerobic</td> <td><u>Glycogen / glucose / carbohydrate</u></td> <td>2 ATP</td> <td><u>Lactic acid / lactate</u></td> </tr> </tbody> </table>				Energy system	Type of reaction	Chemical or food fuel	Amount of ATP produced	By-product	<u>Lactic acid</u>	Anaerobic	<u>Glycogen / glucose / carbohydrate</u>	2 ATP	<u>Lactic acid / lactate</u>	3	
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(b)		3	An event must be in the correct box to gain credit for it.
21	<p><i>(Describe the mechanics of breathing (inspiration and expiration) at rest and during maximal exercise)</i></p> <p>(Inspiration at rest)</p> <ol style="list-style-type: none"> 1. External intercostals contract <ul style="list-style-type: none"> • Lifting rib cage (and sternum) up and out 2. Diaphragm contracts/flattens <ul style="list-style-type: none"> • Lies under the lungs 3. Volume of thoracic cavity increases <ul style="list-style-type: none"> • Space inside lungs increases 4. Pressure in lungs decreases <ul style="list-style-type: none"> • Lower than outside body 5. Air is drawn into lungs <ul style="list-style-type: none"> • Because gases move from area of high to low pressure <p>(Expiration at rest)</p> <ol style="list-style-type: none"> 6. External intercostals relax <ul style="list-style-type: none"> • Lowering rib cage down and in 7. Diaphragm relaxes/returns to dome shape 	10	<p>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.</p> <p>At Level 3 responses are likely to include: Detailed knowledge and understanding of mechanics of breathing at rest and during maximal exercise. At the top of this level both inspiration and expiration at rest and during exercise have been described accurately and at least one additional muscle for both inspiration and expiration during exercise has been named. At the bottom of this level both inspiration and expiration at rest have been accurately described, and a good description of the mechanics of breathing during exercise has been attempted, showing greater changes in lung volume or pressure, but may lack the roles of additional muscles, or vice versa.</p> <p>Level 2 (5–7 marks) A competent answer: Satisfactory knowledge & understanding.</p>

Question	Answer	Marks	Guidance
	<p>8. Volume of thoracic cavity is reduced</p> <p>9. Pressure in lungs increases</p> <p>10. Air is forced out of lungs</p> <p>(During maximal exercise)</p> <p>11. Increased rate and depth of breathing (Inspiration during maximal exercise)</p> <p>12. Same mechanical process as at rest but also....</p> <p>13. External intercostals and diaphragm contract with greater force/more strongly</p> <ul style="list-style-type: none"> • Role of additional inspiratory muscles • Sternocleidomastoid • Pectoralis minor • Scalenes <p>14. Greater volume of thoracic cavity/greater lung volume</p> <ul style="list-style-type: none"> • Lower pressure in lungs • Increased volume of air drawn into lungs <p>(Expiration during maximal exercise)</p> <p>15. Expiration becomes active</p> <ul style="list-style-type: none"> • Additional muscles used/contract to force expiration • Greater downward/inward movement of rib cage • Internal intercostals • Rectus abdominus 		<p>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.</p> <p>At Level 2 responses <u>are likely to include:</u> Satisfactory knowledge and understanding of mechanics of breathing at rest and during maximal exercise. At the top of this level mechanics of breathing at rest and during exercise may be described with some success but during exercise the description may not include additional respiratory muscles. At the bottom of this level the mechanics of breathing at rest may be generally correct, but during exercise there may not be reference to the greater changes in lung volume during exercise.</p> <p>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.</p>

Question	Answer	Marks	Guidance
	<p>16. Greater decrease in volume of thoracic cavity/lung volume</p> <ul style="list-style-type: none"> • Greater increase in pressure in lungs • More air forced out of lungs • Air forced out more quickly/faster • Leads to faster breathing frequency <p>17. Inspiration (at rest and exercise) is an active process</p> <ul style="list-style-type: none"> • Expiration at rest is a passive process 		<p>At Level 1 responses are likely to include: Basic knowledge of the mechanics of breathing. At the top of this level the actions of both diaphragm and external intercostals are likely to be correctly described with some mention of the effect on lung volumes. There may be a very limited attempt to describe changes to mechanics of breathing during exercise. To score 1 mark the correct action of one respiratory muscle has been described. (<i>identification of muscles are given on Q</i>)</p> <p>[0 marks] No response or no response worthy of credit.</p>

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