OCR
Oxford Cambridge and RSA

Cambridge Technicals

Sport

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

Level 3 Cambridge Technical Certificate/Diploma in Sport
05826-05829, 05872

Mark Scheme for January 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.

Answer			Marks	Guidance
1	c	Femur	1	
2	a	Humerus	1	
3	d	Humerus, radius and ulna	1	
4	a	Elbow movement during the downward phase of a press up	1	
5	b	Speeds up the removal of lactic acid	1	
6	c	Marathon	1	
7	b	Red blood cells	1	
8	d	Nasal cavity	1	
9		Saddle (joint)	1	
10		No movement produced/static or doesn't shorten/lengthen or holds position	1	
11		Four marks for: A = deltoid B = pectoralis major C = trapezius D = gastrocnemius or soleus	4	B – pecs or pectorals = NBD C – traps = NBD D – calf = NBD Accept minor misspellings = BOD

<table>
<tr><th colspan="3">Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>12</td><td></td><td>
<table>
<tr><th>Bone</th><th>Type of bone</th></tr>
<tr><td>Vertebra</td><td>Irregular</td></tr>
<tr><td>Carpals</td><td>1. <u>Short</u></td></tr>
<tr><td>Cranium</td><td>2. <u>Flat</u></td></tr>
<tr><td>Patella</td><td>3. <u>Sesamoid</u></td></tr>
<tr><td>Phalanges</td><td>4. <u>Long</u></td></tr>
</table>
</td><td>4</td><td>Missing words are numbered, bold and underlined in the table.

Small = no marks pt 2
Big = no marks pt 4</td></tr>
<tr><td>13</td><td></td><td>Three marks for:
1. (agonist) biceps (brachii)
2. (antagonist) triceps (brachii)
3. (contraction) concentric</td><td>3</td><td>‘Isotonic’ on its own = NBD</td></tr>
<tr><td>14</td><td></td><td>Three marks for:
e.g. football
1. (Powerful) shot at goal
2. Sprinting into space to receive ball
3. A strong tackle
4. Diving to save ball</td><td>3</td><td>Must use team sport with examples that suggest speed/power/explosive strength is being used.
Running for the ball = NBD
Beating a player = NBD</td></tr>
</table>

<table>
<tr><th colspan="3">Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>15</td><td></td><td>
<table>
<tr><th>Structure of heart</th><th>Function</th></tr>
<tr><td><u>1. Right atrium</u></td><td>Deoxygenated blood enters here from the venae cavae</td></tr>
<tr><td>Tricuspid valve</td><td>2. Prevents blood being pumped <u>back into right atrium</u></td></tr>
<tr><td>Left ventricle</td><td>3. Pumps blood to the muscles/tissues/rest of the body or pumps blood out into aorta</td></tr>
<tr><td><u>4. Pulmonary artery</u></td><td>Blood vessel that carries deoxygenated blood towards the lungs</td></tr>
<tr><td><u>5. Aortic valve</u></td><td>This valve prevents blood flowing back into the left ventricle</td></tr>
</table>
</td><td>5</td><td>Missing words are numbered, bold and underlined in the table.

Point 5 – semilunar valve = NBD
Point 2 – prevents backflow (on its own) = NBD
Point 3 – to rest of body (on its own) = NBD</td></tr>
<tr><td>16</td><td>(a)</td><td>1. 25 minutes</td><td>1</td><td>Must include <u>minutes/mins</u></td></tr>
<tr><td>16</td><td>(b)</td><td>Six marks for six of:
1. (Before exercise) anticipatory rise in HR
2. (Caused by) increased adrenaline/noradrenaline
3. (1st 5 minutes) rapid increase in HR
4. (Caused by) shortage of oxygen/anaerobic/oxygen deficit or oxygen supply < demand
5. (10-30 minutes) steady state or HR plateaus or HR remains constant
6. (because) oxygen supply = demand or enough oxygen at muscles
7. (After exercise) HR gradually decreases or heart takes longer to recover than the increase in HR at the start of exercise
8. (as) exercise has stopped or repaying oxygen debt/EPOC/removal of LA</td><td>6</td><td>Pt 1 – only give if response relates to anticipatory rise
Pt 8 ‘end of exercise’ = NBD</td></tr>
</table>

Answer			Marks	Guidance
16	**(c)**	1. (Cardiac output) = Heart rate/HR x stroke volume / SV or 110 x 150 2. (Cardiac output/Q) = 16500ml/min or 16.5l/min or /lmin-1	2	Point 2 – **units are required** 16.5l/m = BOD
17		The diaphragm and the external intercostal muscles **1. relax** This causes the rib cage to move **2. downwards** and in. The volume of the thoracic cavity **3. decreases**. This causes the pressure in the lungs to **4. Increase**, which means that air is **5. exhaled** from the lungs.	5	Missing words are numbered, bold and underlined in the text. For pt 3 accept decrease For pt 4 accept increases
18	**(a)**	Five marks for five from: 1. Breathing gets faster **and** deeper **or** increased rate **and** depth of breathing 2. Respiration becomes active (during exercise) **or** greater volumes of air moved or more air is entering the lungs 3. (inspiration) diaphragm or external intercostals contract with **greater** force 4. (inspiration) scalene/sternocleidomastoid/pectoralis minor contract 5. (inspiration) … causing the rib cage to be drawn **further** up and out 6. (inspiration) … causing **greater** volume in thoracic cavity **or lower** pressure in the lungs 7. (expiration) internal intercostals/rectus abdominis **contract** 8. (expiration) … causing rib cage to be pulled down / diaphragm pushed in/up 9. (expiration) … causing **greater** reduction in volume in thoracic cavity **or higher** pressure in the lungs	5	**Comparative terms** needed for points 3, 5, 6, 8 and 9 to differentiate from what happens during mechanics of breathing at rest. Only give Pt 1 if the two variables are identified eg faster **and** deeper
18	**(b)**	Three marks for: 1. Increased tidal volume **or** more air taken in/out per breath or increase in depth of breathing 2. Increased respiration/breathing rate **or** breathes quicker **or** more breaths per minute 3. Increased minute ventilation **or** more air taken in/out per minute	3	Pt 1 heavy breathing = NBD Pt 2 respiration speeds up = NBD

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<tr><td>19</td><td></td><td>
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<tr><th>System</th><th>Chemical or food fuel</th><th>Type of reaction</th><th>Amount of ATP produced</th></tr>
<tr><td><u>1. ATP-PC/ alactic</u></td><td>Phosphocreatine</td><td><u>2.Anaerobic</u></td><td>1</td></tr>
<tr><td>Aerobic</td><td><u>3. Glucose/fats/ glycogen / carbohydrates / CHO / triglycerides / fatty acids</u></td><td>Aerobic</td><td><u>4. 36-39</u></td></tr>
</table>
</td><td>4</td><td>Missing words are numbered, bold and underlined in the table.
Accept Pt 1 ATP/CP
Do not accept ATP (on its own) for pt 1</td></tr>
<tr><td>20</td><td></td><td>1. (Gym routine) Lactic acid
2. (Javelin) ATP-PC or alactic
3. (50km walk) Aerobic
4. (Rugby tackle) ATP-PC or alactic
5. (400m sprint) Lactic acid</td><td>5</td><td>If more than one i/d then no marks except Pts 2 and 4
LAS = BOD for Lactic Acid system
Accept ATP/CP
Do not accept ATP (on its own)</td></tr>
</table>

Answer			Marks	Guidance
21		***(Analyse movements at knee and ankle when jumping for ball)***	10	
		(Joint types and articulating bones) Knee is hinge joint Femur, tibia (and patella) • Fibula outside joint capsule of knee Ankle is hinge joint • Tibia and talus (and fibula) • Fibula not an integral part of joint **(Joint movements)** (During jump / upward phase) Ankle plantarflexion Knee extension **(Muscles acting and function)** (Upward phase knee extension) quadriceps shorten • (Isotonic) concentric contraction • Rectus femoris / vastus medialis / vastus lateralis / vastus intermedius • Are agonists or prime movers (Upward phase knee extension) hamstrings lengthen • Biceps femoris / semimembranosus / semitendinosus • Are antagonists Fixator muscles stabilise joints • E.g. gluteus maximus (stabilises femur/hip joint) • Credit any given fixator stabilising femur/hip joint • E.g. Rectus abdominus / erector spinae (stabilise trunk) • Isometric contraction		**Level 3 (8–10 marks)** **A comprehensive answer:** Detailed knowledge and 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 both knee and ankle joints, articulating bones, joint movements, muscles and their functions. **At the top of this level** some reference may be made to the role of fixators and types of contraction for both joints. **At the bottom of this level** both joints are addressed and agonists and antagonists are likely to be identified for both joints.

Answer	Marks	Guidance
(Upward phase ankle plantarflexion) soleus / gastrocnemius shorten • (Isotonic) concentric contraction • Are agonists or prime movers (Upward phase ankle plantarflexion) tibialis anterior lengthens • Is antagonist (Ankle) Fixator muscles stabilise tibia • quadriceps or hamstrings as fixators • rectus abdominus / erector spinae (stabilise trunk) • Isometric contraction		**Level 2 (5–7 marks)** **A competent answer:** Satisfactory knowledge and understanding Analysis / critical evaluation and/or discussion / explanation / development attempted with some success Some practical application of knowledge Technical and specialist vocabulary used with some accuracy Written communication generally fluent with few errors**.** **At Level 2 responses <u>are likely</u> to include:** Satisfactory knowledge and understanding of how joint movements occur at these joints. There may be a lack of balance between the parts of the question with some absences or inaccuracies. **At the top of this level** both joints may be covered in some detail, or one joint is covered in depth while the other is more superficial. **At the bottom of this level** at least six valid points have been made.

Answer			Marks	Guidance
				Level 1 (1–4 marks) **A limited answer:** Basic knowledge and 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 and understanding of the joints and movements at the knee and ankle. **At the top of this level** at least five valid points have been made. **To score 1 mark** at least one valid point has been made. **[0 marks]** No response or no response worthy of credit.

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