



Mark Scheme

January 2019

Pearson BTEC Level 3 - Sport

Unit 1: Anatomy and Physiology
(31524)



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Unit 1: Anatomy and Physiology – sample marking grid

General marking guidance

- All learners must receive the same treatment. Examiners must mark the first learner in exactly the same way as they mark the last.
- Marking grids should be applied positively. Learners must be rewarded for what they have shown they can do, rather than be penalised for omissions.
- Examiners should mark according to the marking grid, not according to their perception of where the grade boundaries may lie.
- All marks on the marking grid should be used appropriately.
- All the marks on the marking grid are designed to be awarded. Examiners should always award full marks if deserved. Examiners should also be prepared to award zero marks, if the learner's response is not rewardable according to the marking grid.
- Where judgement is required, a marking grid will provide the principles by which marks will be awarded.
- When examiners are in doubt regarding the application of the marking grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The marking grids have been designed to assess learner work holistically. Rows in the grids identify the assessment focus/outcome being targeted. When using a marking grid, the 'best fit' approach should be used.

- Examiners should first make a holistic judgement on which band most closely matches the learner's response and place it within that band. Learners will be placed in the band that best describes their answer.
- The mark awarded within the band will be decided based on the quality of the answer, in response to the assessment focus/outcome and will be modified according to how securely all bullet points are displayed at that band.
- Marks will be awarded towards the top or bottom of that band, depending on how they have evidenced each of the descriptor bullet points.

Question Number	Answer	Mark
1	<p>Award one mark for identifying each correct region of the vertebral column, up to a maximum of two marks.</p> <p>A - Cervical C - Lumbar</p> <p>Accept phonetic spelling.</p>	2

Question Number	Answer	Mark								
2 (a) 2 (b) Clip together	<p>Award one mark for each identification of a type of bone, up to a total of two marks.</p> <p>Award one mark for each associated function, up to a total of two marks.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr style="background-color: #cccccc;"> <td style="width: 30%;"></td> <td></td> </tr> <tr> <td>Long</td> <td>Movement/blood cell production</td> </tr> <tr> <td>Short</td> <td>Weight-bearing</td> </tr> <tr> <td>Sesamoid</td> <td>Reduce friction across a joint</td> </tr> </table> <p>Accept phonetic spelling. Accept any other appropriate response.</p>			Long	Movement/blood cell production	Short	Weight-bearing	Sesamoid	Reduce friction across a joint	2+2
Long	Movement/blood cell production									
Short	Weight-bearing									
Sesamoid	Reduce friction across a joint									

Question Number	Answer	Mark
3	<p>Award one mark for identifying the response of the skeletal system.</p> <ul style="list-style-type: none"> • Increased mineral uptake (1) <p>Accept any other appropriate response</p>	1

Question Number	Answer	Mark
4	<p>Award up to two marks for a description of the range of movement at the knee.</p> <ul style="list-style-type: none"> • The movement is from flexion (1) to extension (1) • The movement is from extension (1) to flexion (1) <p>Accept phonetic spelling.</p>	2

Question Number	Answer	Mark
5	<p>Award one mark for identification of what causes the pain and up to two marks for linked justification/reasoning.</p> <ul style="list-style-type: none"> Arthritis causes inflammation/swelling (1) because the bones rub together (1) due to cartilage having been worn away. (1) <p>Accept any other appropriate answer.</p>	3

Question Number	Answer	Mark
6	<p>Award one mark for identifying each muscle, up to a maximum of two marks.</p> <p>A - Gluteals B - Gastrocnemius</p> <p>Accept phonetic spelling.</p>	2

Question Number	Answer	Mark
7 (a)	<p>Award one mark for identification of a characteristic of cardiac muscle</p> <ul style="list-style-type: none"> Cardiac muscle is involuntary (1) <p>Accept any other appropriate answer.</p>	1

Question Number	Answer	Mark
7 (b)	<p>Award one mark for stating a reason why it is important that cardiac muscle is non-fatiguing.</p> <ul style="list-style-type: none"> So it can constantly contract (1) So it can constantly supply blood to working muscles (1) So it can constantly provide oxygen to working muscles (1) <p>Accept any other appropriate answer.</p>	1

Question Number	Answer	Mark
8a	<p>Award one mark for identification of a reason for the use of this fibre type and up to two marks for linked justification.</p> <p>The fibres speed/force of contraction is low (1) therefore can continue to contract throughout the race/resisting fatigue (1) allowing the pace to be maintained towards the end of a swim/race (1)</p> <p>Accept any other appropriate answer.</p>	3

Question Number	Answer	Mark
8b	<p>Award one mark for identification of The agonist and one mark for identification antagonist. Award one additional mark for each linked descriptive point about the respective action. Credit to a total of four marks.</p> <p>The bicep is the agonist/contracts (1) to lift the weight/flex the arm at the elbow (1) the triceps are the antagonist/relax (1) to allow the contraction of the agonist/bicep (1)</p> <p>Accept any other appropriate answer</p> <p>Accept any other appropriate answer</p>	4
8c	<p>Award one mark for identification of a response of muscles to exercise and up to two marks for linked justification/reasoning.</p> <ul style="list-style-type: none"> Blood supply increases (to working muscles) (1) because there is an increased oxygen demand (1) in order to maintain energy production for the activity (1) Blood supply increases (to working muscles) (1) because there is an increase in carbon dioxide/lactate (1) which will cause early onset of fatigue (if not removed) (1) Lactate production increases (in working muscles) (1) because there is a lack of oxygen (1) causing muscle fatigue (1) Microtears (in muscles) (1) because of additional loading of muscles (1) causing muscle soreness (1) <p>Accept any other appropriate answer.</p>	3

Question Number	Answer	Mark
9	<p>Award one mark for identifying each structure of the respiratory system, up to a maximum of two marks.</p> <ul style="list-style-type: none"> • A - Nasal cavity (1) • B - Diaphragm (1) <p>Accept phonetic spelling.</p>	2

Question Number	Answer	Mark
10	<p>Award one mark for the meaning of the term breathing rate.</p> <ul style="list-style-type: none"> • An increase in the number of times you breathe per minute (1) <p>Accept any other appropriate answer.</p>	1

Question Number	Answer	Mark
11	<p>Award one mark for identifying the response of the respiratory system.</p> <ul style="list-style-type: none"> • Increased tidal volume/TV/ depth of breathing (1) <p>Accept any other appropriate answer.</p>	1

Question Number	Answer	Mark
12	<p>Award one mark for identifying how the medulla oblongata increases breathing and up to one additional mark for a linked expansion. Credit to a total of two marks.</p> <p>The medulla oblongata increases the frequency of signals to the respiratory muscles (1) and then the respiratory muscles contract at a faster rate(1)</p> <p>Accept any other appropriate answer.</p>	2

Question Number	Answer	Mark
13	<p>Award one mark for identification of an effect and up to two marks for linked expansion of why asthma affects breathing.</p> <ul style="list-style-type: none"> • Asthma causes an increase in breathing rate/decrease in tidal volume (1) because bands of tissue around the airway narrows/constrict (1) causing wheezing/shortness of breath/restricts airflow (1) <p>Accept any other appropriate answer.</p>	3

Question number	Answer	Mark - 6
14	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but learners should be rewarded for other relevant answers.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Diffusion rate is the speed of transfer of gases <input type="checkbox"/> Gases move from a high concentration to a low concentration <input type="checkbox"/> An increased diffusion rate of oxygen would mean greater oxygen uptake by the muscles <input type="checkbox"/> With more oxygen available to the muscles they can work aerobically for longer/recover more quickly <input type="checkbox"/> so Alex will be able to play basketball for sustained periods/delaying the onset of fatigue <input type="checkbox"/> The increased rate of removal of carbon dioxide will prevent CO₂ build up/drop in blood pH <input type="checkbox"/> Also, Alex's increased ability to utilise oxygen will mean that more oxygen is available to break down lactic acid when he has to work at a higher intensity <input type="checkbox"/> this delays OBLA/lactate threshold <input type="checkbox"/> so he can complete multiple sprints up and down the court throughout the game of basketball <p>Accept any other appropriate answer.</p>	
<p>Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.</p>		

Level	Mark	Descriptor
Level 0	0	No rewardable material
Level 1	1-2	<ul style="list-style-type: none"> • Demonstrates isolated knowledge and understanding, there be major gaps or omissions • Few of the points made will be relevant to the context in the question • Limited assessment which contains generic assertions rather than considering the factors or events and their relative importance, leading to a conclusion which is superficial or unsupported
Level 2	3-4	<ul style="list-style-type: none"> • Demonstrates some accurate knowledge and understanding, with few minor omissions/any gaps or omissions are minor • Some of the points made will be relevant to the context in the question, but the link will not always be clear • Displays a partially developed assessment which considers some of the factors or events and their relative importance leading to a partially supported conclusion.
Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates mostly accurate and thorough/detailed knowledge and understanding • Most of the points made will be relevant to the context in the question, and there will be clear links • Displays a well-developed and logical assessment which clearly considers the factors or events and their relative importance, leading to a supported conclusion

Question Number	Answer	Mark
15	<p>Award one mark for describing the flow of blood from the right atrium and up to two additional marks for each linked descriptive point. Credit to a total of three marks.</p> <ul style="list-style-type: none"> • (Blood leaves the right atrium) through the tricuspid valve (1) into the right ventricle (1). The blood then passes through the semi-lunar valve (1) (into the pulmonary artery) <p>Accept any other appropriate answer.</p>	3

Question Number	Answer	Mark
16	<p>Award one mark for identifying each response of the cardiovascular system, up to a maximum of two marks.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Increased cardiac output/stroke volume (1) <input type="checkbox"/> Increased blood pressure (1) <input type="checkbox"/> Redirection of blood flow (1) <p>Accept any other appropriate answer.</p>	2

Question Number	Answer	Mark
17a	<p>Award one mark for identifying each correct structure needed to complete the flow diagram, up to a maximum of two marks.</p> <ul style="list-style-type: none"> • Atrioventricular node/AVN (1) • Purkinje fibres (1) <p>Accept phonetic spelling or spelling mistakes.</p>	2

Question Number	Answer	Mark
17b	<p>Award one mark for identifying the role of the sinoatrial node and one additional mark for a linked descriptive point. Credit to a total of two marks.</p> <ul style="list-style-type: none"> • Acts as a pacemaker/sends an impulse/signal from the right atrium (1) causing the walls of the atria to contract (1) 	2

Question Number	Answer	Mark															
18 a & 18b Clip together	<p>Award one mark for each correct identification of the component of blood, up to a total of two marks.</p> <p>Award one mark for each associated function, up to a total of two marks.</p> <table border="1" data-bbox="344 539 919 1088"> <thead> <tr> <th></th> <th data-bbox="344 539 636 566">Column A</th> <th data-bbox="636 539 919 566">Column B</th> </tr> <tr> <th></th> <th data-bbox="344 566 636 618">(a) - Component of blood</th> <th data-bbox="636 566 919 618">(b) - Function of component of blood</th> </tr> </thead> <tbody> <tr> <td data-bbox="344 618 376 692">1</td> <td data-bbox="376 618 636 692">Red blood cells/ RBC/erythrocytes (1)</td> <td data-bbox="636 618 919 692">Transport oxygen (1)</td> </tr> <tr> <td data-bbox="344 692 376 792">2</td> <td data-bbox="376 692 636 792">White blood cells/WBC/leucocytes (1)</td> <td data-bbox="636 692 919 792">Fight infection (1)</td> </tr> <tr> <td data-bbox="344 792 376 1088">3</td> <td data-bbox="376 792 636 1088">Plasma (1)</td> <td data-bbox="636 792 919 1088">Transport nutrients/red blood cells/white blood cells/maintaining normal blood pressure/maintain homeostasis (1) Also transports hormones and proteins (1) Maintains blood volume (1) Balances electrolytes (1)</td> </tr> </tbody> </table> <p>Accept any other appropriate answer.</p>		Column A	Column B		(a) - Component of blood	(b) - Function of component of blood	1	Red blood cells/ RBC/erythrocytes (1)	Transport oxygen (1)	2	White blood cells/WBC/leucocytes (1)	Fight infection (1)	3	Plasma (1)	Transport nutrients/red blood cells/white blood cells/maintaining normal blood pressure/maintain homeostasis (1) Also transports hormones and proteins (1) Maintains blood volume (1) Balances electrolytes (1)	2 + 2
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Question Number	Answer	Mark
19	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but learners should be rewarded for other relevant answers.</p> <ul style="list-style-type: none"> • Occurs as a result of increased capillarisation • An increase in blood volume will mean that more blood is returning to the heart. • Which will enable a more forceful contraction of the heart • Causing stroke volume to increase • And cardiac output will increase also • Therefore there will be a greater supply off oxygen to the work muscles • And a greater removal of carbon dioxide • Enabling Christine to cycle at a higher intensity for a longer duration • While withstanding fatigue/complete her training distance quicker 	6
<p>Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.</p>		

Level	Mark	Descriptor
Level 0	0	No rewardable material
Level 1	1-2	<ul style="list-style-type: none"> • Demonstrates isolated elements of knowledge and understanding • Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question • Limited analysis that contains generic assertions rather than interrelationships or linkages
Level 2	3-4	<ul style="list-style-type: none"> • Demonstrates some accurate knowledge and understanding • Breaks the situation down into component parts and some of the points made will be relevant to the context in the question • Displays a partially developed analysis that considers some interrelationships or linkages but not always sustained
Level 3	5-6	<ul style="list-style-type: none"> • Demonstrates mostly accurate knowledge and understanding • Breaks the situation down into component parts and most of the points made will be relevant to the context in the question • Displays a developed and logical analysis that clearly considers interrelationships or linkages in a sustained manner

Question Number	Answer	Mark
20a	<p>Award one mark for identifying a chemical source.</p> <p>ATP-PC system</p> <ul style="list-style-type: none"> <input type="checkbox"/> Phosphate (1) <input type="checkbox"/> Creatine (1) <p>Accept any other appropriate response, for example:</p> <ul style="list-style-type: none"> <input type="checkbox"/> phosphocreatine (1) <input type="checkbox"/> creatine phosphate (1) 	1

Question Number	Answer	Mark
20b	<p>Award one mark for identification of why the system is used, and up to two further marks for linked expansion.</p> <ul style="list-style-type: none"> • Because it provides/releases energy quickly (1) so the shot putter can produce an explosive movement / so it can provide enough energy to sustain the movement (1) which allows the athlete to throw the shot as far as possible (1) <p>Accept any other appropriate response.</p>	3

Question Number	Answer	Mark
21	<p data-bbox="371 573 826 651">Award one mark for identification of why hypoglycaemic attacks occur and up to one mark for linked justification/reasoning.</p> <ul data-bbox="411 674 855 954" style="list-style-type: none"><li data-bbox="411 674 855 786">• Low glucose levels in the blood/blood sugar is too low/low blood sugar (1) because the performer did too much exercise (1)<li data-bbox="411 786 855 898">• Blood sugar has fallen (1) because the performer did not eat enough carbohydrate/because the performer missed a meal (1)<li data-bbox="411 898 855 954">• Glucose levels are too low (1) because the performer took too much insulin (1)	2

Question Number	Answer	Mark
22	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but learners should be rewarded for other relevant answers.</p> <p>Aerobic System</p> <ul style="list-style-type: none"> • Increase usage of fats as an energy source • Therefore access to larger energy stores • Meaning that the performer will be able to train/play for long periods of time • Increase the storage of glycogen • Therefore Freddie will be able to play at a higher intensity, hitting the shuttle constantly harder or moving at a higher pace around the court to retrieve shots • Increase the number of mitochondria • Therefore more able to produce energy aerobically • Allowing him to recover quicker between points • Be able to maintain intensity and withstand fatigue for longer/last the full match <p>Accept any other appropriate answer.</p>	6

Mark scheme (award up to 6 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.

Level	Mark	Descriptor
Level 0	0	No rewardable material
Level 1	1–2	<ul style="list-style-type: none"> • Demonstrates isolated knowledge and understanding, there be major gaps or omissions • Few of the points made will be relevant to the context in the question <p>Limited assessment which contains generic assertions rather than considering the factors or events and their relative importance, leading to a conclusion which is superficial or unsupported</p>
Level 2	3–4	<ul style="list-style-type: none"> • Demonstrates some accurate knowledge and understanding, with few minor omissions/any gaps or omissions are minor • Some of the points made will be relevant to the context in the question, but the link will not always be clear <p>Displays a partially developed assessment which considers some of the factors or events and their relative importance leading to a partially supported conclusion.</p>
Level 3	5–6	<ul style="list-style-type: none"> • Demonstrates mostly accurate and thorough/detailed knowledge and understanding • Most of the points made will be relevant to the context in the question, and there will be clear links • Displays a well-developed and logical assessment which clearly considers the factors or events and their relative importance, leading to a supported conclusion

Question Number	Answer	Mark
23	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and level descriptors below. The indicative content that follows is not prescriptive. Answers may cover some/all of the indicative content but learners should be rewarded for other relevant answers.</p> <ul style="list-style-type: none"> <input type="checkbox"/> Chemoreceptors send signals to the medulla oblongata/brain/respiratory centre/RCC <input type="checkbox"/> That there has been a reduction in oxygen <input type="checkbox"/> Or an increase in carbon dioxide/acidity/decreased pH <p><u>Respiratory</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Signals from the brain are sent to increase breathing rate <input type="checkbox"/> And tidal volume <input type="checkbox"/> The causes a steep diffusion gradient <input type="checkbox"/> Gas exchange happens quicker and the oxygen rich blood is sent to the working muscles <input type="checkbox"/> Which will allow more oxygen to be offloaded into the working muscles <input type="checkbox"/> And carbon dioxide to be removed and returned back to the lungs via the heart <input type="checkbox"/> This means that he will be able to better utilise the increased oxygen coming into his body to sustain aerobic energy production for longer <input type="checkbox"/> Khalid's increased ability to utilise oxygen breathed into the body will mean that more oxygen is available to break down lactic acid, which delays the OBLA/lactate threshold so that he can complete the change of pace in the race <p><u>Muscular</u></p> <ul style="list-style-type: none"> <input type="checkbox"/> Increase blood supply <input type="checkbox"/> In order to deliver increased oxygen to the muscle <input type="checkbox"/> Increase muscle temperature <input type="checkbox"/> Causes an increase in muscle pliability <input type="checkbox"/> Increasing the range of movement and therefore stride length, which allows Khalid to increase his pace 	8
<p>Mark scheme (award up to 8 marks) refer to the guidance on the cover of this document for how to apply levels-based mark schemes*.</p>		

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 0	0	<ul style="list-style-type: none"> No rewardable material.
Level 1	1-3	<ul style="list-style-type: none"> Demonstrates isolated elements of knowledge and understanding. Breaks the situation down into component parts and a few of the points made will be relevant to the context in the question. Limited analysis that contains generic assertions rather than interrelationships or linkages
Level 2	4-6	<ul style="list-style-type: none"> Demonstrates some accurate knowledge and understanding. Breaks the situation down into component parts and some of the points made will be relevant to the context in the question. Displays a partially developed analysis that considers some interrelationships or linkages but not always sustained.
Level 3	7-8	<ul style="list-style-type: none"> Demonstrates mostly accurate knowledge and understanding. Breaks the situation down into component parts and most of the points made will be relevant to the context in the question. Displays a developed and logical analysis that clearly considers interrelationships or linkages in a sustained manner.

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