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BTEC

Mark Scheme (Results)

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Pearson BTEC Nationals
In Sport (31824H)
Unit 1: Anatomy and Physiology

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Unit 1: Anatomy and Physiology

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.
- Mark 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 mark grid, not according to their perception of where the grade boundaries may lie.
- All marks on the mark grid should be used appropriately.
- All the marks on the mark 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 mark grid.
- Where judgement is required, a mark grid will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark grid to a learner's response, a senior examiner should be consulted.

Specific marking guidance

The mark grids have been designed to assess learners' work holistically.

Rows in the grids identify the assessment focus/outcome being targeted. When using a mark 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
1a General	Award **one** mark for labelling each bone correctly. • A – Scapula (1) • B – Humerus (1) • C – Radius (1) • D – Ulna (1) Accept phonetic spelling.	4

Question Number	Answer	Mark
1b General	Award **one** mark for type of joint found at the shoulder. • Ball and socket Accept phonetic spelling.	1

Question Number	Answer	Mark
2a Expert	Award **one** mark for identifying why flat bones and **one** mark for identifying why long bones will help when playing in the match and **one** mark for justifying each reason. Flat bones protect the vital organs (1) reducing the risk of injuries when being tackled. (1) Long bones enable leverage/movement to take place (1) to enable Warren to run with the ball. (1) Accept any other appropriate answer.	4

Question Number	Answer	Mark
2b General	Award **one** mark for stating a type of bone found in the skeleton. • Short (1) • Sesamoid (1) • Irregular (1) Accept any other appropriate answer.	1

Question Number	Answer	Mark
3 Expert	Award **one** mark for identifying that bones become stronger/denser and up to **two** marks for justifying that reason. The weight-bearing activities cause additional stress or damage to the bone/help make the bones stronger/denser. (1) The process happens through ossification (1) osteoclasts clear away old bone (1) increasing osteoblast activity to build new bone (1) allowing the bones to take up more calcium/minerals (1) and making them less likely to break/fracture in later life. (1) Accept any other appropriate answer.	3

Question Number	Answer	Mark
4 General	Award **one** mark for labelling each muscle correctly. • A – Bicep (1) • B – Pectorals (1) • C – Obliques (1) Accept phonetic spelling. *DNA = Do not accept	3

Question Number	Answer	Mark
5 General	Award **one** mark for each type of muscle contraction, up to **three** marks. • Type I(1) • Type IIa (1) • Type IIx (1)	3

Question Number	Answer	Mark
6 Graduate	Award up to **one** mark for describing the role of an agonist muscle and **one** mark for the sporting example of the action. • Muscle that contracts for the movement to take place (1) quadricep when extending the knee, kicking a ball (1) Accept any other appropriate answer/example.	2

Question Number	Answer	Mark
7 (a) Graduate	Award **one** mark for identifying how increased muscle temperature will affect him and **one** mark for linked expansion. Increases the speed/force of contraction/ increases the pliability of his muscles/increases the amount that his muscles can stretch/makes him more flexible (1) increases his stride length/reduces the risk of injuries (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
7 (b) Expert	Award **one** mark for explaining an increase in tolerance to lactate and up to **two** further marks for linked expansion. More efficient in clearing waste products (1) enabling him to work at a higher intensity for longer duration/run a faster time (1) fatigue is delayed/reduced until later in the race. (1) Accept any other appropriate answer.	3

Question Number	Answer	Mark
8 General	Award **one** mark for labelling each respiratory structure correctly. • A – Nasal cavity (1) • B – Trachea(1) • C – Bronchiole(s) (1 • D – Intercostal (muscles) (1) Accept phonetic spelling.	4

Question Number	Answer	Mark
9(a) Expert	Award up to **four** marks for explaining the effects on the respiratory system of taking part in the race. **Two** marks are awarded for increased breathing rate and **two** marks awarded for increased tidal volume. • Increased breathing rate/breathe quicker (1) due to a greater demand for oxygen in the race. (1) • Increased tidal volume/depth of breathing/more air (1) to meet the need of the body to remove waste products. (1) Accept any other appropriate answer.	4

Question Number	Answer	Mark
9 (b) Graduate	Award up to **two** marks for describing how chemical control changes minute ventilation. • Chemoreceptors detect an increase in CO_2/decrease in O_2/decrease in pH(1) • which **<u>increases</u>** minute ventilation. (1) Accept any other appropriate answer.	2

Question number	Indicative content
9(c) Expert	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 should be rewarded for other relevant answers. • Gas exchange occurs through diffusion, where gases move from a high concentration to a low concentration **Muscle** • During the race there is a high PPO_2 in the blood/capillary • There is a low PPO_2 in the muscle • O_2 diffuses from the blood into the muscle • During the race there is a high $PPCO_2$ in the muscle • There is a low $PPCO_2$ in the blood • CO_2 diffuses from the muscle into the blood. **Lungs** • During the race there is a high PPO_2 in the alveoli • There is a low PPO_2 in the blood/capillary • O_2 diffuses from the alveoli into the blood/capillary • During the race there is a high $PPCO_2$ in the blood/capillary • There is a low $PPCO_2$ in the alveoli • CO_2 diffuses from the blood/capillary into the alveoli. **Impact** • Steeper diffusion gradient created • Enables more oxygen to be used in the tissue and the body • Gas exchange becomes more efficient and more CO_2 removed. Accept any other appropriate answer.

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	• 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 which contains generic assertions rather than interrelationships or linkages.
Level 2	3–4	• 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 which considers some interrelationships or linkages but not always sustained.

Level 3	5–6	• 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 which clearly considers interrelationships or linkages in a sustained manner.

Question Number	Answer	Mark
10 General	Award **one** mark for identifying each structure correctly. • A – Sinoatrial node/SA node/SAN (1) • B – Bundle of His (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
11 Graduate	Award up to **two** marks for describing the role of Purkinje fibres. • Carry the impulse around the ventricles (1) causing them to contract (1)	2

Question Number	Answer	Mark
12 Graduate	Award **one** mark for identifying what hypothermia is and up to **one** mark for linked expansion. • Body temperature is below 35°C (1) which causes shivering/confusion/heart stopping (1) Accept any other appropriate answer.	2

Question Number	Answer	Mark
13 (a) Expert	Award **one** mark for explaining why Ashley's heart rate increases before she starts to exercise and **three** marks for linked expansion. This is an anticipatory rise (1) due to the release of adrenaline (1) this in turn will **increase** cardiac output/**increase** blood supply to working muscle/body (1) and enable **more** oxygen to be delivered to the working muscles (1) Accept any other appropriate answer.	4

Question Number	Answer	Mark
13 (b) General	Award **one** mark for stating the correct blood vessel that returns blood. • Vena cava (1) Accept any other appropriate answer.	1

Question Number	Answer	Mark
13 (c) Expert	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 should be rewarded for other relevant answers. **Sympathetic** • Sympathetic nervous system **increases** heart rate • Messages sent down the sympathetic/accelerator nerve from the medulla oblangata • Which **increases** the firing rate/number of impulses of the sinoatrial node/SA node/SAN • causing the atria to contract **more/with more force** • the impulses are transferred causing **more often/forceful** contractions of the ventricles • To enable **more** blood/oxygen to be delivered to the working muscles during exercise **Impact** • to enable her to maintain/work at a higher intensity (e.g.) repeated sprints within a rally, whilst withstand/delaying fatigue	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	• 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 which contains generic assertions rather than interrelationships or linkages.
Level 2	3–4	• 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 which considers some interrelationships or linkages but not always sustained.
Level 3	5–6	• 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 which clearly considers interrelationships or linkages in a sustained manner.

Question Number	Answer	Mark
14 Expert	Award **one** mark for identification of why the system is used and **one** mark for linked expansion up to **three** marks. It provides/releases energy quickly/immediate source of energy (1) so Luke can produce an explosive movement/so it can provide enough energy to complete the movement (1) the high jump/energy system lasts less than 10 seconds (1) ATP is resynthesised quickly for the next jump/recovery time is short. (1) Accept any other appropriate answer.	3

Question Number	Answer	Mark
15 Expert	Award up to **four** marks for describing anaerobic glycolysis. • Anaerobic glycolysis will provide the energy required (1) • Glycogen/glucose is broken down (1) into pyruvic acid (1) • Produces 2 ATP (1) • Lactic acid produced (as there is no oxygen) (1) Accept any other appropriate answer.	4

Question Number	Answer	Mark
16 Expert	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 should be rewarded for other relevant answers. • The ATP-PC may be used at the start of the race or when sprinting. • The ATP-PC system is unable to supply enough energy for long enough due to it being a long duration activity • Lactic Acid system used to provide further energy for when increasing/maintain higher pace during the race • Lactic acid system cannot provide energy for long enough due to the build up of lactic acid • In the 1500 m Luke will predominately use the aerobic energy system to create ATP continuously • Because the race is long duration/to sustain energy production	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 1	1–2	• Demonstrates isolated elements of knowledge and understanding. • Provides little or no reference to the context in the question. • A conclusion may be presented, but will be generic and the supporting evidence will be limited. Limited attempt to address the question. • Response is likely to lack clarity, organisation and the required technical language.
Level 2	3–4	• Demonstrates accurate knowledge and understanding. • Line(s) of argument occasionally supported through the application of relevant references to context in question. • Judgement is made from a partially-developed discussion, although the discussion may be imbalanced or superficial in places. Learners will produce some statements with development in the form of mostly accurate and relevant factual material leading to an assessment being presented. • The response may contain parts which lack clarity or organisation. There is evidence of correct technical language being used.
Level 3	5-6	• Demonstrates accurate knowledge and understanding. • Line(s) of argument supported throughout by sustained application of relevant references to context in the question. Might demonstrate the ability to integrate and synthesise relevant systems.

		• Arrives at a supported judgement from a well-developed and logical balanced discussion, containing logical chains of reasoning. Demonstrates an awareness of competing arguments using these to reach a valid assessment. • Response demonstrates good organisation, clarity and use of technical language.

Question Number	Answer	Mark
17 Expert	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 should be rewarded for other relevant answers. • Hip is a ball and socket joint, made up of the femur and pelvis, • the movement taking place is flexion • the agonist muscle is the hip flexor and the antagonist is the gluteus maximus • the hip flexor (iliopsoas) is contracting concentrically and the gluteals are relaxing • Knee is a hinge joint, made up of the femur, tibia, • the movement taking place is knee extension • the agonist muscle is the quadriceps and the antagonist is the hamstrings • the quadriceps are contracting concentrically and the hamstrings are relaxing • Ankle joint is a hinge joint, made up of tibia, fibula, tarsals • movement is plantar flexion • the agonist muscle is the gastrocnemius and the antagonist is the tibialis anterior • the gastrocnemius is contracting concentrically and the tibialis anterior is relaxing • Skeletal muscles attach to bones via tendons and when they contract they pull on the bone producing movement when Sammy shoots • Ligaments provide stability for the joints, so that they do not dislocate • The muscle fibres being used within the shot are type IIx, which can generate a maximum force but only last a short duration	8

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*.		
Level	**Mark**	**Descriptor**
Level 0	0	No rewardable material.
Level 1	1–3	• 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 which contains generic assertions rather than interrelationships or linkages.
Level 2	4-6	• 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 which considers some interrelationships or linkages but not always sustained.
Level 3	7-8	• 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 which clearly considers interrelationships or linkages in a sustained manner.

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