

Mark Scheme (Results)

January 2020

Pearson BTEC Level 3 Applied Science /
Forensic and Criminal Investigation

Unit 1: Principles and Applications of
Science I – Biology (31617H)

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Unit 1: Applications of Science I – 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.

BTEC Next Generation Mark Scheme Template

Applied Science Unit 1: Biology FINAL 2001

Question Number	Answer	Additional Guidance	Mark
1 (a)(i)	A – biconcave structure		1
1 (a)(ii)	B – enable carbon dioxide transport		1
1 (b)(i)	difference (1) $3.40 - 2.72$ substitution (1) <u>0.68</u> 3.40 evaluation (1) 0.2×100 OR division (1) <u>2.72</u> 3.40 multiplication (1) $\times 100$ evaluation (1) $100 - (80)$	allow full marks for correct answer of 20(%) without working ECF from difference and from substitution allow 2 marks for 80(%) without working	3
1 (b)(ii)	C – saturated fats		1

1 (b) (iii)	<p>Any two from:</p> <p>smoking increases the risk of atherosclerosis (1)</p> <p>the risk of atherosclerosis is higher in coronary arteries than in the aorta (1)</p> <p>there is always a risk of atherosclerosis (1)</p> <p>the difference between smokers and non-smokers is proportionally greater in the aorta (1)</p> <p>Accept any other valid response.</p>	accept reference to data throughout	2
Total			8 marks

Question Number	Answer	Additional Guidance	Mark
(a) (clip with Figure 3)	(permanent) vacuole	accept phonetic spelling reject small/ nonpermeable vacuole	1
2 (b) (i)	organelle(s)	accept phonetic spelling reject organ reject organism	1
2 (b) (ii)	<p>award 1 mark for an identification point and an additional 3 marks for appropriate related explanations. Any of the following points may be either identification or expansion depending on how the learner shapes their response.</p> <p>any four from:</p> <p>(chloroplasts) contain chlorophyll(1)</p> <p>(chlorophyll) trap/take in light (energy) (1)</p> <p>convert (sun)light energy to chemical energy/generate ATP (1)</p> <p>carry out photosynthesis (1)</p> <p>convert/fix/use/absorb CO₂ (1)</p> <p>make glucose/sugar/carbohydrate (1)</p> <p>(glucose) is available for respiration (1)</p> <p>make starch/sucrose/ lipids/amino acid/organic compounds/DNA/cellulose/vitamins (1)</p> <p>enable (cellular) growth (1)</p>	accept equation	4

2 (c)	Two from: fluid filled space (1) folded membranes (1) intermembrane space (1) electron transport chains/electron carriers (1) (contains) enzymes / ATP synthase (1) (contains) ribosomes (1)	allow matrix/stroma allow large surface area membrane allow cristae and thylakoid membranes/ granum/grana ignore 70 or 80s	2
Total			8 marks

Question Number	Answer	Additional Guidance	Mark
3 (a)	X (Gram's) iodine (1) Y safranin/ counterstain (1)	Accept phonetic spelling For X accept iodide, IKI, I. I ₂ for Y ignore saflon, savlon, saffron accept saffrin, saffarin ignore reference to colours, e.g. pink	2
3 (b)	One from: (light) microscope (1) oil immersion (objective lens) (1)	reject electron microscope ignore eyepiece	1
3 (c)	Any two from: thick (cell wall)/ lots of {peptidoglycan/murein} (1) (cell wall) has only one <u>membrane</u> / no outer membrane (1) low lipid content (1)	accept plasmalemma	2
Total			5 marks

Question Number	Answer	Additional Guidance	Mark
4 (a)	<p>award 1 mark for an identification point and an additional 2 marks for appropriate related explanations. Any of the following points may be either identification or expansion depending on how the learner shapes their response.</p> <p>(neurotransmitter) has a complementary shape (to receptors) (1)</p> <p>{ binds/docks } with receptors (1)</p> <p>{ sodium ion /Na⁺ } channels/gates open (1)</p> <p>influx of sodium ions into the cell /influx of sodium ions (across the post-synaptic membrane) (1)</p> <p>(post-synaptic) membrane potential becomes more positive/less negative/ gets to -55mV/ gets to +40mV (1)</p>	accept sodium/ Na	3

Question number	Indicative content
4 (b)	<p>Answers will be credited according to the learner's demonstration of knowledge and understanding of the material, using the indicative content and levels descriptors below. The indicative content that follows is not prescriptive. Answers may cover some or all of the indicative content but learners should be rewarded for other relevant answers.</p> <p>experimental method</p> <p>a month is not really long enough</p> <p>we don't know the sex/gender of the patients</p> <p>we don't know if it was single or double blind trial</p> <p>patients may have felt better/fewer tremors due to placebo effect</p> <p>no quantitative data</p> <p>were both groups in same state/severity of the condition at the start</p> <p>L-Dopa</p> <p>L-Dopa is effective at reducing tremors</p> <p>is a precursor to dopamine</p> <p>can enter the brain</p> <p>(then) converted to dopamine</p> <p>(which can then) attach to the receptors</p> <p>depolarise post-synaptic neurones</p> <p>Drug M</p> <p>is not effective at reducing tremors/treating Parkinson's/ increases tremors</p> <p>can enter the brain</p> <p>may <u>prevent</u>:</p> <p>the naturally occurring dopamine from being released/produced</p> <p>dopamine reaching the receptors</p> <p>depolarisation of post-synaptic neurones</p> <p>repolarisation of post-synaptic neurones</p> <p>may cause (naturally occurring) dopamine to be broken down</p> <p>(therefore) is an antagonist</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*.

Level	Mark	Descriptor
Level 0	0	No rewardable material.
Level 1	1–2	Adequate interpretation, analysis and/or evaluation of the scientific information with generalised comments being made. Generic statements may be presented rather than linkages being made so that lines of reasoning are unsupported or partially supported. The discussion shows some structure and coherence.
Level 2	3–4	Good analysis, interpretation and/or evaluation of the scientific information. Lines of argument mostly supported through the application of relevant evidence. The discussion shows a structure which is mostly clear, coherent and logical.
Level 3	5–6	Comprehensive analysis, interpretation and/or evaluation of all pieces of scientific information. Line(s) of argument consistently supported throughout by sustained application of relevant evidence. The discussion shows a well-developed structure which is clear, coherent and logical.

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