Mark Scheme (Results)

June 2019

Pearson BTEC Level 3 National Certificate – Applied Science

Unit 1: Principles and Applications of Science I - Biology

SECTION A: STRUCTURES AND FUNCTIONS OF CELLS AND TISSUES

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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

1906

Question Number	Answer	Additional Guidance	Mark
1 (a)	C - nucleus		1
1 (b)(i)	alveoli	accept capillaries	1
1 (b)(ii)	any one from the following: trachea/windpipe bronchus bronchi bronchioles	ignore airways/pharynx/larynx/lungs/throat reject alveoli	1
1 (b)(iii)	flat/thin	accept pavement/flattened accept rectangular/square/round/hexagonal/ octagonal/circular/oval/ovoid reject spherical	1
		total	4 marks

Question Number	Answer	Additional Guidance	Mark
2 (a)	X (1) specialised/differentiated/types/shaped/ specific/special/specialist Y (1) function	allow adapted ignore animal/plant allow job/role / purpose/task accept plurals accept phonetic spellings	2
2 (b)	any three from: identification point the vacuole is large/ takes up a lot of the cell space (1) linked expansion (so) pushes/spreads chloroplasts to edge of the cell (1) (therefore) they receive {maximum/more/increased} light (energy) /sunlight (1) short diffusion distance for/increased rate of diffusion {carbon dioxide/water} (to get to the chloroplast) (1) (therefore) not competing for raw materials (1) (vacuole makes the cell) rigid/turgid (1)	allow increased surface area	3
2 (c)	B - cell wall		1
		Total	6 marks

Question Number	Answer	Additional Guidance	Mark
3 (a)	any two of the following: transmits impulse (1) between neurones/ across nerve endings/to other nerves/ to receptors (1) in one direction only /from the pre synaptic to post synaptic neurone (1) regenerates impulse (1) filters out low level stimuli (1)	 Allow information/ neurotransmitter/ signal/ message reject transmits action potentials ignore electrical allow carry on impulse	2
3 (b)(i)	C - acetylcholine is a neurotransmitter		1
3 (b)(ii)	Any 3 from: broken down/hydrolyses/digests (1) by an enzyme (1) absorbed by {pre}synaptic neurone/membrane/ reuptake (1) so it can be recycled/reused (1) to re-synthesise acetylcholine (1)	 accept acetylcholinesterase allow some acetylcholine diffuses away	3

3 (c)	any four from: nicotine (molecule) has a similar shape to acetylcholine (1) so mimics/replicates acetylcholine's {function/job}/ acts like acetylcholine (1) (so nicotine) stimulates/binds (1) to the acetylcholine receptors (1) (which causes) the same action potential/impulse/electrical activity/signal (as acetylcholine) (1)	allow nicotine is a stimulant	4
		Total	10 marks

Question Number	Answer	Additional Guidance	Mark
4 (a)	conversion (1) 2 hour = 120 min number of divisions (1) 120/20= 6 substitution (1) 1500 x 2^6 or 1500 x 64 evaluation (1) 96000	allow full marks for correct answer of 96000 with no working for 4 marks allow ECF throughout	4

Question number	Indicative content
4 (b)	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. • penicillin diffuses out from disc (into [nutrient[agar [gel]) **Gram-positive** • Gram-positive cell wall contains a thick layer of peptidoglycan. • Gram positive bacteria have no outer membrane so penicillin can enter (the wall/bacteria) • penicillin prevents the cross-linking of protein chains in peptidoglycan • (by) inhibiting an enzyme/(transpeptidase/D-alanine carboxypeptidase) • (so) cell wall synthesis is disrupted • (so) new cells grow abnormally • can't maintain their wall rigidity • cells lyse/burst/split (due to take up of water by osmosis) • so no growth around the disc • penicillin prevents growth of new cells/cells just after dividing/binary fission/does not kill established cells **Gram-negative** • cell wall contains a thinner layer of peptidoglycan surrounded by an outer membrane • antibiotic must cross cell wall to be effective • reduced ability of penicillin to cross the (Gram-negative) outer membrane • (so) no/reduced disruption of cell wall/peptidoglycan synthesis • (so) walls are rigid and prevent excess entry of water/osmosis • cells do not lyse/burst • cells continue to grow around the disc of penicillin in the agar/no zone of inhibition

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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