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GCE

Biology B (Advancing Biology)

Unit **H022/02:** Biology in depth

Advanced Subsidiary GCE

Mark Scheme for June 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.

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Annotations

Annotation	Meaning
DO NOT ALLOW	Answers which are not worthy of credit
IGNORE	Statements which are irrelevant
ALLOW	Answers that can be accepted
( )	Words which are not essential to gain credit
__	Underlined words must be present in answer to score a mark
ECF	Error carried forward
AW	Alternative wording
ORA	Or reverse argument

Subject-specific Marking Instructions

INTRODUCTION

Your first task as an Examiner is to become thoroughly familiar with the material on which the examination depends. This material includes:

- the specification, especially the assessment objectives
- the question paper
- the mark scheme.

You should ensure that you have copies of these materials.

You should ensure also that you are familiar with the administrative procedures related to the marking process. These are set out in the OCR booklet **Instructions for Examiners**. If you are examining for the first time, please read carefully **Appendix 5 Introduction to Script Marking: Notes for New Examiners**.

Please ask for help or guidance whenever you need it. Your first point of contact is your Team Leader.

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>1</td><td>(a)</td><td></td><td>
<table>
<tr><th>Description</th><th>Letter</th></tr>
<tr><td>Provides ATP</td><td>G</td></tr>
<tr><td>Modifies enzymes</td><td>C</td></tr>
<tr><td>Involved in protein synthesis</td><td>D</td></tr>
</table>
✓ ✓ ✓
</td><td>3</td><td>IGNORE anything outside the table
ALLOW names of organelles i.e. G = mitochondria, C = Golgi (body), D = rough endoplasmic reticulum (rER)</td></tr>
<tr><td></td><td>(b)</td><td></td><td>mutation / described ✓
proto-oncogenes become oncogenes ✓
(causes) uncontrolled, mitosis / cell division / cell replication ✓

idea that damages p53 gene ✓
idea that mutation / damage, could be in tumour suppressor gene ✓</td><td>Max 2</td><td></td></tr>
<tr><td></td><td>(c)</td><td>(i)</td><td>ANY TWO FROM

gender ✓
age range ✓
how long they have smoked for ✓
underlying medical condition ✓
family history of lung cancer ✓</td><td>Max 2</td><td>IGNORE number of cigarettes smoked per day</td></tr>
</table>

		(ii)	209 (%) ✓✓	**2**	If answer not given to nearest whole number allow 1 mark for correct working i.e. 340-110 **OR** divided110 **OR** 209.1 or 209.09
	(d)	**(i)**	*idea that* a clearer image can be gained without interference from the rib cage ✓	**1**	
		(ii)	*idea that* no symptoms / symptoms similar to minor illness ✓ rarely diagnosed early ✓ difficult to treat / lumpectomy often not possible ✓ no routine screening for lung cancer ✓	**Max 2**	
	(e)		*idea that* receptors / antigens, for the drug are not found on the cell surface membrane of lung cancer cells ✓	**1**	**ALLOW ORA** for breast cancer cells
	(f)		*idea that* cells undergo cell division regularly ✓	**1**	
			Total	**14**	

Question			Answer	Marks	Guidance
2	(a)		67 - 75 ✓✓	2	If answer not given to two significant figures allow one mark for correct working i.e. 60 divided by, 0.80 – 0.90 **OR** 75.00 – 66.67
	(b)		*idea that* there is no clear P-wave ✓ *idea that* there is increased frequency ✓	2	
	(c)		**Heart attack treatment** sit patient, down with support / in W position ✓ call 999 / emergency services ✓ reassure / calm then down ✓ *idea of* monitoring vital signs ✓ *3 max* **Cardiac arrest treatment** lie patient down ✓ CPR / description of CPR ✓ (request) defibrillator (if in public space) ✓	Max 4	
			Total	8	

Question			Answer	Marks		Guidance
3	(a)		Domain, Kingdom, Phylum, Class, Order, Family, Genus ✓	1		
	(b)*		***Summary of instructions to markers:*** *Read through the whole answer. (Be prepared to recognise and credit unexpected approaches where they show relevance.)* *Using a 'best-fit' approach based on the science content of the answer, first decide which of the level descriptors,* ***Level 1****,* ***Level 2*** *or* ***Level 3****, best describes the overall quality of the answer.* *Then, award the higher or lower mark within the level, according to the* ***Communication Statement*** *(shown in italics):* o *award the higher mark where the Communication Statement has been met.* o *award the lower mark where aspects of the Communication Statement have been missed.* • ***The science content determines the level.*** • ***The Communication Statement determines the mark within a level.***			
			Level 3 (5–6 marks) Provides a **comprehensive** description of types of evidence useful to classify species **and** why other evidence can't be used for species such as *H.habilis*. A comprehensive / clear description of useful evidence with advantages and disadvantages can be awarded Level 3 without reference to evidence that can't be used for classifying *H.habilis*. Likewise a comprehensive description of non-useful evidence with regards to *H.habilis* can be awarded Level 3. *There is a well-developed line of reasoning which is clear and logically structured and uses scientific terminology at an appropriate level. All the information presented is relevant and forms a continuous narrative.*	6		**Indicative scientific points may include** *Types of evidence useful in classifying a species* Fossil records Carbon dating Morphology Anatomy Physical features *Evidence not useful* Embryo development Biochemical molecules e.g. DNA / amino acids Behaviour Immunology Fossil records may be incomplete

Question			Answer	Marks		Guidance
			Level 2 (3–4 marks) Provides a basic description of types of evidence useful to classify *H.habilis* **and** limited reasons why other evidence can't be used. *There is a line of reasoning presented with some structure and use of appropriate scientific language. The information presented is mostly relevant.* **Level 1 (1–2 marks)** Description of types of evidence **or** limited description offered to support evidence that can't be used to classify *H.habilis*. *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.* **0 marks** No response or no response worthy of credit.			
	(c)		*For H. neanderthalensis* tools are specialised ✓ tools require greater dexterity to make ✓ *idea that* (shows) increased use of hands ✓ *idea that* (shows) increased use of tools ✓ *idea that* (shows) more complex thought processes ✓	**Max 2**		**ALLOW ORA** for *H. habilis* **ALLOW** tools are sharper **ALLOW** requires greater skill to make

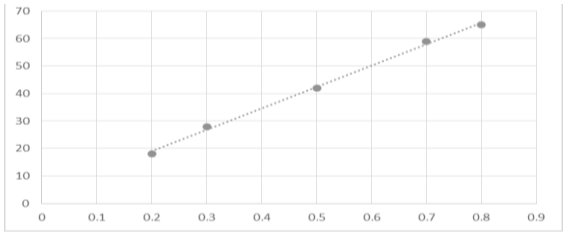
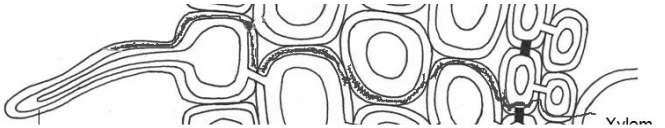
	(d)		*idea that* based on the data only Australopithecus sp. / early hominids could spend time required to maintain the group size **OR** *idea that* species (other than *Australopithecus)* would have to spend too much time grooming to maintain group size ✓ *idea that* species (other than *Australopithecus)* would not have enough time for other activities such as hunting to maintain group size ✓ *idea that* increased level of , vocal grooming / language, needed to maintain group size ✓ comparative figures including units to support ✓	**Max 3**		
			Total	**12**		

Question			Answer	Marks		Guidance
4	(a)*		***Summary of instructions to markers:*** *Read through the whole answer. (Be prepared to recognise and credit unexpected approaches where they show relevance.)* *Using a 'best-fit' approach based on the science content of the answer, first decide which of the level descriptors,* ***Level 1****,* ***Level 2*** *or* ***Level 3****, best describes the overall quality of the answer.* *Then, award the higher or lower mark within the level, according to the* ***Communication Statement*** *(shown in italics):* o *award the higher mark where the Communication Statement has been met.* o *award the lower mark where aspects of the Communication Statement have been missed.* • ***The science content determines the level.*** • ***The Communication Statement determines the mark within a level.***			
			Level 3 (5–6 marks) Provides a **comprehensive** description of method(s) used to limit the transmission of TB that includes some detail of opportunistic infection. A comprehensive / clear description of methods can be awarded Level 3 without comprehensive detail of opportunistic infection although some detail would be expected. *There is a well-developed line of reasoning which is clear and logically structured and uses scientific terminology at an appropriate level. All the information presented is relevant and forms a continuous narrative.* **Level 2 (3–4 marks)** Describes method(s) used to limit the transmission of TB that may include a reference to opportunistic infection. *There is a line of reasoning presented with some structure and use of appropriate scientific language. The information presented is mostly relevant.*	**6**		**Indicative scientific points may include** **Limiting transmission** Detail of: Mantoux tests BCG vaccine herd immunity screening programmes antibiotics / DOTS protective clothing by medical staff reducing overcrowding and isolation of patients **Opportunistic infections** Detail of: description of what is meant by opportunistic infection reference to AIDS reference to compromised immune system

Question			Answer	Marks		Guidance
			Level 1 (1–2 marks) Limited description of the method(s) used to limit the transmission of TB but no reference to the prevention of opportunistic infection. *There is an attempt at a logical structure with a line of reasoning. The information is in the most part relevant.* **0 marks** No response or no response worthy of credit.			
		(i)	cell wall not synthesized ✓ water enters (cells) by osmosis ✓ from a higher water potential to lower water potential ✓ cells, lyse / burst ✓	**Max 3**		
		(ii)	human cells do not have cell walls ✓ *idea that* human cells do not need mycolic acid ✓	**Max 1**		
			Total	**10**		

Question			Answer	Marks	Guidance
5	(a)		550,000 ✓✓	2	**ALLOW** one mark for (1 ÷ 0.004) **OR** 250 **OR** X11
		(ii)	removes grease / finger prints ✓ *idea that* cells are equally distributed ✓ solution is not too concentrated to count cells accurately ✓ **OR** Dacie's fluid preserves shape of RBC's so they are easier to count ✓ makes, nuclei / white blood cells, visible ✓	Max 4	**ALLOW** allows leucocytes to be identified
	(b)		high white blood cell count ✓ normal red blood cell count ✓ supporting figures e.g. WBC is 6.0 x10^{10} per dm^3 **OR** RBC count is 5.0 x 10^{12} per dm^3 ✓ *idea that* could not diagnose platelet disorder ✓ *idea that* could not tell which WBCs are low so couldn't diagnose specific disorder✓	Max 4	
			Total	10	

Question			Answer	Marks	Guidance
6	(a)	(i)	*idea that* the cell (surface membrane) / tonoplast , can be seen ✓ plasmolysed cells can be seen ✓	Max 1	
		(ii)	the student is correct **AND** *idea that* the water potential of the cells decreases / dye is soluble in the cytoplasm ✓	1	
		(iii)	***Error*** immediately remove ✓ ***Improvement*** immersion time should be, longer / stated ✓ ***Error*** drops (of solution) ✓ ***Improvement*** *idea that* should be flooded to ensure full coverage ✓	4	

	(b)	**(i)**	all points plotted correctly ✓ sucrose concentration, mol dm^{-3}, on x axis **AND** percentage of plasmolysed cells, %, on y axis ✓ line of best fit drawn ✓	**3**	**ALLOW** +/- half a small square **DO NOT CREDIT** if line extends beyond range of values obtained 
		(ii)	0.6 mol dm^{-3} ✓	**1**	**ALLOW** ECF **DO NOT CREDIT** if more than two decimal places
	(c)		line passes through cell wall ✓ line passes around Casparian strip ✓	**2**	**Note:** line must begin from an external cell wall 
			cohesive ✓ adhesive ✓ lignin ✓ (bordered) pits ✓	**4**	
			Total	**16**	

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