OCR
Oxford Cambridge and RSA

GCSE

Biology A

Unit **A163/02**: Ideas in Context plus B7 (Higher Tier)

General Certificate of Secondary Education

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.

Annotations

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	alternative wording
ORA	or reverse argument

Available in RM Assessor to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject

	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

If a candidate alters his/her response, examiners should accept the alteration.

Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

E.g.

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.

This would be worth 1 mark.

Put ticks (✓) in the two correct boxes.

This would be worth 0 marks.

Put ticks (✓) in the two correct boxes.

This would be worth 1 mark.

The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

Marking method for tick boxes:

Always check the additional guidance.

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.
Credit should be given for each box correctly ticked. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

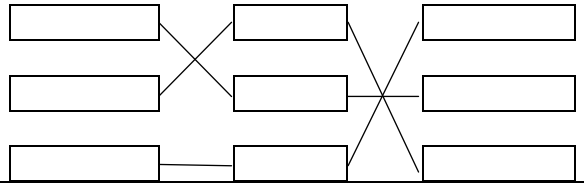
E.g. If a question requires candidates to identify a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third <u>should be blank</u> (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

MARK SCHEME:

Question			Answer	Marks	Guidance
1	a	i	muscle drawn to left of humerus and labelled; (1)	1	**accept** label as muscle/antagonistic muscle/triceps
		ii	tendons labelled and clearly attached to scapula and ulna; (1)	1	**accept** correctly attached labelled tendon
	b		***any two from:*** (muscles can only move joints) by contraction; (1) muscles work as an antagonistic **pair**; (1) idea that one muscle bends joint and second straightens joint; (1)	2	**accept** getting shorter/pull bone **ignore** muscle tenses one muscle contracts **and the other** muscle relaxes (2)
	c			3	one mark each for cartilage correct property and job (1); ligament correct property and job (1); tendon correct property and job (1);
			Total	7	

Question			Answer	Marks	Guidance
2	a		*Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.* **Level 3 (5–6 marks)** Writes about most components of the blood and relates this to the molecules that they transport. *Quality of written communication does not impede communication of the science at this level.* **Level 2 (3–4 marks)** Writes about some components of the blood AND refers to some molecules transported by the blood. *Quality of written communication partly impedes communication of the science at this level.* **Level 1 (1–2 marks)** Writes about components of the blood OR molecules that are transported by the blood. *Quality of written communication impedes communication of the science at this level.* **0 marks** No response or no response worthy of credit.	6	**This question is targeted at grades up to C** **Indicative scientific points may include** **Blood components** Red blood cells White Blood Cells Platelets Plasma **Molecules carried** Oxygen/haemoglobin (by red blood cell) Carbon dioxide (by plasma/rbc) Glucose/amino acids (plasma) Hormones (plasma) urea (plasma) water (plasma) Antibodies (plasma) **ignore** mineral ions/salts
	b		**A** to the left of first red blood cell in line with capillary, **B** to the right of last red blood cell in line with capillary (1); tissue fluid between the bottom of the cells and the top capillary wall ; (1)	2	**accept** highest (blood pressure) for A and lowest (blood pressure) for B end of label line/arrow must be in the right area
			Total	8	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>3</td><td>a</td><td>i</td><td>110

100 (1)</td><td>1</td><td>both required for 1 mark</td></tr>
<tr><td></td><td></td><td>ii</td><td>55% (1)</td><td>1</td><td>accept 54.5/ 54.55/ 54.54</td></tr>
<tr><td></td><td>b</td><td></td><td><table><tr><td>conclusion</td><td>fits</td><td>Does not</td></tr><tr><td>There is a correlation….</td><td>✓</td><td></td></tr><tr><td>For a given power ……</td><td></td><td>✓</td></tr><tr><td>The greater the power …</td><td></td><td>✓</td></tr><tr><td>Heart rates …..</td><td></td><td>✓</td></tr></table></td><td>3</td><td>four correct = 3 marks
three correct = 2 marks
two correct = 1 mark</td></tr>
<tr><td></td><td>c</td><td></td><td>any two from:
Jon repeats investigation/test; (1)

other people do the same test/investigation; (1)

idea that Jon trains at more/ bigger range of altitudes; (1)</td><td>2</td><td>ignore just take more data/readings.

ignore data/readings from other people.</td></tr>
<tr><td></td><td>d</td><td></td><td>any two from:
the blood vessels (supplying the skin) dilate/widen/vasodilation; (1)

allowing more/increased blood flow to the skin surface/through the capillaries (1)

ref to (increased) heat loss/radiation; (1)</td><td>2</td><td>reject capillaries/veins dilate
ignore blood vessels expand/get bigger

reject blood vessels move (closer) to the surface

ignore cool down</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>9</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
4			*Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.* **Level 3 (5–6 marks)** Explains why diabetics benefit from knowledge of GI AND correctly suggests low GI foods in all five types *Quality of written communication does not impede communication of the science at this level.* **Level 2 (3–4 marks)** Explains why diabetics benefit from knowledge of GI AND correctly suggests low GI foods in some food types *Quality of written communication partly impedes communication of the science at this level.* **Level 1 (1–2 marks)** Partial explanation of why diabetics benefit from knowledge of GI OR correctly suggests low GI foods in some food types *Quality of written communication impedes communication of the science at this level.* **0 marks** No response or no response worthy of credit.		**This question is targeted at grades up to A*** **Relevant points about why diabetics benefit from knowledge** *General points about diabetes* • ref to Type 1 and Type 2 diabetes • (Type 1) not enough/lack of insulin • (Type 2) less sensitive to insulin • diabetics unable to control/regulate blood sugar/glucose levels • Diabetics need to avoid foods that will raise their blood glucose levels (quickly)/need foods that will help keep the blood glucose level stable • Type 2 diabetics control blood glucose levels with diet • Diabetics should have a diet complex/slow release carbohydrates/starch • Complex carbohydrates help maintain a constant blood sugar level • Diabetics should have a diet high in fibre (to allow for slower absorption)

Question	Answer	Marks	Guidance
			GI points • High(er) blood glucose/sugar levels from high GI foods ORA • High GI foods raise/drop **blood glucose/sugar** levels quickly/quicker (than low GI) ORA • Low GI foods maintain blood glucose levels for longer ORA • Diabetics should avoid high GI foods/ 70 and above/eat foods that are low GI/ 55 and below. **Suitable foods all low GI** Snacks (chocolate bar, popcorn) Starchy (brown rice, spaghetti, white rice) Vegetable (broccoli, carrots, green peas) Fruits (apple, cherries) Dairy (custard, plain yogurt, soy milk, whole milk)
Total		**6**	

Glycaemic Index (GI)									
Snacks	**GI**	**High in starch**	**GI**	**Vegetables**	**GI**	**Fruits**	**GI**	**Dairy**	**GI**
milk chocolate	49	brown rice	55	broccoli	10	apple	38	custard	43
doughnut	76	pancakes	67	beetroot	64	bananas	56	ice cream	60
energy bar	58	baked potatoes	85	carrots	49	cherries	22	plain yoghurt	14
popcorn	55	spaghetti	38	green peas	48	dates	103	soy milk	31
pretzels	83	white rice	38	onions	75	watermelon	72	whole milk	30

Question			Answer	Marks	Guidance
5	a		***any two from:*** rabbit/animal leaves/removed/migrates; (1) (nitrogen compounds/soil) may be washed away; (1) (crop) plants/timber may be harvested/taken away; (1)	2	 **accept** herbivore **accept** soil removed/taken away **accept** deforestation
	b	i	**statement** in all countries … ☐ France adds 10 … ✓ France adds more …. ✓ the mean …. ✓ only two countries ☐	2	**accept** any 2 correct answers for 1 mark each **deduct** one mark for each additional incorrect response **accept** all three correct answers (2 marks)
		ii	correct calculation of tonnes of fertiliser **AND** linked to correct conclusion (Spain uses less fertiliser/student is correct) = 3 marks correct calculation without a correct conclusion = 2 marks correct working but incorrect answer = 1 mark	3	UK adds 213.3 more (tonnes of fertiliser) than Spain ORA/ UK adds more (tonnes of fertiliser) than Spain-1038.3 ORA **accept** student is correct/Yes if supported by 213.3/1038.3 1038.3/213.3 2047.9 X 50.7÷ 100/ 2047.9 X 0.507

		iii	<table><tr><td>D</td><td>C</td><td>A</td><td>B</td><td>E</td></tr></table>	1	
		iv	***any two from***: idea of increased (crop) yield/production; (1) (community gets)more/enough food; (1) cheaper food/idea of financial benefit; (1) no need for crop rotation; (1) idea that crops can be grown on infertile land (1)	2	**accept** faster growth/make food more quickly
	c	**I**	sun/sunlight/solar energy	1	**do not accept**: light
		ii	***any two from:*** crude oil takes millions of years to form (from dead organisms); (1) being used faster than it can be replaced/made; (1) energy released from fossil fuels/burning originated from the sun; (1) idea that energy in fossil fuels has been 'locked away'/fossil sunlight energy; (1)	2	
			Total	13	

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>6</td><td></td><td></td><td>Please refer to the marking instructions on page 4 of this mark scheme for guidance on how to mark this question.

Level 3 (5–6 marks)
Comments on level of sustainability for all harvesting methods AND lists some environmental impacts

Quality of written communication does not impede communication of the science at this level.

Level 2 (3–4 marks)
Comments on level of sustainability of some harvesting methods OR lists several environmental impacts

Quality of written communication partly impedes communication of the science at this level.

Level 1 (1–2 marks)
Correctly lists some environmental impacts
Quality of written communication impedes communication of the science at this level.

0 marks
No response or no response worthy of credit.</td><td></td><td>This question is targeted at grades up to A*

Comment on sustainability of harvesting methods for :
<table><tr><th></th><th>A</th><th>B</th><th>C</th><th>D</th></tr><tr><td>Sustainable</td><td>No</td><td>No/Least</td><td>Yes/Most</td><td>*</td></tr><tr><td>Harvest</td><td>low</td><td>Low</td><td>High/ increasing</td><td>variable</td></tr><tr><td>Trend/Future yield</td><td>stable / falling</td><td>Falling</td><td>stable/ small fall</td><td>increasing/ uncertain /level</td></tr></table>
• Direct ranking of two methods e.g A is more sustainable than B (order C,D,A,B)

*For D - sustainable/ unsustainable insufficient requires qualification from rows below

Environmental impact
soil erosion
desertification
damage to water supplies
silting of rivers/increased turbidity
loss of (bio)diversity/extinction
change/loss of habitats/named habitat/deforestation
effect on rainfall/water cycle
effect on carbon cycle/increased carbon dioxide
local climate effects/effects on temperature</td></tr>
<tr><td colspan="3"></td><td>Total</td><td>6</td><td></td></tr>
</table>

<table>
<tr><th colspan="3">Question</th><th>Answer</th><th>Marks</th><th>Guidance</th></tr>
<tr><td>7</td><td>a</td><td></td><td>James</td><td>1</td><td></td></tr>
<tr><td></td><td>b</td><td></td><td>
<table>
<tr><th>suggestion</th><th>advantage .. farmer</th><th>advantage .. seed producer</th><th>disadvantage</th></tr>
<tr><td></td><td></td><td>✓</td><td></td></tr>
<tr><td></td><td>✓</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>✓</td></tr>
<tr><td></td><td></td><td>✓</td><td></td></tr>
<tr><td></td><td>✓</td><td></td><td></td></tr>
<tr><td></td><td></td><td></td><td>✓</td></tr>
</table>
</td><td>3</td><td>Six correct= 3 marks
four or five correct = 2 marks
three correct = 1 mark

deduct a mark for each incorrect additional response</td></tr>
<tr><td></td><td>c</td><td></td><td>any two from:

less public opposition/concern in Americas/ (more) public opposition/concern in UK; (1)

different levels of awareness of advantages/disadvantages; (1)

greater need for increased yield/food (1)

(different) legislation/laws/regulations (1)</td><td>2</td><td>we/people assume is reference to UK unless otherwise indicated</td></tr>
<tr><td></td><td></td><td></td><td>Total</td><td>6</td><td></td></tr>
</table>

Question			Answer	Marks	Guidance
8	a		***any two from:*** show plastic package has broken/not air tight; (1) oxygen will get in; (1) (which will allow the) growth/entry of bacteria/microorganisms; (1) idea that quality of the food decreases/food should not be eaten/unsafe; (1)	**2**	 **ignore** ref to use by/best before/past the sell by date/not fresh **ignore** oxygen increases **accept** may cause food poisoning **ignore** can't eat the food
	b		some molecules (1)	**1**	deduct a mark for each incorrect additional response
	c		***any two from:*** single-cell protein; (1) enzymes (used in food production) (1) alcoholic drinks/alcohol/ethanol (1) yoghurt (1)	**2**	**do not accept** biogas, biofuel, antibiotics, insulin **accept** mycoprotein, Quorn™ **accept** examples of enzymes e.g. chymosin that are produced by fermentation for the food industry. **accept** vinegar, soy sauce
			Total	**5**	

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