UNIT 2: VARIATION, HOMEOSTASIS AND MICRO-ORGANISMS
FOUNDATION TIER

MARK SCHEME

GENERAL INSTRUCTIONS

Recording of marks

Examiners must mark in red ink.

One tick must equate to one mark (apart from the questions where a level of response mark scheme is applied).

Question totals should be written in the box at the end of the question.

Question totals should be entered onto the grid on the front cover and these should be added to give the script total for each candidate.

Marking rules

All work should be seen to have been marked.

Marking schemes will indicate when explicit working is deemed to be a necessary part of a correct answer.

Crossed out responses not replaced should be marked.

Credit will be given for correct and relevant alternative responses which are not recorded in the mark scheme.

Extended response question
A level of response mark scheme is used. Before applying the mark scheme please read through the whole answer from start to finish. Firstly, decide which level descriptor matches best with the candidate's response: remember that you should be considering the overall quality of the response. Then decide which mark to award within the level. Award the higher mark in the level if there is a good match with both the content statements and the communication statements.

Marking abbreviations

The following may be used in marking schemes or in the marking of scripts to indicate reasons for the marks awarded.

cao = correct answer only
ecf = error carried forward
bod = benefit of doubt

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
1	(a)			Reflex	1					
	(b)			Protection / to stop fingers being burned	1					
	(c)			Nervous (1) Fast (1) Automatically (1)	3					
				Question 1 total	**5**	**0**	**0**	**5**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
2	(a)	(i)		55[mm]		1		1	1	
		(ii)		$\frac{55}{5} = x\,11$ [e.c.f. from a (i)]		1		1	1	
	(b)			34-38 (1) mm^2 (1)		2		2	2	
	(c)			<u>the wasps were reducing the population of beetles</u>			1	1		
	(d)			Biological (control) / biocontrol	1			1		
	(e)			Wasp may kill useful species		1		1		
				Question 2 total	**1**	**5**	**1**	**7**	**4**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
3	(a)			All 6 plots correct (2) 5 plots correct (1) Plots joined with a ruler (1)		2 1		3	3	
	(b)	(i)		24/25/ correct from candidates graph		1		1	1	
		(ii)		{53/52} – {25/24} = 29/28/27/ correct from candidates graph		1		1	1	
		(iii)		60		1		1	1	
	(c)	(i)		They kill bacteria	1			1		
		(ii)		Bacteria become resistant	1			1		
				Question 3 total	**2**	**6**	**0**	**8**	**6**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
4	(a)	(i)		Increase in concentration		1		1		
		(ii)		Increase in concentration		1		1		
	(b)			Produces insulin (1) Which changes glucose to glycogen (1) Which is stored in liver (1)	3			3		
	(c)	(i)		Concentration would decrease below a safe limit / to a dangerous level		1		1		
		(ii)		Eat glucose / sugar/ sugary food		1		1		
				Question 4 total	**3**	**4**	**0**	**7**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
5	(a)	(i)		L	1					
		(ii)		K	1					
		(iii)		M	1					
	(b)	(i)		Ureter	1					
		(ii)		Bladder	1					
		(iii)		Urethra	1					
				Question 5 total	**6**	**0**	**0**	**6**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
6	(a)			4		1		1		
	(b)			5 and 6		1		1		
	(c)			1		1		1		
	(d)			1		1		1		
	(e)			4		1		1		
				Question 6 total	**0**	**5**	**0**	**5**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
7	(a)	(i)		<table><tr><td></td><td>N</td><td>n</td></tr><tr><td>n</td><td>Nn</td><td>nn</td></tr><tr><td>n</td><td>Nn</td><td>nn</td></tr></table> All correct for 1 mark		1		1		
		(ii)		50%		1		1	1	
	(b)			NN x NN (1) Nn x NN (1)			2	2		
				Question 7 total	**0**	**2**	**2**	**4**	**1**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
8	(a)			4	1			1		
	(b)	(i)		Circle around first diamond from left			1	1		
		(ii)		Mutation	1			1		
	(c)	(i)		B			1	1		
		(ii)		Profile / bands match DNA from blood			1	1		
	(d)			Identical twins		1		1		
				Question 8 total	**2**	**1**	**3**	**6**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
9	(a)	(i)		B	1					
		(ii)		C	1					
		(iii)		D	1					
		(iv)		A	1					
	(b)			Line passing through pupil and hitting the detached retina		1				
	(c)			Pushes {choroid/ sclera} onto retina/ supports retina / holds retina in correct place		1				
				Question 9 total	**4**	**2**	**0**	**6**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
10				**Indicative content:** Use of sterile Petri dish. Flaming the inoculating loop before collecting a sample of harmless bacteria (from yogurt). Using nutrient agar, spread / plate bacteria. Seal Petri dish with tape. Invert Petri dish. Incubate at a stated temperature ($25^{q}C$) for a stated time (12-24 hours). **5 – 6 marks** All steps should be present including stated incubation temperature and detailed aseptic technique. *There is a sustained line of reasoning which is coherent, relevant, substantiated and logically structured. The candidate uses appropriate scientific terminology and accurate spelling, punctuation and grammar.* **3 – 4 marks** Most steps present, including use of sterile Petri dish/ flaming loop and incubation. *There is a line of reasoning which is partially coherent, largely relevant, supported by some evidence and with some structure. The candidate uses mainly appropriate scientific terminology and some accurate spelling, punctuation and grammar.* **1-2 marks** Any correct statement regarding aseptic technique *There is a basic line of reasoning which is not coherent, largely irrelevant, supported by limited evidence and with very little structure*. *The candidate uses limited scientific terminology and inaccuracies in spelling, punctuation and grammar.* **0 marks** *No attempt made or no response worthy of credit.*	6					6
				Question 10 total	**6**	**0**	**0**	**6**	**0**	**6**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
11	(a)			It makes the reaction faster / speeds up reaction		1		1		
	(b)			Concentration of coffee / mass of coffee / volume of water		1		1		1
	(c)			**Any 3 (x 1) from:** Gender / sex Age Fasting before test Time interval between drinking and testing.			3	3		3
				Question 11 total	**0**	**2**	**3**	**5**	**0**	**4**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
12	(a)			Increases chances of survival (1) Because increase in size means it will have fewer predators/ can run faster (1)			2	2		
	(b)	(i)		Reduction of number/ bones reduce from four to one (1) Bones become thicker(1)		2		2		
		(ii)		Greater surface area prevents sinking in marsh land		1		1		
				Question 12 total	**0**	**3**	**2**	**5**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
13	(a)			They can differentiate into many types of cells	1			1		
	(b)			Cells will not be rejected (1) No ethical objections (1)	2			2		
				Question 13 total	**3**	**0**	**0**	**3**	**0**	**0**

Question				Marking details	Marks Available					
					AO1	AO2	AO3	Total	Maths	Prac
14	(a)	(i)		The bacteria enter via drinking water			1	1		
		(ii)		The bacteria were being killed by chlorine		1		1		
	(b)			Drinking water could have been boiled		1		1		
	(c)	(i)		To act as a control			1	1		1
		(ii)		Ionising radiation speeds up mutation in bacteria (1) so they become resistant to antibiotics (1) New antibiotics are needed to replace resistant ones (1)			3	3		
				Question 14 total	**0**	**2**	**5**	**7**	**0**	**1**

FOUNDATION TIER

SUMMARY OF MARKS ALLOCATED TO ASSESSMENT OBJECTIVES

Question	AO1	AO2	AO3	TOTAL MARK	MATHS	PRAC
1	**5**	**0**	**0**	**5**	**0**	**0**
2	**1**	**5**	**1**	**7**	**4**	**0**
3	**2**	**6**	**0**	**8**	**6**	**0**
4	**3**	**4**	**0**	**7**	**0**	**0**
5	**6**	**0**	**0**	**6**	**0**	**0**
6	**0**	**5**	**0**	**5**	**0**	**0**
7	**0**	**2**	**2**	**4**	**1**	**0**
8	**2**	**1**	**3**	**6**	**0**	**0**
9	**4**	**2**	**0**	**6**	**0**	**0**
10	**6**	**0**	**0**	**6**	**0**	**6**
11	**0**	**2**	**3**	**5**	**0**	**4**
12	**0**	**3**	**2**	**5**	**0**	**0**
13	**3**	**0**	**0**	**3**	**0**	**0**
14	**0**	**2**	**5**	**7**	**0**	**1**
TOTAL	**32**	**32**	**16**	**80**	**11**	**11**