MARK SCHEME for the May/June 2013 series

0438 BIOLOGY (US)

0438/53   Paper 5 (Practical Test), maximum raw mark 40

Mark schemes will use these abbreviations

- ;   separates marking points
- /   alternatives
- **R**   reject
- **A**   accept (for answers correctly cued by the question)
- **I**   ignore as irrelevant
- **ecf**   error carried forward
- **AW**   alternative wording (where responses vary more than usual)
- **AVP**   alternative valid point
- **ORA**   or reverse argument
- **OWTTE**   or words to that effect
- <u>underline</u>   actual word given must be used by candidate (grammatical variants excepted)
- ( )   the word / phrase in brackets is not required but sets the context
- **D, L, T, Q**   quality of: drawing / labelling /
- table / detail as indicated
- max   indicates the maximum number of marks

			Answer	Marks	Guidance for Examiners
1	(a)	(i)	Yellow/orange to blue/black;	[1]	Check Supervisor's Report.
		(ii)	Zone drawn around **P/Q**; Label clear zone; Zone around **P** larger than **Q**; Measurement recorded; No zone around **R**;	[max 4]	Check Supervisor's Report. If Report indicates otherwise – both equal accept.
		(iii)	*Explanation:* – **R** no clear zone but **P** and **Q** do; Therefore enzyme must break down starch; **P** must have more (concentrated) enzyme (as wider clear area); **Q** has less enzyme in the water to breakdown starch; to produce clear areas ; no enzyme – no breakdown of starch/water does not contain enzyme /AW;	[max 3]	Accept 'iodine changed since starch not broken down'. Ignore 'growth'.
		(iv)	amylase/carbohydrase;	[1]	
		(v)	For comparison/control;	[1]	Accept to see result without enzyme.
	(b)		1. remove testa/germinate peas; 2. preparation of 'enzyme from seed; 3. leave for 15 mins and then add iodine solution; 4. look for colour <u>change</u>/black to clear; 5 repeat for reliability/or to calculate an average; 6 controlled variable;	[max 4]	For example: place pea on plate/grind up with specified volume of water to extract enzyme and place in hole in starch agar jelly/cut the seed in half/**AW**; Accept idea of set time period. 1h max. Same size of pea/same species/same type/AW.

© Cambridge International Examinations 2013

(c)	**O** – outline; **S** – size; **D** – detail – show side root developing **and** split testa; one label from: testa/radicle/plumule/cotyledon;	[4]	Whole page allowed for drawing. Check Supervisor's Report – living specimen provided. Larger than Fig 101 mm+ Not seed/shoot/root.

(d)(i)

number of pea seeds in each pod	tally	number of pods
4	/	1
5		0
6		0
7		0
8	already	completed 3
9	////	4
10	already	completed 7
11	/#//	5
12	///	3

[2]

Accept blank or 0 for 5 to 7 seeds in pod.
One for correct tally and number of pods.
All boxes correct – 2 marks.
1 error in tally and ecf for number of pods – 1 mark.
2 or more errors – no marks.
Place ticks under the columns.

(ii)	**A**- axes – labelled and evenly scaled; **S** – size to fill more than ½ of grid; **P** – plotting accurate; **C**- columns of equal width **and** touching	[4]	x axis – number of seeds in pod and y axis number of pods. Label of number be central under column. If axes reversed max 3 for **S, P and C** **A** Within ± 1mm. ecf from tally table. If columns do not make contact.no **C** If line graph Max 2 – **A** and **S** only.
(iii)	**X** in bar for 4 peas	[1]	
(iv)	variation (genetic or environmental);	[1]	**A** not all peas fertilised in pod/mutation/change in weather eg very dry/cold/less nutrients/AW. **I** 'not counting correctly'.
		[Total: 26]	

2	(a)	length of line 10 mm; formula – ST length ÷ magnification 10/2.5 ; actual length of leg – 4.0 mm;	[3]	**A** ± 1 mm. **A** word formula 3.6, 4.0, or 4.4 mm if line ST is 9, 10 or 11 mm.
	(b)	*Group* - arachnid/arachnida/spiders; *reasons* – eight/8 legs/4 pairs of leg; two/2 parts to body/cephalothorax <u>and</u> abdomen;	[3]	If incorrect group – allow one feature for that group visible in Fig. Ignore negative features/ref to teeth/2 **segments.** Accept 2 parts to body.
			[Total: 6]	
3	(a)	label to root hair cell; label to cortical cell;	[2]	Line needed to indicate **cell.**
	(b)	(see table below)	[6]	One mark per box. **A** green yellow/yellow **R** mauve as it is the **positive** result for the presence of protein.
			[Total: 8]	

Question 3 (b) table:

substance	reagent	results		
		initial colour	final colour	positive or negative (√ or x)
water	cobalt chloride	blue	pink;	√
reducing sugar	Benedict's ;	blue	orange / red;	√
protein	biuret;	blue	blue /**AW**;	x
fat	ethanol + water	colourless	clear / colourless	x

© Cambridge International Examinations 2013