Cambridge
O Level

Cambridge International Examinations
Cambridge Ordinary Level

BIOLOGY **5090/31**

Paper 3 Practical Test **October/November 2016**

MARK SCHEME

Maximum Mark: 40

Published

This mark scheme is published as an aid to teachers and candidates, to indicate the requirements of the examination. It shows the basis on which Examiners were instructed to award marks. It does not indicate the details of the discussions that took place at an Examiners' meeting before marking began, which would have considered the acceptability of alternative answers.

Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

Cambridge will not enter into discussions about these mark schemes.

Cambridge is publishing the mark schemes for the October/November 2016 series for most Cambridge IGCSE®, Cambridge International A and AS Level components and some Cambridge O Level components.

® IGCSE is the registered trademark of Cambridge International Examinations.

© UCLES 2016

Mark schemes will use these abbreviations:

;	separates marking points
/	alternatives
()	contents of brackets are not required but should be implied
R	reject
A	accept (for answers correctly cued by the question, or guidance for examiners)
Ig	ignore (for incorrect but irrelevant responses)
AW	alternative wording (where responses vary more than usual)
AVP	alternative valid point (where a greater than usual variety of responses is expected)
ORA	or reverse argument
underline	actual word underlined must be used by candidate (grammatical variants excepted)
+	statements on both sides of the + are needed for that mark

© UCLES 2016

Question	Answer	Mark	Additional Guidance
1(a)(i)	suitable column headings with units: time agar pieces added **+** time colour change **+** time taken to change **;**	**1**	
1(a)(ii)	$10 \times 10 \times 10$ **;**	**1**	
1(a)(iii)	consistent system for recording times for agar pieces added to acid **;** all boxes completed **;** time taken to change correctly calculated **;**	**3**	
1(b)(i)	**A** / largest piece takes longest (to change colour) / **ORA ;** the bigger the piece (of agar) / larger the surface area, the longer the time taken (for the colour change) / **ORA ;;**	**2**	
1(b)(ii)	in small cells movement of (named) substances in / out is rapid / fast enough **ORA ;** diffusion**;**	**2**	**A** for named substances oxygen, CO_2, waste products, ions, vitamins, hormones, molecules (anything small enough to diffuse)

© UCLES 2016

Question	Answer	Mark	Additional Guidance
1(c)(i)	cell **F** shows cell membrane / contents pulled away from cell wall **;** (in cell **F**) unable to observe vacuole **;** cytoplasm shrunk / smaller **;** plasmolysed**;**	**2**	
1(c)(ii)	water moves **;** exits / leaves / out of cell **;** by osmosis **;** correct reference to concentration gradient / water potential (lower outside cell **F** i.e. concentrated salt solution) **;** partially permeable membrane **;** reference to plasmolysis **;**	**max 4**	**A** semi / selectively permeable

© UCLES 2016

Question	Answer	Mark	Additional Guidance
1(c)(iii)	use a range of different concentrations of salt solutions ; extra detail, e.g. stated concentrations / minimum of 3 concentrations ; same onion / same time / same temperature / same sized piece of epidermis ;; microscope ; recording approach – number / presence of plasmolysed cells ; handling of data to determine salt concentration ;	4	
	Total:	**19**	

© UCLES 2016

Question	Answer	Mark	Additional Guidance
2(a)	outline clear and continuous + no shading ; larger than actual seed and fills at least half the available space ; detail of embryo and correct proportions ; label the plumule and radicle ;	4	
2(b)(i)	describe preparation of samples / crush / chop up peanut ; addition of biuret reagent ; blue to lilac / mauve / purple ;	3	
2(b)(ii)	results recorded for bean seeds ;	1	
2(b)(iii)	results recorded for maize seeds ;	1	
2(b)(iv)	relevant comparison / comment consistent with results ;	1	
2(b)(v)	use same mass / similar surface area of tissue ; same volume / concentration of reagent ; record after same time (period) ; agitated / stirred same amount ;	2	
2(c)(i)	35 (mm) ;	1	**A** 34 – 36 (mm)

© UCLES 2016

Question	Answer	Mark	Additional Guidance
2(c)(ii)	35 ÷ 4500 ; 0.0078 (mm) ;	2	**A** error carried forward from result in (c)(i) **A** 0.008 (mm) for any measurement
2(d)(i)	axes fully labelled with names of protein source central to bars + source of protein on one axis and protein content / g per 100 g on the other ; at least half the grid used on both axes + linear scale for protein content with a value at origin ; all plots / height of bars correct ; sides of bars ruled + of equal width ;	4	
2(d)(ii)	50 ÷ 10 / 5 ; × 100 ; **OR** 500 ;;	2	 correct answer = 2 marks awarded
	Total:	21	
	Total:	40	

© UCLES 2016