CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2014 series

5090 BIOLOGY

5090/31 Paper 3 (Practical Test), maximum raw mark 40

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 May/June 2014 series for most IGCSE, GCE Advanced Level and Advanced Subsidiary Level components and some Ordinary Level components.

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)
- **underline** actual word underlined must be used by candidate (grammatical variants excepted)
- **max** indicates the maximum number of marks that can be given
- **+** statements on both sides of the + are needed for that mark

Question	Expected Answer	Additional Guidance	Marks
1 (a) (i)	shape ; outer layer indicated ;		[2]
(ii)	both drawn ; straighter in distilled water **+** more curved in sugar solution ;		[2]
(iii)	piece in water straightens / curve 'opens' / **AW** ; piece in sugar solution more curved / curve closes / **AW** ;	 **A** rolled / folded	[2]
(iv)	reference to movement of water ; out of (onion) piece in sugar solution **+** into piece in water ; osmosis ; water potential / concentration greater in onion than sugar solution **+** water potential / concentration lower in onion than distilled water / **AW** ; semi or partially permeable membrane ; piece in water more turgid **+** piece in sugar solution less turgid / more flaccid ; outer layers waterproof / less change / unchanged ;	 **A** exosmosis and endosmosis **A** hypotonic / hypertonic **A** def. of turgid / flaccid **A** plasmolysed with reference to cells only	[5]

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(b)	*factor* – same source / type of onion tissue ; *expl* – no variation in cells / comparing similar cells / same water potential of cells ; *factor* – same size / thickness of onion tissue ; *expl* – same distances for water movement ; *factor* – same length of time in solution ; *expl* – same opportunity for movement of water to occur ;	factor and explanation must be linked for two marks	[2]
		Total	**[13]**
2 (a) (i)	*drawing* clear continuous lines **+** no shading ; size (should be the same size as the specimen) ; central part clear and in proportion to whole and showing some seeds ; *label* seed **+** remains of sepals ;	see measurement given in **(a)(ii)**	[4]
(ii)	line drawn **+** measurement **+** units ;	tolerance ± 2 mm **A** measurements in cm	[1]
(iii)	line drawn on Fig. 2.1 in a similar position to **(a)(ii) +** measurement **+** units ; formula = $\frac{\text{drawn apple measurement}}{\text{Fig. 2.1 apple measurement}}$; allowance for × 3 in Fig. 2.1 ; answer ;		[4]
(b) (i)	colour recorded ; below pH 7 / acidic ;	should be yellow green / yellow / orange but check Supervisor's Report	[2]

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(ii)	crush / cut up apple / extract juice / **AW** ; add Benedict's solution ; heat (in a water bath) ; colour change from blue to green / orange / red / red-brown indicates reducing sugar ;	 **R** if non-reducing sugar test carried out initial **+** final colours needed	[4]
(c) (i)	unwrapped – (0) 20, 45, 65, 80 ;;	4 correct – 2 marks, 1 error – 1 mark	[2]
(ii)	storage time on x axis **+** loss in mass on y, both axes fully labelled with units ; scales linear using at least half of grid ; correct plots ; 2 lines drawn – either by straight lines between points or lines of best fit ; lines identified ;	minimum acceptable labels: storage or t / days loss in mass / g tolerance of $\frac{1}{2}$ square **R** fuzzy / thick lines lines may be labelled or a key given	[5]
(iii)	reading at day 8 for unwrapped apples; reading at day 8 for wrapped apples ; subtraction + answer + units ;	read values from candidate's graph	[3]
(iv)	respiration / stored sugars (food) used ; evaporation / water loss ; decomposition / **AW**;	 **A** dehydration **A** decay / microbial action / rotting	[2]
		Total	**[27]**

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