CAMBRIDGE INTERNATIONAL EXAMINATIONS

GCE Ordinary Level

MARK SCHEME for the May/June 2014 series

5090 BIOLOGY

5090/61 Paper 6 (Alternative to Practical), 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)
- **ORA** or reverse argument
- **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	Mark
1 (a) (i)	*in water* – less curved / straighter / curve 'opens' / **AW** ; *in sugar solution* – more curved / curve closes up / **AW** ; *idea* curved in opposite directions w.r.t. epidermis ;	 **A** rolled / folded e.g. epidermis on outside in sugar solution, inside in distilled water	[3]
(ii)	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) (i)	*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]
(ii)	volume of solutions / volume of water added to sugar ; temperature ; length of time immersed ; tissue from the same source ; size / thickness of onion tissue ; same type of sugar in each solution ;	**Ig** amount unless qualified (e.g. 100 ml) these factors should be different from the one in **(b)(i)** *if mark awarded*	[2]
(iii)	measure the distance between the two ends (using a ruler) / measure length ; measure changes in mass ;		[1]
(c)	water entering = water leaving / no **net** movement of water ; equilibrium is reached ; concentration of external solution balances that of the internal solution / reference to isotonic / reference to water potential same inside and out ;	**R** no osmosis, no difference	[2]
		Total	**[15]**

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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 ;	 **A** 75–85 mm for width	[4]
(ii)	line drawn **+** measurement **+** units ;	**A** measurements in cm	[1]
(iii)	line drawn on Fig. 2.2 in a similar position to X – X **+** measurement **+** units ; $\frac{\text{Fig. 2.1 measurement}}{\text{Fig. 2.2 measurement}}$; allowance for × 3 in Fig. 2.2 ; answer ;		[4]
(b)	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]

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(iv)	respiration / stored sugars (food) used ; evaporation / water loss ; decomposition / **AW** ;	 **A** dehydration **A** decay / microbial action / rotting	[2]
		Total	**[25]**

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