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GCE Ordinary Level

MARK SCHEME for the May/June 2014 series

5090 BIOLOGY

5090/62 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.

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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)	cell membrane ; chloroplast ;	labelling line must end precisely on the cell membrane labelling line may end in middle of chloroplast or end on the outer membrane	2
(ii)	(membranes) destroyed / damaged / broken / no longer only partially permeable / **AW** ; chlorophyll / green contents leak out / **AW** (into water) / chloroplast damaged ;	**Ig** damage to cell wall **A** chlorophyll diffuses out *idea* of chlorophyll leaving cells required	2
(b) (i)	boiling time on x axis **+** vitamin C content on y **+** both axes fully labelled ; scales linear using more than half of grid on both axes ; correct plots ; 2 lines drawn – either by straight lines between points or lines of best fit ; both lines identified ;	minimum labels: t / min **R** m vit C / mg per 100 g **R** thick or 'fuzzy' lines lines may be labelled 'cabbage', 'water' or a key given	5
(ii)	correct answer **+** units ;;	**A** answers written on graph, e.g. 2.8 mins if not in **(b)(ii)** **A** e.g. 3.5 min or 3 min 30 sec award one mark for correct working or method indicated on graph	2

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(iii)	*cabbage* vitamin C decreases ; rapidly then more slowly / **AW** ; *water* vitamin C increases to 4 minutes / 26.0 mg per 100 g ; then decreases ;		4
(c)	temperature – boiling or 100 °C ; mass / weight / volume of cabbage ; feature of cabbage – age / type / variety / healthy / from same plant ; size of leaf pieces / surface area of cabbage ; volume / mass of oil (= volume / mass of water) ; (boiling / cooking) time ; samples taken at same time intervals ; same volume / size of sample taken for testing ; same method for testing for vitamin C used ;	**A** same temperature for water and oil **Ig** amount or quantity unless qualified **A** volume of liquids	4
(d)	take more vitamin C measurements between 4 to 8 minutes / decrease time intervals for taking samples / samples at regular intervals ; use larger sample of / more cabbage ; repeat experiment **+** mean / average ; use a water bath ;		2
		Total	**21**

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2 (a) (i)	only rose hip in 'box' drawn **+** good size ; body of fruit drawn with clear continuous outline **+** line delimiting body of fruit and sepals **+** no shading anywhere ; top of fruit flattened **+** body of fruit wider than high ; at least 4 sepals realistically shaped, all longer than the depth of the fruit ; a sepal correctly labelled ;	at least 70 mm at widest **R** any leaves etc. drawn / two fruits drawn	5
(ii)	X – X measurement **+** units ; drawing measurement **+** units ; formula ; allowance for x2 in Fig. 2.1 ; magnification ;	**A** 41 – 45 mm **A** measurements in cm tolerance ± 1 mm **R** if any units given	5
(iii)	contains seed(s) / **AW**;		1
(b)	thin / aerodynamic / flat / disc-shape ; large surface area (to volume ratio) ;	 **A** large lamina / winged	2
(c) (i)	to avoid competition / overcrowding ; to colonise new areas / increase range ;	**A** idea of competition e.g. if not dispersed new plant will tap nutrients in same soil as parent	 2
(ii)	seeds evenly spread over surface in one **+** close together in the other dish ; same number of seeds in each dish ; left for same time ; same volume / mass of water (at start) ; same (environmental) conditions given to both ; both dishes covered to prevent loss of water / kept watered ; measurement / comparison of growth ;	**R** different numbers with no reference to spacing **lg** few / several days **lg** amount or quantity unless qualified e.g. pH, temperature, light, oxygen	4
		Total	**19**

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