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Cambridge Ordinary Level

MARK SCHEME for the October/November 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.

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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)
- **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

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Question	Expected Answer	Mark	Additional Guidance
1 (a)	B ; minutes ; 6 and 8 in the time column ; *temperatures*: 50 ; 54 ;	 [5]	 **A** min
(b)	A - 25 ; B - 28 ;	 [2]	
(c) (i)	time on x axis, temperature on y axis **+** full labels ; only one linear scale on each axis, both using at least half the grid ; all points clearly plotted ; two continuous lines between the points / two smooth curves / two lines of best fit ; key or label to distinguish between the two sets of data ;	 [5]	x-axis: t/min, y-axis: temp/°C tolerance ± ½ small square

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(ii)	drop in temperature in both containers / AW ; in **A** the drop is greater / **AW** / comparative statement (e.g. both decrease similar amounts) / temperature falls most quickly (in both) in the first 2 minutes / ref. to early rate ;	[2]	
(iii)	larger surface area (SA) loses more heat ; by named heat loss ;	[max. 2]	**A** ref. surface area : volume ratio **A** radiation / evaporation / convection / conduction
(d)	volume / mass of container / water / liquid ; starting <u>water</u> / <u>liquid</u> temperature ; times of measuring temperature ; material of container (i.e. plastic) ; (same type of) liquid within containers ;	[max. 3]	**A** 100 cm^3 **A** 65 °C e.g. every two minutes, total measuring time

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(e)	*improvement* automation / data logger / digital thermometer ; *explanation* removes human error / increase precision/accuracy ; *improvement* two thermometers ; *explanation* recordings on time / simultaneous readings / avoid time delay / save time / ref. equilibration time / can be left in container without need for moving ; *improvement* ref. method / idea of maintaining external conditions, e.g. screen around containers / turn off air conditioning / **AW** ; *explanation* prevent draughts / prevent uneven heat loss (due to external factors) ; *improvement* shorter time intervals / more frequent monitoring ; *explanation* clear trend / more detailed curve / 'better graph' ; *improvement* repeat **+** mean/average ; *explanation* improve <u>reliability</u> / remove effect of anomalous results ;	[max. 4]	Improvement and method to be linked Improvement mark available without explanation **R** more accurate
		[Total: 23]	

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Question	Expected Answer	Mark	Additional Guidance
2 (a) (i)	counting / adding up / estimating / AW number of squares or parts of squares (covered by leaf) ;	[1]	
(ii)	evidence of counting / adding up squares, e.g. ticks, numbers ; 6 - 8 ;	[2]	
(b)	clear outline, realistic shape and no shading ; at least 100 mm in length ; midrib (as double line, and to apex) and veins represented ; labels: 2 from (leaf) stalk (petiole) / mid rib (main vein) / vein / blade (lamina) / cuticle ;	[4]	
(c) (i)	label palisade (cell) in correct position ; label xylem (vessel) in correct position ;	[2]	**A** P for palisade **A** X for xylem **A** layers labelled
(ii)	palisade cell – contains (many) chloroplasts / chlorophyll / AW ; xylem vessel – thick walls / (strong hollow) tubes / tubular / AW ;	[2]	 **A** woody / lignin / strengthening
(iii)	palisade cell – light (needed for photosynthesis) **+** position near to upper surface / top / AW ; xylem vessel – in midrib / veins / below main part of leaf / AW **+** ref. most support for leaf ;	[2]	
		[Total: 13]	

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<table>
<tr><th>Question</th><th>Expected Answer</th><th>Mark</th><th>Additional Guidance</th></tr>
<tr><td>3 (a)</td><td>
<table>
<tr><th>reagent used</th><th>colour of reagent at start</th><th>final colour of reagent</th><th>conclusion</th></tr>
<tr><td></td><td></td><td>green ;</td><td></td></tr>
<tr><td></td><td></td><td>violet / purple / mauve / lilac ;</td><td></td></tr>
<tr><td></td><td>yellow / brown ;</td><td></td><td>starch present ;</td></tr>
</table>
</td><td>[4]</td><td></td></tr>
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