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Cambridge Ordinary Level

MARK SCHEME for the October/November 2014 series

5090 BIOLOGY

5090/32 Paper 3 (Practical Test), maximum raw mark 40

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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) (i)	B ; time / minutes ; 6 and 8 ;	[3]	**A** min
(ii)	start temps difference of < 6 °C ; 5 temps recorded for **A** ; 5 temps recorded for **B** ; general trend – decreasing ;	[4]	
(b)	total drop in temperature for container **A** ; total drop in temperature for container **B** ;	[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]	refer to candidate's results, e.g. if **A** and **B** opposite of expected
(iii)	container **A** has a larger surface area (SA) than container **B** or vice versa [check data in **(a)(ii)**,**(b)**] ; 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 ; keeping environmental / room temperature constant ; times of measuring temperature ; material of container (e.g. glass / plastic) ; (same type of) liquid within containers ;	[max. 3]	**A** stated volume **A** stated temperature 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: 25]	

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Question	Expected Answer	Mark	Additional Guidance
2 (a) (i)	prominent veins / lighter (light green) / duller / not as waxy / ORA ;	[1]	
(ii)	clear outline, realistic shape and no shading ; larger than leaf provided ; 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]	
(b) (i)	complete outline drawn on grid ;	[1]	
(ii)	counting / adding up / estimating / AW number of squares or parts of squares (covered by leaf) ;	[1]	
(iii)	evidence of counting / adding up squares, e.g. ticks, numbers ; answer ;	[2]	ref. candidate's results

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(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: 15]	

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