

MARK SCHEME for the October/November 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 October / November 2014 series for most Cambridge IGCSE[®], Cambridge International A and AS Level components and some Cambridge O 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)
- **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)	three readings ;; trend shown ;	[3]	1 or 2 readings = 1 mark
(ii)	three readings ;; trend shown ;	[3]	1 or 2 readings = 1 mark
(b) (i)	<i>description:</i> movement increases / more movement / fast(er) ; credit for using data ; <i>explanation:</i> more substrate / sugars / carbohydrates (for respiration) / increases respiration / fermentation / more CO ₂ produced / AW ;	[3]	
(ii)	<i>description:</i> less / slight / slower movement of meniscus ; <i>explanation:</i> yeast did not respire / respiration decreases / stops / little / no CO ₂ produced ;	[2]	
(iii)	<u>control</u> ; for comparison / AW ;	[2]	e.g. to see the effect of adding ethanol

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(c)	<u>volume</u> of active yeast / mixture ; bore / diameter of tubing ; meniscus starting point ;		A 10 cm ³ mixture
		[max. 2]	I temperature / pH / pressure / light
		[Total: 15]	

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Question	Expected Answer	Mark	Additional Guidance
2 (a) (i)	phloem ;	[1]	
(ii)	clear, continuous outline of all three cells as in Fig 2.1 + no shading ; size (min. 80 mm across) ; cell walls indicated by double line ; correct proportion of the three cells ;	[4]	R if cells not touching need not be continuous correct proportion of wall thickness 1 st and 2 nd cells of similar size + both larger than 3 rd
(b)	measurement on Fig. 2.1 (7 ± 1 mm) and on drawing (± 2 mm) ; measurement of drawing \div measurement on Fig.2.1 ; $\times 240$; answer ;	[4]	R if change units A ecf R if units used max. 2 d.p.
(c) (i)	axes labelled with units ; size to fill at least $\frac{1}{2}$ of grid + linear scale on y-axis ; plot correct ± 1 mm ; all columns drawn ruled and of equal width ;	[4]	y – mass / g ; x – plant + names centred to bar A rotation of axes through 90° with zero or scale break A columns touching or separate I shading, etc.

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(ii)	2900 ÷ 600 ; 4.8 (times) ;	[2]	
(iii)	diameter / thickness (of fibre) ;	[1]	A (presence of) lignin / cellulose
		[Total: 16]	

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Question	Expected Answer	Mark	Additional Guidance												
3 (a)	<table border="1"> <thead> <tr> <th>feature</th> <th>in the dark</th> <th>in the light</th> </tr> </thead> <tbody> <tr> <td>leaf</td> <td>small / pale</td> <td>large / dark ;</td> </tr> <tr> <td>stem</td> <td>long / tall</td> <td>short / dwarf ;</td> </tr> <tr> <td>root</td> <td>narrow / straight</td> <td>wide / curled ;</td> </tr> </tbody> </table>	feature	in the dark	in the light	leaf	small / pale	large / dark ;	stem	long / tall	short / dwarf ;	root	narrow / straight	wide / curled ;	[3]	
feature	in the dark	in the light													
leaf	small / pale	large / dark ;													
stem	long / tall	short / dwarf ;													
root	narrow / straight	wide / curled ;													
(b)	<p>grow in substrate (on paper/soil) ;</p> <p>same type / batch / age of seeds / species / type of plant / number ;</p> <p>same external conditions / named condition ;</p> <p>same <u>volume</u> of water ;</p> <p>carried out at more than one temperature / AW ;</p> <p>min. 3 <u>stated</u> temperatures between 10 °C and 60 °C ;</p> <p>replicates / repeat for each temperature + mean ;</p> <p>left for same length of time / same number of days OR time taken for germination recorded ;</p> <p>comparison of no. germinating / rate of germination / AW ;</p>	[max. 6]	<p>e.g. light intensity, O₂ concentration I pressure A stated volume</p> <p>A mark if more than 1 seed used earlier + mean If time stated, must be > 1 day</p>												
		[Total: 9]													