MARK SCHEME for the May/June 2014 series

9700 BIOLOGY

9700/32

Paper 32 (Advanced Practical Skills 2), 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 scheme abbreviations:

;	separates marking points
1	alternative answers for the same point
R	reject
Α	accept (for answers correctly cued by the question, or by extra guidance)
AW	alternative wording (where responses vary more than usual)
<u>underline</u>	actual word given must be used by candidate (grammatical variants accepted)
max	indicates the maximum number of marks that can be given
ora	or reverse argument
mp	marking point (with relevant number)
ecf	error carried forward
I	ignore
	-

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1	 (a) (i) (labels under correct sequence of beakers) + 10 + 5 + 2.5 + %; adds previous concentration of C to each of the last two beakers + 10cm³; adds water/W + 10 cm³ to three beakers; 		[3]			
		(ii)	 ii) organised into table + all columns separated by a line + all headings underlined; headings (top or to left of data) percentage concentration + (any column/row headed) time (/)s or seconds; whole seconds for at least three concentrations; records highest concentration first; 		•	
				est concentration recorded in shorter time than next co	oncentration;	[5]
		(iii)	(dep	endent) stage 3 or end-point + <i>idea of</i> judging/determ	iining;	[1]
		(iv)	or	nge or thermometer + no effect + if use same syringe o nges + affect accuracy + not true value ;	or thermometer ;	[max 1]
		(v)	repla	aces calcium chloride / C with water ;		[1]
	(b)	(i)	calcium chloride + optimum % conc. of calcium chloride from investigation or stated figure % e.g. 20% ;		e.g. 20% ;	
			•••	of milk or volume of milk <u>me</u> milk or <u>same</u> volume or stated volume e.g. 2 cm ³ ;		
				perature of water-bath e 70 °C maintained by thermostatically controlled wate	er-bath	
			temp	perature of milk (reaching desired temperature) eck temperature of milk has reached 70 °C or milk (has reached) 70 °C (before enz	zyme added) ;	
			+ us or	me of enzyme e <u>same</u> volume of E or stated volume e.g. 1 cm ³ of E		
				centration of enzyme / E e <u>same</u> conc. of E or 1% E ;		[max 2]

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	 (ii) (x-axis) time of heating solution E/seconds + (y-axis) time to reach the end-point/seconds ; 				
			(x-axis) 2 cm to 50 seconds, labelled each 2 cm, except c + (y-axis) 2 cm to 50 seconds, labelled each 2 cm, except	-	ls
		c	correct plotting of five points as small cross or dot in circ	le or cross ;	
		five plots + ruled sharp lines exactly point to point or			
			ruled line of best fit + sharp smooth line ;		[4]
		 (iii) structure of protein/substrate/enzyme/active site or bonds + changed/altered/destroyed/no longer complementary/broken ; 			
		f	fewer ESCs/Enzyme Substrate Complexes or less subs	trate can <u>bind</u> ;	
		i	idea of enzyme denatured ;		[3]
					[Total: 20]
2	(a)	no ce root c choo	ast 3 lines + size at least 40 mm across greatest width o ells + one closed end with one open end ; cap as separate area or two lines around margin ; ses (correct) area to cells undergoing mitosis ; (e.g. <u>mitosis</u>) to area with cells undergoing mitosis ;	root tip + no shadi	ing ; [5]
	(b)	contin only s for ce for Q 2 lab	ast 5 cells + size at least 50 mm across largest cell at nuous lines ; 5 whole cells drawn + enclosure drawn in cells Q and S ells P , R and T whole nuclei drawn as different shapes ; a chromosomes drawn as a mass ; els + 2 lines + 2 different stages of mitosis identified ; correct annotation of one stage ;	·	irp [6]
	(c)	meas	sures scale bar within range + mm + to 0.5 ; (range 13–	15mm);	
		show or	vs conversion of scale bar in mm to μ m (× 1000)		
		-	vs conversion of 31 μ m to mm (31 divided by 1000 = 0.0	31 mm) ;	
		show or	\prime measurement of scale bar in μm divided by 31 μm		
		-	vs measurement of scale bar in mm divided by 0.031 mr	ו;	
		<u>corre</u>	ect answer 451.61 / correct answer rounded to a whole n	umber (452) ; ecf	[4]

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(d) organise as table with 3 columns headed feature + Fig. 2.1 + Fig. 2.2;

[5]

max 4 for differences

point of comparison	Fig 2.1	Fig 2.2
cells undergoing mitosis	more	few(er)
visibility of chromosomes	chromosome/chromatids visible	chromosome/chromatids not visible ;
metaphase or anaphase	present/ (one cell in) metaphase/anaphase	absent / no metaphase / anaphase ;
interphase or telophase	less or no telophase	more or (one/two cells in) telophase ;
cell walls or cell shape or cell arrangement	not visible/absent or rectangular/4 sides or scattered/irregular/random	prominent/ present or 6 sides/5 sides or aligned/regular/ordered ;
cell packing or air spaces or cells touching	loosely packed/more spaced out/ separated or more air spaces or have spaces between cells or cells not touching	closely packed/less spaced out; or none or few air spaces or have no spaces between cells or cells touching ;
nucleus	present or all cells show a nucleus	not all cells show a nucleus or some cells have a nucleus ;

[max 5]

[Total: 20]