Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/61**

Paper 6 Alternative to Practical **May/June 2017**

MARK SCHEME

Maximum Mark: 40

Published

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Mark schemes should be read in conjunction with the question paper and the Principal Examiner Report for Teachers.

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Mark schemes will use these abbreviations

- **;** separates marking points
- / alternatives
- **I** ignore
- **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 any valid point
- **ecf** credit a correct statement / calculation that follows a previous wrong response
- **ora** or reverse argument
- ( ) the word / phrase in brackets is not required, but sets the context
- underline actual word given must be used by candidate (grammatical variants excepted)
- max indicates the maximum number of marks that can be given

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Question	Answer	Marks	Guidance
1(a)(i)	(tube 3) = 0.10 ; (tube 7) = 0.80 ;	**2**	
1(a)(ii)	purple / violet / lilac / mauve / AW ;	**1**	
1(a)(iii)	(shows a sequence) 1 = + 2 and 3 = ++ 4 = +++ 5 and 6 = ++++ ;	**1**	
1(a)(iv)	table drawn with 14 cells for results and 2 heading cells ; column and row headings and appropriate units for each heading ; recording of any concentrations and the intensity scores from (a)(iii) ;	**3**	**R** % symbol in body of table
1(a)(v)	records ++ or +++ for tube **A** **and**, ++++ for tube **B** ;	**1**	
1(a)(vi)	*tube **A*** between 0.05% to 0.20% (inclusive) / figure quoted from range ; *tube **B*** between 0.40% (inclusive) to whatever given in their table (or figure quoted from range) ;	**2**	**ecf** from (a)(iii) and (a)(v)
1(b)(i)	tube **1** / tube with only water / tube with no protein / 0% protein ; to show effect due to protein / for comparison of colour with tubes containing protein / to show colour when no protein is present / AW ;	**2**	

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Question	Answer	Marks	Guidance
1(b)(ii)	idea that it is a qualitative method / not quantitative / not measured ; subjective / judged by eye / could be visually impaired ; similar concentrations look the same / not enough intervals to be precise ;	**2**	

Question	Answer	Marks	Guidance
2(a)(i)	any two correct labels to different structures on Fig. 2.1 ;	**1**	
2(a)(ii)	marks on 4 cells or 3 and PQ on Fig.2.1 **and** 4 measurements with units ; average correct from candidates measurements with units ;	**2**	**ecf** for average if no units given
2(a)(iii)	(cell **A**) 12 ± 1mm ; (actual length) 0.015 mm ;;	**3**	 **ecf** incorrect measurement of cell **A** if answer incorrect, award 1 mark for correct working shown (12 ÷ 800)
2(a)(iv)	single clear continuous lines with no shading / stippling / hatching ; drawing occupies at least half of the space provided ; *detail marks* one entire cell and one budding cell with correct proportions and orientation and angles ; circular or rounded inclusions shown (minimum of one in entire cell, one in mother cell and two in the bud) ;	**4**	

Question	Answer	Marks	Guidance
2(b)(i)	time qualified e.g. time intervals for measurements / total time of measuring ; temperature ; (starting) volume of yeast ; same yeast culture ;	**2**	

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Question	Answer	Marks	Guidance
2(b)(ii)	*error:* loss of yeast from syringe (so less respiration / gas released) ; *improvement:* idea of: sealed syringe / 3-way tap and collecting gas using gas syringe / AW ; *error:* idea of taking up, air / froth, with the yeast ; *improvement:* filling from below the level of the foam ; *error:* samples of yeast may vary in concentration ; *improvement:* mix / stir, the culture before removing samples ; *error:* no method of maintaining temperature ; *improvement:* use a thermostatically controlled water bath / Bunsen burner and thermometer / idea of insulation ; *error:* syringe containing yeast not equilibrated before using ; *improvement:* idea of leaving for a time to reach, correct temperature / 35 °C ; *error:* syringe has an imprecise scale ; *improvement:* use a syringe with more graduations ;	**2**	improvement must relate to the error given

Question	Answer	Marks	Guidance
2(c)(i)	13.5(0) ;	**1**	
2(c)(ii)	axes labelled with units ; even scale and plots to fill half or more of the printed grid on both axes ; points plotted accurately ±½ square ; line ;	**4**	
2(c)(iii)	there is large difference between syringe 1 and 2 / AW ;	**1**	

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Question	Answer	Marks	Guidance
2(d)	1 using 20 cm3 of yeast culture ; 2 using a water bath at, same temperature / 35°C ; 3 measuring volume of gas every 5 minutes ; 4 total time for gas collection 25 minutes ; 5 use of at least 3 different pH values ; 6 stated range of values ; 7 same volumes of pH solutions added ; 8 ref to method of measuring the pH values used ; 9 adding the pH solution to the yeast culture ; 10 repeats – use of (at least) 3 (syringes) per pH tested ; 11 measuring gas produced by a new method e.g. use of gas syringe / time how long it takes for each syringe to produce a certain volume of gas ; 12 method of maintaining water-bath at a constant temperature ; 13 relevant safety precaution ;	**6**	max 2 from MP1-4 (the given method)

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