Cambridge International Examinations
Cambridge International General Certificate of Secondary Education

BIOLOGY **0610/51**

Paper 5 Practical Test **May/June 2017**

MARK SCHEME

Maximum Mark: 40

Published

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.

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This syllabus is approved for use in England, Wales and Northern Ireland as a Cambridge International Level 1/Level 2 Certificate.

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

Question	Answer	Marks	Guidance
1(a)(i)	(tube 5) = 0.1(0) ; (tube 1) = 0.8(0) ;	**2**	
1(a)(ii)	1. table drawn with (ruled) lines **and** minimum of 20 cells for results and scores ; 2. column and row headings **and** appropriate units for each heading ; 3. colour recorded for each test-tube ; 4. score recorded for each test-tube ; 5. correct match of concentration and score ;	**5**	**R** % symbol in body of table
1(a)(iii)	records ++ or +++ for tube **A** **and**, ++++ for tube **B** ;	**1**	**A** if A is less than B
1(a)(iv)	(tube **A**) between 0.05 and 0.2 ; (tube **B**) 0.4 to 0.8 ;	**2**	ecf from (a)(iii)

Question	Answer	Marks	Guidance
1(b)(i)	tube **7** / tube with only water / 0% protein / no protein / AW ; to compare with tubes containing protein / to show the effect is due to protein / to show the colour when protein is present ;	**2**	
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**	
2(b)(i)	time qualified e.g. time intervals for measurements / total time of measuring ; temperature ; (starting) volume of yeast ; same yeast culture ;	**2**	

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
2(c)(i)	13.5(0) ;	**1**	

Question	Answer	Marks	Guidance
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**	

Question	Answer	Marks	Guidance
2(d)	1 using 20 cm^3 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)