



BIOLOGY

0610/61

Paper 6 Alternative to Practical

May/June 2017

MARK SCHEME

Maximum Mark: 40

Published

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This document consists of **9** printed pages.

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 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) | <i>tube A</i> between 0.05% to 0.20% (inclusive) / figure quoted from range ; <i>tube B</i> 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 | |

| 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 ± 1 mm ; (actual length) 0.015 mm ;; | 3 | ecf incorrect measurement of cell A if answer incorrect, award 1 mark for correct working shown ($12 \div 800$) |
| 2(a)(iv) | single clear continuous lines with no shading / stippling / hatching ; drawing occupies at least half of the space provided ; <i>detail marks</i> 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 | |

| Question | Answer | Marks | Guidance |
|----------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------|--------------------------------------------|
| 2(b)(ii) | <p><i>error:</i> loss of yeast from syringe (so less respiration / gas released) ;</p> <p><i>improvement:</i> idea of: sealed syringe / 3-way tap and collecting gas using gas syringe / AW ;</p> <p><i>error:</i> idea of taking up, air / froth, with the yeast ;</p> <p><i>improvement:</i> filling from below the level of the foam ;</p> <p><i>error:</i> samples of yeast may vary in concentration ;</p> <p><i>improvement:</i> mix / stir, the culture before removing samples ;</p> <p><i>error:</i> no method of maintaining temperature ;</p> <p><i>improvement:</i> use a thermostatically controlled water bath / Bunsen burner and thermometer / idea of insulation ;</p> <p><i>error:</i> syringe containing yeast not equilibrated before using ;</p> <p><i>improvement:</i> idea of leaving for a time to reach, correct temperature / 35 °C ;</p> <p><i>error:</i> syringe has an imprecise scale ;</p> <p><i>improvement:</i> use a syringe with more graduations ;</p> | 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 $\pm\frac{1}{2}$ 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) |