CAMBRIDGE INTERNATIONAL EXAMINATIONS

International General Certificate of Secondary Education

MARK SCHEME for the October/November 2013 series

0610 BIOLOGY

0610/62 Paper 6 (Alternative to Practical), 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.

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Mark schemes will use these abbreviations

- ; separates marking points
- / alternatives
- **R** reject
- **A** accept (for answers correctly cued by the question)
- **I** ignore as irrelevant
- **ecf** error carried forward
- **AW** alternative wording (where responses vary more than usual)
- **AVP** alternative valid point
- Underline actual word given must be used by candidate (grammatical variants excepted)
- ( ) the word / phrase in brackets is not required but sets the context
- **D, L, T, Q** quality of: drawing / labelling / table / detail as indicated
- max indicates the maximum number of marks.

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Question	Answer	Mark allocation	Guidance for Examiner
1 (a) (i)	*Description of each result:–* Credit use of data for comparison; + up to **Any 2** comparative statements with / without data: seeds 1 versus seeds 2; seeds 1 v seedling 1; seeds 2 v seedling 2; overall summary e.g. seeds v seedlings;	[max 3]	e.g. [‘x’ bubbles for seed 1 v ‘y’ bubbles for seeds 2 + difference calculated number of bubbles) gets process numbers mark. comparison must be clear in words e.g. (seed 1 is higher / more bubbles)
(ii)	catalase / enzyme is more active in seeds or less active in seedlings;	[1]	**A** catalyse / catalise **A enzyme** works faster
(b) (i)	*2 errors from:* oxygen bubbles not all composed of oxygen / bubbles of different sizes / oxygen escaped before bung fitted tightly / bubbles too fast to count / AW / different mass of seed / seedlings / different degree of grinding / different hydrogen peroxide conc. / amount / shaking tubes any ref to timing / ref to temperature / pH ;;	[2]	Ignore ‘bubbles’ alone – require reference to the need to count / size of bubbles / speed of release. Ignore ref to number of seeds / age of seeds etc.

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(ii)	*One improvement for one error from* **(b)(i)** measure volume of oxygen instead of counting bubbles / use a measuring cylinders use of gas syringe / monitor mass lost / use thistle funnel and tap to add hydrogen peroxide AW / tightly fitting bungs / use of accurate timing device / AW / water bath / pH buffer;	[1]	There must be a link to **(c)(i)** e.g. use of stop clock instead of looking at the clock on the wall. Need to state a practical method not just 'avoid the error' or 'use same amount of hydrogen peroxide'
(c) (i)	<table><tr><th>extract</th><th>height of foam / mm</th></tr><tr><td>**seeds 1**</td><td>**60**</td></tr><tr><td>**seeds 2**</td><td>**72**</td></tr><tr><td>**seedlings 1**</td><td>**40**</td></tr><tr><td>**seedlings 2**</td><td>**45**</td></tr></table> Completion of any 2 boxes correctly ; 4 boxes ;	[2]	2 correct measurements for each mark. ± 1 mm
(ii)	catalase / enzyme is more active in seeds OR less active in seedlings; seeds give more foam / oxygen OR seedlings give less foam / oxygen;	[max 1]	Allow idea of seeds 2 and / seedlings 2 give more / less oxygen or more / less foam than seeds 1 or seedlings 1. Accept all possible combinations if correct.
(iii)	Yes or No appropriate deduction + evidence;	[1]	Must justify decision. e.g. more bubbles linked to more foam idea or both conclusions show more activity with seeds than seedlings.

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(d) (i)	reaction is fast – so some bubbles of gas missed; increase reliability; any reference to '**identification**' of anomalies; AVP e.g. variation in seeds / gas leaking;	[max 2]	Ignore 'to take a mean' unqualified Ignore idea of 'accuracy' Ignore 'temperature'
(ii)	enzymes e.g. catalase, within cells / inside seeds / seedlings; testa around seeds / AW (barrier idea) prevents substrate / hydrogen peroxide contacting with enzymes; speeds up reaction / surface area idea; might not fit inside test-tubes; mixture of seeds in extract more uniform sample; AVP;	[max 2]	**Allow ORA** throughout

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(e) (i)	species / type of seed;	[1]	
(ii)	TWO *variables to keep constant from – :* mass of seeds / seedlings used to prepare extract / mass of extract used ; volume or concentration of hydrogen peroxide solution; time period for counting bubbles or measure height of foam; same age / batch or growing conditions; temperature; pH;	[max 1]	
(iii)	bubble number of foam height;	[1]	
(iv)	use of boiled / denatured extract or water;	[1]	
		[Total: 19]	

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2 (a) (i)	measurements in **mm** bean **A 25** **B 27** **C 28** **D 27** **E 29**	[2]	All within 1 ± 1 mm. Any two correct for **1** mark. 4 or 5 correct for **2** marks. Ignore decimal places.
(ii), (iii)	bean length / mm — original — extra tally — number in group **24.0 – 25.9 — 1 — I — 2** **26.0 – 27.9 — 4 — II — 6** **28.0 – 29.9 — 7 — II — 9** **30.0 – 31.9 — 17 — 17** **32.0 – 33.9 — 6 — 6** **34.0 – 35.9 — 5 — 5**	[2], [2]	Check for ecf in tally and number. 2 marks for their correct tallies cf measurements. (lose 1 mark for each error) 2 marks for correct numbers cf tallies in their table. (lose 1 mark for each error) Ticks under column for **(ii)** tallies Ticks under column for **(iii)** numbers
(iv)	histogram: **A** – labelled axes and suitable even scale; **S** – size to fill half or more of the grid in both directions; **P** – plot; **C** – columns equal width and touching;	[4]	**A** either orientation x-axis must show categories not just numbers **P** cf <u>numbers</u> in their table, allow <u>one</u> wrong plot. Bar charts and Line graphs lose **C** mark. **R** plotted points not joined no **C** mark.
(v)	<u>continuous</u>;	[1]	Ignore normal / natural distribution.

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(b) (i)	drawing: **O** – outline clear; **S** – size; **D** – detail; **L** – labels: plumule / radicle / cotyledon;	[4]	O – allow stippling but no other shading S – more than half of available space – (75 mm) D – part of embryo inside and out (beyond edge of cotyledon) L – Ignore stem / root / testa.
(ii)	*measurements:* length of seed in mm; length on their drawing to mm accuracy; formula; answer; [4]		**A** within range of 68–70 mm **R** if no line on their drawing **A** + / 1 mm If construction lines touch either side of the bean, measure max distance where bean makes contact. <u>length on drawing</u> in words or numbers length of seed ecf from measurements for correct length, Accept if answer correct without working = 2 marks. **R if mm** after the figures. R if wrongly rounded
(c)	biuret solution / test; <u>blue</u> to purple;	[2]	**A** named $CuSO_4$ + NaOH or KOH / biuret A + B / I and II. Need **starting colour** in answer or remains blue if protein is absent in whole of the answer.
		[Total: 21]	

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