Mark Scheme (Results)

Pearson Edexcel

Additional Sample Assessment Materials
GCSE 9-1
Combined Science
Paper 1: Biology 1
1SC0/1BH

First examination 2017

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Summer 2017

General Marking Guidance

- All candidates must receive the same treatment. Examiners must mark the first candidate in exactly the same way as they mark the last.
- Mark schemes should be applied positively. Candidates must be rewarded for what they have shown they can do rather than penalised for omissions.
- Examiners should mark according to the mark scheme not according to their perception of where the grade boundaries may lie.
- There is no ceiling on achievement. All marks on the mark scheme should be used appropriately.
- All the marks on the mark scheme are designed to be awarded. Examiners should always award full marks if deserved, i.e. if the answer matches the mark scheme. Examiners should also be prepared to award zero marks if the candidate's response is not worthy of credit according to the mark scheme.
- Where some judgement is required, mark schemes will provide the principles by which marks will be awarded and exemplification may be limited.
- When examiners are in doubt regarding the application of the mark scheme to a candidate's response, the team leader must be consulted.
- Crossed out work should be marked UNLESS the candidate has replaced it with an alternative response.

Paper 1H Biology Higher Additional SAMs Combined Science

Question number	Answer	Mark
1(a)	cannot be transferred from one person to another	**(1)**

Question number	Answer	Additional guidance	Mark
1(b)	Any one from: • mammals may be harmed • drugs may affect other mammals in a different way(1)	other mammals systems work in a different way from humans	**(1)**

Question number	Answer	Mark
1(ci)	C	**(1)**

Question number	Answer	Mark
1(cii)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via reasoning (2 marks): • male Q (1) • higher BMI / less exercise / higher fat intake (1) • so more risk of fatty deposits / plaques in arteries / atherosclerosis / restricted blood flow to heart (1)	**(3)**

Question number	Answer	Mark
1(d)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification - application of understanding (2 marks): • stent inserted into blood vessel and is expanded (1) • stent opens /widens blood vessel (1) • greater blood flow (through blood vessel) (1) • more oxygen delivered to body organ (1)	**(3)**

Total for question 1 = 9 marks

Question number	Answer	Additional guidance	Mark
2(a)	• to produce more food (1) • to improve quality of food (1)	bigger plants , produce more kernels, more sweet/juicy, pest resistant,	**(2)**

Question number	Answer	Additional guidance	Mark
2(b)	An answer that combines the following points of application of knowledge and understanding to provide a logical description: • best characteristics/named characteristic chosen (1) • parents bred together (1) • offspring produced showing some of the best characteristics are selected(1) • selection and breeding process repeated (1)	accept reference to pollination / fertilisation	**(3)**

Question number	Answer	Mark
2(c)	An answer that provides a description by making reference to: • an extra/new gene (1) • present in the DNA/chromosome (1)	**(2)**

Question number	Answer	Mark
2(d)	An explanation that combines identification - knowledge (1 mark) and reasoning/justification - understanding (1mark): • cut DNA at recognition sites (1) • to create areas called sticky ends (1)	**(2)**

Total for question 2 = 9 marks

Question number	Answer	Mark
3(a)(i)	Substitution 6mm ÷ 750 (1) Evaluation = 0.008 mm (1) Conversion = 8.0 x 10^{-3} mm	(3)

Question number	Answer	Mark
3(a)(ii)	B	(1)

Question number	Answer	Mark
3(b)	interphase	(1)

Question number	Answer	Mark
3(c)	D	(1)

Question number	Answer	Mark
3(d)	An answer that combines points of interpretation and evaluation to provide a logical description: • the chromosomes are split (1) • then the chromatids are pulled to either side of the cell (1) • by spindle fibres (1)	(3)

Total for question 3 = 9 marks

Question number	Answer	Mark
4(a)(i)	Substitution 1.84 – 2.15 = -0.31 (1) change in mass Evaluation -0.31 ÷ 2.15 = -0.144 (1) Correct decimal places -0.144 x 100 = -14.41 (%) (correct to 2 dec place)	**(3)**

Question number	Answer	Additional guidance	Mark
4(a)(ii)	An explanation that combines application of knowledge (1 marks) and reasoning/justification – application of understanding: (2 mark) • chip 2 has gained mass but chip 5 has lost mass (1) • because chip 2 was immersed in a solution where the sucrose concentration outside the chip was lower than the sucrose concentration inside the chip (1) • so water osmosed into the chip causing it to become turgid / so chip water osmosed out of chip 5 and it became plasmolysed (1)	Accept reverse argument for chip 5	**(3)**

Question number	Answer	Mark
*4(b)	Answers will be credited according to the candidate's deployment of knowledge and understanding of the material in relation to the qualities and skills outlined in the generic mark scheme. The indicative content below is not prescriptive and candidates are not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant o tube 1 will be larger o as water will move into the tube by osmosis o from a high water potential outside tube 1 o into the low water potential inside tube 1 o across the partially permeable membrane of the visking tubing o tube 2 will shrink o as water will move out of the tube by osmosis o moving from a high water potential inside tube 2 o to a lower water potential outside of tube 2 o across the partially permeable membrane of the visking tubing	**(6)**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• The explanation attempts to link and apply knowledge and understanding of scientific enquiry, techniques and procedures, flawed or simplistic connections made between elements in the context of the question. • Lines of reasoning are unsupported or unclear. (AO2)
Level 2	3–4	• The explanation is mostly supported through by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, some logical connections made between elements in the context of the question. • Lines of reasoning mostly supported through the application of relevant evidence. (AO2)
Level 3	5–6	• The explanation is supported throughout by linkage and application of knowledge and understanding of scientific enquiry, techniques and procedures, logical connections made between elements in the context of the question. • Lines of reasoning are supported by sustained application of relevant evidence. (AO2)

Total for question 4 = 12 marks

Question number	Answer	Mark
5(a)(i)	A description that combines analysis via a judgement (1 mark) to reach a conclusion (1 mark) • as the pH of the hydrogen peroxide increases to pH 7 the catalase activity increases / above pH7 the activity of catalase decreases / less oxygen is produced (1) • catalase activity is optimal at pH7 (1)	**(2)**

Question number	Answer	Mark
5(a)(ii)	An explanation that combines application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks) • decrease in volume of oxygen produced (1) • as catalase denatures and there is less breakdown of hydrogen peroxide (1) • because less enzyme substrate complexes form (1)	**(3)**

Question number	Answer	Mark
5(a)(iii)	Any two variables from: • catalase concentration • catalase volume • hydrogen peroxide concentration • hydrogen peroxide volume • temperature	**(2)**

Question number	Answer	Additional Guidance	Mark
5(b)(i)	61 to be left out of the calculation (1) Substitution $\frac{53.0 + 51.2 + 52.8}{3}$ Evaluation = 52.3	Accept correct calculation using all 4 numbers for 1 mark (54.5)	**(2)**

Question number	Answer	Mark
5(b)(ii)	An analysis to develop an experimental procedure (2 marks) • only test the range between 6 and 8 (1) • with more intervals within this range (1)	**(2)**

Total for question 5 = 11 marks

Question number	Answer	Mark
6(a)	C	**(1)**

Question number	Answer	Mark
6(b)(i)	Total percentage for AT bases = 56.8 % (1) Remainder shared between 2 bases 43.2 ÷ 2 = 21.6 %	**(2)**

Question number	Answer	Mark
6(b)(ii)	An explanation that combines identification of knowledge (1 mark) and reasoning/justification – understanding (2 marks): • the percentage of each of the bases are different (1) • so bases cannot be complementary to one another (1) • so will not form a double helix / will form a single strand (1)	**(3)**

Question number	Answer	Mark
6(c)	An explanation that combines application of knowledge (2 marks) and reasoning/justification – application of understanding (2 marks) • The phosphorescent gene needs to be isolated from the DNA of the phosphorescent organism using enzymes to expose sticky ends(1) • The plasmid is removed from the bacterial cell and cut open using the same enzymes to expose complementary sticky ends (1) • The phosphorescent gene is inserted into the bacterial cell matching the sticky ends using the enzyme ligase (1) • The plasmid is inserted back into the bacterial cell and is grown on a petri dish each bacterial cell will express the phosphorescent gene and glow in the dark (1)	**(4)**

Total for question 6 = 10 marks

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