Mark Scheme (Results)

Pearson Edexcel

Additional Sample Assessment Materials

GCSE 9-1

Paper 2: Biology 1BI0/2H

First examination 2018

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Summer 2018

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 1BI0_2BH Biology – Mark scheme

Question Number	Answer	Mark
1(a)(i)	**B** ethene	**(1)**

Question Number	Answer	Mark
1(a)(ii)	**A** carbon dioxide	**(1)**

Question Number	Answer	Additional guidance	Mark
1(b)(i)	Any two from: • size of banana (1) • age / ripeness of bananas (1) • size of box / available oxygen in box (1) • humidity inside box (1)	accept other relevant factors	**(2)**

Question Number	Answer	Additional guidance	Mark
1(b)(ii)	as the temperature increases the rate of decomposition increases (1)	accept a conclusion based on data e.g. the banana decomposed fastest at 40 °C	**(1)**

Question Number	Answer	Mark
1(c)	An explanation that combines identification - understanding (1 mark) and reasoning/justification - understanding (1 mark): • enzymes cause the breakdown of large biological molecules into smaller biological molecules (1) • as temperature rises there are more reactions between the enzymes and biological molecules in the fruit (1) OR • microorganisms reproduce faster (1) • more breakdown of large molecules into smaller molecules (1)	**(2)**

Total for Question 1 = 7 marks

Question number	Answer	Mark
2(a)(i)	(belt) transect	**(1)**

Question number	Answer	Mark
2(a)(ii)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (2 marks): • number of poppy plants decreases (closer to the woodland) (1) and • trees block light (1) • light is needed for photosynthesis (1) or • competition (with other species/trees) (1) • for resources/named resource (1)	**(3)**

Question number	Answer	Mark
2(a)(iii)	An answer that combines the following points to provide a plan: • **randomly** place the quadrat several times (1) • record the number of poppy plants in each quadrat (1) • method for scaling up the area sampled to the total area of the field (1)	**(3)**

Question number	Answer	Additional guidance	Mark
2(b)	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • woodland provides a different type of habitat (1) • allows different {animal/plant} species to live in the park (1)	 accept the idea that human intervention is controlled accept specific example e.g. nesting site for birds	**(2)**

Total for Question 2 = 9 marks

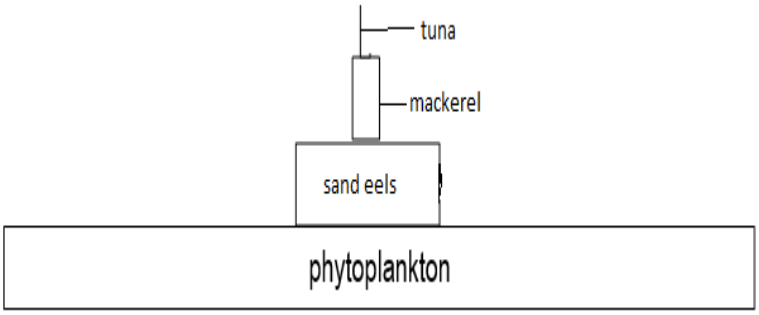
Question number	Answer	Additional guidance	Mark
3(a)	Any two from: • weight (1) • height (1) • fitness (1) • other medical conditions (1) • drug intake / medication (1)	 accept other valid factors when selecting the people	**(2)**

Question number	Answer	Additional guidance	Mark
3(b)	subtraction 630 - 480 = 150 (1) (150 ÷ 630) x 100 = 24 (%)	 accept 23.8 award full marks for correct numerical answer without working	**(2)**

Question number	Answer	Additional guidance	Mark
3(c)	An explanation that combines identification – application of knowledge (1 mark) and reasoning / justification – application of understanding (2 marks): • less aerobic respiration (1) • because there is reduced oxygen entering the lungs (1) • which reduces oxygen supplied to the blood/to the cells (1)	accept reduced removal of carbon dioxide from the blood / less energy released (1)	**(3)**

Question number	Answer	Mark
3(d)	An explanation that combines identification - knowledge (1 mark) and reasoning/justification - understanding (1 mark): • less oxygen available for aerobic respiration (1) • so start to respire anaerobically more quickly to release the energy needed to complete the same intensity of exercise (1)	**(2)**

Total for Question 3 = 9 marks

Question Number	Answer	Mark
4(a)	correct shape (exact widths not required) (1) – ignore pyramid drawn as a triangle correct labels (1)  	**(2)**

Question Number	Answer	Mark
4(b)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (3 marks): • high-protein diet (1) • because the tuna reach 35kg in approximately three months (1) • whereas the medium-protein diet the tuna take four and a half months to reach this mass (1) • on the low-protein diet the tuna do not reach 35kg (1)	**(4)**

Question Number	Answer	Additional guidance	Mark
4(c)	conversion 60 ÷ 1000 =0.06 (1) evaluation 300 ÷ 0.06 = 5000 (kg)	accept alternative methods of calculation award full marks for correct numerical answer without working	**(2)**

Question Number	Answer	Additional guidance	Mark
4(d)(i)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • to restrict movement (1) • so less energy is lost (1) Or • to prevent predators entering (1) • so fish not harmed / higher yield (1)	accept other relevant explanations	**(2)**

Question Number	Answer	Additional guidance	Mark
4(d)(ii)	increasing world population / humans eating a high protein diet / increase preference for fish protein	accept other relevant reasons	**(1)**

Total for Question 4 = 11 marks

Question Number	Answer	Mark
5(a)(i)	**B** to provide carbon dioxide for photosynthesis	**(1)**

Question Number	Answer	Mark
5(a)(ii)	**C** the chlorophyll in the chloroplast	**(1)**

Question Number	Answer	Mark
5(b)(i)	to remove the calcium chloride solution	**(1)**

Question Number	Answer	Mark
5(b)(ii)	wash hands after use / use gloves / wear goggles	**(1)**

Question Number	Answer	Mark
5(c)(i)	Any **two** from: • same number/size of algal balls (1) • same volume of hydrogencarbonate solution (1) • same concentration of hydrogencarbonate solution (1) • same size (bijou) bottle (1) • reduce influence of external light (1) • temperature of room (1)	**(2)**

Question Number	Answer	Mark
5(c)(ii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): • the bottle closest to the light source will photosynthesise the most due to greater light intensity (1) • this will remove carbon dioxide from the indicator solution (1) • causing the solution to become less acidic/more alkaline /pH to increase (1)	**(3)**

Total for question 5 = 9 marks

Question Number	Answer	Mark
6(a)	An explanation that combines identification – improvement of the experimental procedure (2 marks) and justification / reasoning which must be lined to the improvement(1 mark): • set up the same apparatus / petri dish with 20 seeds (1) • place agar in the petri dish without the addition of gibberellin (1) • the control would allow the scientist to see how plants were affected by the gibberellins in comparison to those grown on agar only (1)	**(3)**

Question Number	Answer	Additional guidance	Mark
6(b)	Any two from: • fruit formation • flower formation • production of seedless fruit	accept larger fruit / more fruit formed accept fewer flowers formed accept other correct use of gibberellins	**(2)**

Question Number	Answer	Mark
6(c)(i)	**B** positive gravitropism | positive phototropism	(1)

Question Number	Answer	Mark
6(c)(ii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): • auxins accumulate on the underside of the root (1) • causing inhibition of cell elongation (1) • the cells on the top side of the root elongate more causing the root to grow downwards (1)	(3)

(Total for question 6 = 9 marks)

Question Number	Answer	Additional guidance	Mark
7(a)(i)	the size/mass of the biscuits is not known	accept: biscuits come in various sizes and weights	**(1)**

Question Number	Answer	Additional guidance	Mark
7(a)(ii)	An explanation that combines identification via a judgement (1 mark) to reach a conclusion via justification/reasoning (1 mark): • type 2 diabetics are not able to regulate the glucose levels in their body (1) • and this variety has less sugar (1)	accept: 0.4g compared to 16.1g	**(2)**

Question Number	Answer	Mark
7(b)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): • if blood glucose levels become too low glucagon is released (1) • from the pancreas (1) • causing glycogen in the liver/muscles to be converted back to glucose (1) • returning blood glucose levels to normal (1)	**(3)**

Question Number	Answer	Mark
7(c)(i)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • teeth break up the biscuit into smaller pieces (1) • which increases the surface area of the biscuit (1) • so enzymes can break it down quicker (1)	**(2)**

Question Number	Answer	Mark
7(c)(ii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): • (small droplets of fat) are broken down by the enzyme **lipase** (1) • into **fatty acids** and **glycerol** (1) • absorbed into the bloodstream by diffusion (1)	**(3)**

Total for question 7 = 11 marks

Question Number	Answer	Additional guidance	Mark
8(a)(i)	substitution 172 – 1.4 =170.6 (1) evaluation 170.6 ÷ 172 = 99.186 (1) correct to 2 dec places 99.19%	award full marks for correct numerical answer without working accept other methods of calculating this percentage	**(3)**

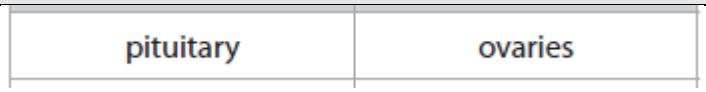
Question Number	Answer	Mark
8(a)(ii)	volume of water produced will be lower	**(1)**

Question Number	Answer	Additional guidance	Mark
8(a)(iii)	An explanation that combines identification - application of knowledge (1 mark) and reasoning/justification – application of understanding (2 marks): • water moves (from the collecting duct) into the bloodstream (1) • by osmosis (1) • from where it is in high water concentration in the collecting duct to low water concentration in the bloodstream (1)	accept down a concentration gradient	**(3)**

Question number	Indicative content	Mark
***8(b)**	Answers will be credited according to 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. **AO1 (6 marks)** Reabsorption of glucose • in the proximal convoluted tubule • by selective reabsorption • as active transport • against the concentration gradient • using energy from respiration Why glucose is in the urine of a person with untreated diabetes. • glucose levels are not controlled • so glucose levels in the blood are very high • not all glucose can be selectively reabsorbed • so passes through the nephron into the collecting duct	**(6)**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3–4	• Demonstrates elements of biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

(Total for question 8 = 13 marks)

Question Number	Answer	Mark
9(a)(i)	A 	(1)

Question Number	Answer	Mark
9(a)(ii)	An answer that combines a maximum of two points of interpretation/evaluation to provide a logical description: • as oestrogen level peaks the temperature is at its lowest (day 12)(1) • as oestrogen levels fall there is a temperature rise (days 12 – 15) (1) • temperature remains high with higher oestrogen levels (days 15 – 25)(1)	(2)

Question Number	Answer	Additional guidance	Mark
9(a)(iii)	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (1 mark): • there is a drop in body temperature prior to ovulation (1) • identifies the time when the egg is released (1)	accept best time for intercourse to take place to increase the chance of fertilisation (1)	**(2)**

Question number	Indicative content	Mark
***9(b)**	Answers will be credited according to 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. **AO1 (6 marks)** • FSH released by pituitary gland • stimulates eggs to mature in the follicle • FSH triggers a rise in oestrogen • oestrogen released from the ovaries • oestrogen causes the lining of the uterus to build up • high levels of oestrogen stimulate LH production • surge of LH from the pituitary gland • triggers ovulation • progesterone is produced by the corpus luteum • progesterone maintains the lining of the uterus • high levels of oestrogen and progesterone inhibit LH and FSH production • as progesterone levels fall menstruation occurs • low levels of progesterone and oestrogen restart the cycle	**(6)**

Level	Mark	Descriptor
	0	No rewardable material.
Level 1	1–2	• Demonstrates elements of biological understanding, some of which is inaccurate. Understanding of scientific ideas lacks detail. (AO1) • Presents an explanation with some structure and coherence. (AO1)
Level 2	3–4	• Demonstrates elements of biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and/or developed. (AO1) • Presents an explanation that has a structure which is mostly clear, coherent and logical. (AO1)
Level 3	5–6	• Demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. (AO1) • Presents an explanation that has a well-developed structure which is clear, coherent and logical. (AO1)

(Total for question 9 = 11 marks)

Question Number	Answer	Mark
10(a)(i)	**B** 3.1 x 10^{-3} m	**(1)**

Question Number	Answer	Mark
10(a)(ii)	**D** vena cava	**(1)**

Question Number	Answer	Mark
10(a)(iii)	An explanation that combines identification – understanding (1 mark) and reasoning / justification – understanding (1 mark): • thin walls allow maximum diffusion (of substances into and out of the capillaries) (1) • shorter diffusion distance (1) • small lumen slows blood flow so more substances diffuse (1)	**(2)**

Question Number	Answer	Additional guidance	Mark
10(b)(i)	87 – 15 = 72 (1) 72% of 4.7 (1) 3.4/3.38 (litres) OR 87% = 4.1 (1) 15% = 0.7 (1) 4.1 – 0.7 = 3.4 (litres)	award full marks for correct numerical answer without working accept other methods of calculating the volume increase	**(3)**

Question Number	Answer	Mark
10(b)(ii)	An explanation that combines identification – application of knowledge (1 mark) and reasoning/justification – application of understanding (3 marks): • more glucose and oxygen needs to be delivered to the working muscles (1) • more waste products / carbon dioxide removed (1) • to increase aerobic respiration (1) • releasing more energy to the working muscles (1)	**(4)**

(Total for question 10 = 10 marks)