Mark Scheme (Results)

Summer 2024

Pearson Edexcel GCSE
In Biology (1BI0)
Paper 2H

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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.

Question Number	Answer	Mark
1(a)(i)	The only correct answer is **D pancreas** *A is incorrect because the liver is the target organ for insulin it does not produce it* *B is incorrect because the heart does not produce insulin* *C in not correct because the kidneys do not produce insulin*	**(1)** **AO1 1**

Question Number	Answer	Mark
1(a)(ii)	The only correct answer is **B dissolved in blood plasma** A is incorrect because hormones do not travel along neurones C is incorrect because insulin does not attach to red blood cells D is not correct because hormones do not move by osmosis or in white blood cells	**(1)** **AO1 1**

Question Number	Answer	Additional Guidance	Mark
1(b)	A description including: • (take a sample of urine and) add Benedict's reagent (1) • heat the solution (in a water bath) (1) • observe the colour change to (brick) red (1)	 accept solution for reagent accept other colours yellow, green, orange, brown	**(3)** **AO1 2**

Question Number	Answer	Mark
1(c)	Any two from: ● **volume** of urine (1) ● **volume** of Benedict's (reagent) (1) ● **concentration** of Benedict's (reagent) (1) ● temperature (1) ● time left (in the water bath) (1)	**(2)** **AO1 2**

(Total for question 1 = 7 marks)

Question Number	Answer	Mark
2(a)(i)	plasma (accept phonetic spellings)	(1) AO2 1

Question Number	Answer	Mark
2(a)(ii)	The only correct answer is **D oxygen** A is incorrect because carbon dioxide is not needed for respiration B is incorrect because urea is not carried by red blood cells or needed for respiration C is not correct because amino acids are not needed for respiration	(1) AO1 1

Question Number	Answer	Additional guidance	Mark
2(a)(iii)	• phagocytes (1) • lymphocytes / B cells / memory cells (1)	answers can be in either order accept T cells accept other correctly named white blood cells (1)	(2) AO1 1

Question Number	Answer	Additional guidance	Mark
2(b)(i)	470 ÷ 100 **or** 4.7 (1) (4.7 x 44) = 206.8 (1) 207 **OR** 44 ÷ 100 **or** 0.44 (1) (0.44 x 470) = 206.8 (1) 207 **OR** 44 x 470 **or** 20680 (1) (20680 ÷ 100) = 206.8 (1) 207	accept correct answer on answer line for 3 marks award two marks for 206.8 / 206 ecf for a calculated number in the working to the nearest whole number accept alternative methods of calculating percentages award two marks for 263 award one mark for 263.2	**(3)** **AO2 1**

Question Number	Answer	Additional guidance	Mark
2(b)(ii)	Any two from: ● wear gloves / wash hands (1) ● sterilise skin (of donor) (1) ● use sterile needle (1) ● cover the wound after taking the blood (1)	accept wear a mask accept use hand gel accept the doctor covers any open wounds / cuts accept clean the skin accept sterilise equipment	**(2)** **AO2 1**

(Total for question 2 = 9 marks)

Question Number	Answer	Mark
3(a)(i)	vacuole / large vacuole / permanent vacuole (accept phonetic spellings)	(1) AO2 1

Question Number	Answer	Mark
3(a)(ii)	Any one from: • it has a large surface area / it is long / large surface area : volume (1) • thin (cell) walls (1) • many mitochondria (1)	(1) AO2 1

Question Number	Answer	Additional Guidance	Mark
3(a)(iii)	An explanation including three from: • (root hair cells grow) underground (1) • where there is no sunlight / light (1) • so they can't photosynthesise (1)	 accept roots grow underground / in the soil accept roots can't photosynthesise / chloroplasts are needed for photosynthesis	(3) AO2 1

Question Number	Answer	additional guidance	Mark
3(b)(i)	A description including two of the following: • in tap water **chloroplasts** are near the {cell wall / cell	accept reverse argument about cells not in salt solution	(2) AO3 2ab

	membrane / edge of the cell} (1) • in salt water **chloroplasts** are in the middle of the cells / **chloroplasts** clump together (1)	accept cells appear larger / cells are more magnified (in salt water) (1)	

Question Number	Answer	Additional Guidance	Mark
3(b)(ii)	An explanation including three from: • water has moved (1) • by **osmosis** (1) • from a high water concentration to low water concentration (1) • through a partially-permeable membrane (1)	accept correct references to the concentration gradient / water potential / low to high solute concentrations	**(3)** **AO2 1**

(Total for question 3 = 10 marks)

Question number	Answer	Additional guidance	Mark
4(a)	Any two from: • temperature (1) • humidity / water levels (1) • {size / volume / size of holes / material} of bag (1)	accept the bags need to be identical	**(2)**

Question number	Answer	Additional guidance	Mark
4(b)(i)	correct data selected and subtracted 200 – 120 = 80 (1) rate calculated 80 ÷ 50 = 1.6 (g per day)	accept correct answer on the answer line for 2 marks ecf accept 2.6 for 1 mark (oak)	**(2)**

Question number	Answer	Additional guidance	Mark
4(b)(ii)	An answer including: • both holly and oak leaves decrease in mass (1) • oak leaves decrease in mass faster (1)	ORA	**(2)**

Question number	Answer	Additional guidance	Mark
4(c)	An explanation linking: • (decomposition of leaves) release minerals / named minerals (1) • which are absorbed / used by other organisms / plants / primary producers (1) **OR** • (if they weren't decomposed) leaves would build up covering (small) plants (1) • small plants wouldn't {get light / be able to photosynthesise} (1)	accept nutrients for minerals accept recycling of minerals / nutrients for two marks accept (small) plants would die accept supplies energy to decomposers / named decomposers (1)	**(2)**

Question number	Answer	Additional guidance	Mark
4(d)	bacteria / fungi / detritivores	accept microorganisms / named {decomposers / detritivores}	**(1)**

Question number	Answer	Mark
4(e)	An explanation including two from: • the change in mass of snails is smaller than the change in mass of the leaves / {not all the mass / only 120 g} of the leaves is transferred to the snails (1) • some of the leaves were {not digested	**(2)**

	/ absorbed} / some of the leaves were {excreted / egested} (1) • some mass was used up in {respiration / providing energy} for the snail (1) • some mass / energy was used up by the snail moving (1) • leaf mass may be digested by decomposers (1)	

(Total for question 4 = 11 marks)

Question number	Answer	Additional guidance	Mark
5(a)(i)	A plan including three from: • use a quadrat (1) • use a random number generator (to decide the areas to sample) / use random co-ordinates (1) • (use a key) to identify the plants (1) • **count the number** of plant **species** (1)	ignore belt transect accept square / grid ignore sample the number of plant species	**(3)** **AO3 3a**

Question number	Answer	Additional guidance	Mark
5(a)(ii)	Any three from: ● measure the temperature with a thermometer (1) ● measure the light levels using a {lux / light} meter (1) ● measure the levels of water in the soil using a water {meter / sensor / wet - dry mass of soil sample} (1) ● rainfall using a {measuring cylinder / beaker} (1) ● humidity using a humidity {meter / sensor} (1) ● depth of the soil using a ruler (1) ● wind {direction / strength} using {wind sock / wind meter} (1)	 accept heat for temperature accept photometer / phone app / light sensor accept data logger accept datalogger accept hygrometer accept anemometer / weather vane / air flow meter	**(3)** **AO1 2**

Question number	Answer	Additional guidance	Mark
5(a)(iii)	A description including two from: • the tree is the host (1) • the mistletoe gains {nutrients / water} from the tree (1) • the tree is damaged by the mistletoe (1)	accept any indication of harm including killing the tree	**(2)** **AO1 1**

Question number	Answer	Additional guidance	Mark
5(b)	An explanation including: • (fertilisers are used) to increase {growth / repair} of plants (1) • (because nitrates are needed) to make proteins (1)	accept DNA / amino acids for proteins	**(2)** **AO1 1**

(Total for question 5 = 10 marks)

Question number	Answer	Additional guidance	Mark
6(a)(i)	A description including: • repeat the experiment / use a measuring cylinder with yeast and washing up liquid (1) • add water only (1)	 accept 0% glucose solution	**(2)** **AO2 2**

Question number	Answer	Additional guidance	Mark
6(a)(ii)	increase the temperature (so the reaction happens faster) / add more yeast	accept heat it up	**(1)** **AO3 3b**

Question number	Answer	Additional guidance	Mark
6(b)(i)	An explanation including: • the result of 3 / the result at 15% (1) • because the result does not follow the pattern / because the height of foam is less than expected / it is less than the 10% concentration (1)	 accept height of the foam {did not increase / decreased} / all the other values show an increase accept the result of 5 / result at 10% (1) because it was higher than expected (1)	**(2)** **AO3** **1ab**

Question number	Answer	Additional guidance	Mark
6(b)(ii)	An explanation linking **three** of the following: ● at 25% concentration there is **more** {substrate / glucose} (1) ● to bind with the {enzymes / active site} / enzyme-substrate complexes formed (1) ● **more** respiration takes place (1) ● so carbon dioxide is produced (1) ● because the glucose is the limiting factor (1)	accept glucose concentration is **high** accept respiration occurs for longer	**(3)** **AO2 1**

(Total for question 6 = 8 marks)

Question number	Answer	Mark
7(a)	The only correct answer is **D gibberellins** A is incorrect because adrenalin does not cause seeds to germinate B is not correct because auxins do not cause seeds to germinate faster than gibberellins C is not correct because thyroxine is not a plant hormone	**(1)** **AO1 1**

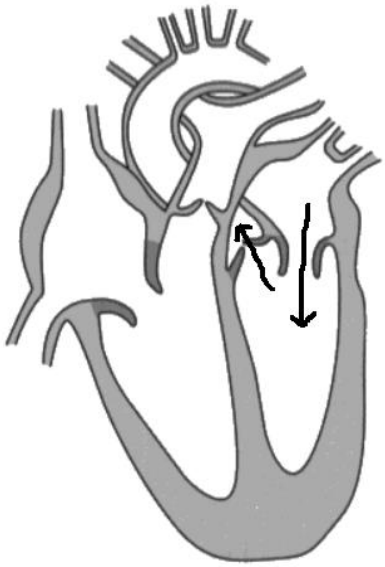
Question number	Answer	Additional guidance	Mark
7(b)(i)	An explanation including **four** of the following: ● auxins (collect) (1) ● on the shaded part of the stem/plant (1) ● causing **cell elongation** (1) ● making the plant {bend / grow / move / face} towards the sun / light (1)	 accept away from the light ignore plant or stem elongation accept heliotropism (1)	**(4)** **AO2 1**

Question number	Answer	Additional guidance	Mark
7(b)(ii)	An explanation including **three** from: ● (water travels through) the xylem (1) ● from root (to leaf) (1)	 reject phloem carrying water	**(3)** **AO1 1**

	● through a hollow tube (1) ● with lignified walls/walls made of dead cells (1) ● by transpiration (1) ● water is {evaporated / diffused} through the stomata (1)	accept ref to cohesion of water molecules (1)	

Question number	Answer	Mark
7(b)(iii)	An explanation linking: ● (large leaves have a) large surface area (1) ● so more light (1) ● to produce **glucose** by the process of **photosynthesis** (1)	**(3)** **AO2 1**

(Total for question 7 = 11 marks)

Question number	Answer	Additional guidance	Mark
8(a)(i)	 arrow indicating blood flow through the atrioventricular valve (1) arrow indicating blood flow through the semi-lunar valve (1)	no marks awarded if any arrows on right side of heart	(2) AO2 1

Question number	Answer	Additional guidance	Mark
8(a)(ii)	vena cava / superior vena cava		(1) AO1 1

Question number	Answer	Additional guidance	Mark
8(b)(i)	(at rest 68 x 72) = 4 896 (exercise 112 x 124) = 13 888 (1) 13 888 – 4 896 = 8 992 (1) 8 990 units (1) cm^3 per min	accept either value for 1 mark accept 8992 for 2 marks accept 8 990 for 3 marks with no working accept	(4) AO3 2ab

	cm^3/min $cm^3.min^{-1}$	ml/min $ml.min^{-1}$ accept minute	

Question number	Answer	Additional guidance	Mark
8(b)(ii)	An explanation linking **four** of the following: ● to deliver more oxygen (to the muscles) (1) ● to deliver more glucose (to the muscles) (1) ● to remove more carbon dioxide (1) ● to prevent build-up of lactic acid (1) ● to increase (the rate of aerobic) respiration (1) ● and therefore release more energy (1)	accept more oxygenated blood accept remove lactic acid ignore produce energy	**(4)** **AO1 1**

(Total for question 8 = 11 marks)

Question number	Answer	Mark
9(a)(i)	The only correct answer is **B oestrogen and progesterone** A is incorrect FSH causes the egg to develop in the follicle C is not correct because LH causes ovulation D is not correct because FSH causes the egg to develop in the follicle and LH causes ovulation	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
9(a)(ii)	An explanation linking: • oestrogen inhibits FSH (1) • so the {egg / follicle} cannot mature (1) • progesterone inhibits {LH / FSH} (1)	 reject oestrogen inhibits LH accept FSH causes the {egg / follicle} to mature ignore no eggs are released / ovulation	**(3)** **AO1 1**

Question number	Answer	Additional guidance	Mark
9(a)(iii)	An explanation including: • stops the sperm and the egg from meeting (1) • so there will be no fertilisation (1)	accept gametes for sperm and ovum accept prevents sperm entering the vagina / cervix / uterus	**(2)** **AO2 1**

Question number	Indicative content	Mark
9 *(b)	**AO1 6 marks** **Clomifene therapy** ● Clomifene is a fertility drug ● that causes the pituitary gland ● to release more FSH and LH ● so more eggs are matured in the follicle ● more chance of the egg being released **IVF (*in vitro* fertilisation)** ● eggs are removed from the mother's ovary ● sperm are taken from the father ● the sperm and the eggs are mixed / the sperm is injected into the egg ● in a *Petri* dish ● the fertilised egg is allowed to divide ● the {fertilised egg / ball of cells / zygote / embryo} is placed into the uterus	**(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. ● presents an explanation with some structure and coherence.
Level 2	3-4	● demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and /or developed. ● presents an explanation that has a structure which is mostly clear, coherent and logical.
Level 3	5-6	● demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. ● presents an explanation that has a well-developed structure which is clear, coherent and logical.

Additional Guidance

Level 1	1–2	● A brief explanation of either IVF OR Clomifene therapy OR other ART techniques ● The response links the method to a hormone, named process or the idea of external fertilisation
Level 2	3–4	● A brief explanation of how IVF AND Clomifene therapy work **OR** a detailed explanation of one method ● The response links one method to the type of ART either Clomifene OR IVF
Level 3	5–6	● A detailed explanation of **BOTH** IVF and Clomifene therapy ● The response links both methods to the type of ART, Clomifene AND IVF

(Total for question 9 = 12 marks)

Question number	Answer	Mark
10(a)(i)	The only correct answer is A **amino acids urea** B is incorrect because enzymes are not a waste product C is not correct because enzymes are not a waste product D is not correct because urea is not a substance to be broken down and amino acids are not a waste product	**(1)** **AO1 1**

Question number	Answer	Mark
10(a)(ii)	In the blood/ in the bloodstream / in the plasma / in the renal artery	**(1)** **AO1 1**

Question number	Answer	Additional guidance	Mark
10(b)(i)	An evaluation including the following: ● protein levels are zero for both because protein cannot pass through the {kidney / nephron} (1) ● glucose levels are lower for person A because {they have fewer carbohydrates / glucose is selectively reabsorbed} (1) ● urea levels are higher for person A because urea is a breakdown product from protein (1)	accept reverse argument accept glucose levels are higher for person B as they have diabetes	**(3)** **AO1 1**

Question number	Indicative content	Mark
10 *(b)(ii)	**AO1 and AO2 6 marks** **protein** ● protein cannot pass into the nephron ● during ultrafiltration ● the glomerulus puts pressure on the blood ● and the liquid part of the blood passes into the Bowman's capsule ● protein molecules are too large to pass through **glucose** ● glucose is selectively reabsorbed ● back into the blood ● in the PCT / proximal convoluted tubule / first convoluted tubule ● by active transport ● against the concentration gradient	**(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. ● presents an explanation with some structure and coherence.
Level 2	3-4	● demonstrates biological understanding, which is mostly relevant but may include some inaccuracies. Understanding of scientific ideas is not fully detailed and /or developed. ● presents an explanation that has a structure which is mostly clear, coherent and logical.
Level 3	5-6	● demonstrates accurate and relevant biological understanding throughout. Understanding of the scientific ideas is detailed and fully developed. ● presents an explanation that has a well-developed structure which is clear, coherent and logical.

Additional information

Level 1	1–2	● a named structure of the nephron ● linked to one of the substances correctly
Level 2	3–4	● more than one named structure of the nephron ● linked to both substances
Level 3	5–6	● the main parts of the nephron named including the glomerulus, Bowman's capsule and PCT in the correct order ● correctly linked to proteins not entering the nephron because they are too large and glucose being selectively reabsorbed.

(Total marks for Question 10 = 11 marks)