Pearson

Mark Scheme (Results)

November 2025

Pearson Edexcel International GCSE in Biology
4BI1/1B

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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)	**D (S)** *A is not the answer as P is a vacuole* *B is not the answer as Q is the cytoplasm* *C is not the answer as R is the cell membrane*	**1**

Question Number	Answer	Mark
1(a)(ii)	**B (Q)** *A is not the answer as P is the vacuole* *C is not the answer as R is the cell membrane* *D is not the answer as S is the nucleus*	**1**

Question Number	Answer	Mark
1(a)(iii)	**D (S)** *A is not the answer as P is the vacuole* *B is not the answer as Q is the cytoplasm* *C is not the answer as R is the cell membrane*	**1**

Question Number	Answer	Additional guidance	Mark
1(a)(iv)	calculation method not marking points line length = 43 (mm) 43 mm = 43 × 1000µm Actual size = image size / magnification 43 000 ÷ 65 = 660 (µm) (2)	correct answer full marks 1 mark for correct length and units 43-44mm or 4.3 -4.4cm OR ÷65 some candidates may use 4,3 cm allow as 4.3cm allow 660-677(2)	**2**

Question Number	Answer	Additional guidance	Mark
1(b)	An answer that that makes reference to three of the following: • *Amoeba* larger (1) • *Amoeba* has nucleus / eq (1) • *Amoeba* has cytoplasm / eq (1) • *Amoeba* has organelles /eq (1) • *Amoeba* has cell membrane (1) • Virus has protein coat / capsid / envelope/ eq (1) • *Amoeba* has chromosomes / DNA and RNA/ Virus has DNA or RNA /eq (1)	Allow converse Assume **it** is *Amoeba* allow one example mitochondrion /vacuole / ribosomes	**3**

(Total for Question 1 = 8 marks)

Question Number	Answer	additional guidance	Mark
2(a)	An answer that incudes • movement of particles / atoms/ molecules / gas / liquid / ions from a region of high concentration to a region of lower concentration / eq (1)	ignore substance / not just movement alone down a concentration gradient	**1**

Question Number	Answer	Mark
2(b)(i)	time (for litmus to change) / seconds / rate of diffusion / eq(1)	**1**

Question Number	Answer	additional guidance	Mark
2(b)(ii)	An answer that includes • Scales linear and at least 4 big squares on y and 3 on x (1) • Lines straight and through all points (1) • Axes correct way around time on y and distance on x (1) • Units labelled with seconds /s and cm / eq (1) • Points correctly plotted within a small square (1) • Key / lines labelled 1 and 3 or low and high /eq (1)	allow 2 graphs Extrapolation No L Bar chart max 3 no S no L	**6**

Question Number	Answer	Additional guidance	Mark
2(b)(iii)	An explanation that makes reference to two of the following • litmus / colour changes quicker / less time / eq (1) • molecules diffuse faster / faster diffusion / faster diffusion rate /eq (1) • higher concentration gradient / steeper gradient / eq(1)		**2**

Question Number	Answer	Additional guidance	Mark
2(b)(iv)	calculation method not marking points 24 – 4 = 20cm Time taken 38-8 = 30s Rate = 20 ÷ 30 = 0.67 cm per s (2)	full marks for correct answer 1 mark for 20 or ÷ 30 0.667 or 0.6667 or 0.66˙ or 0.6˙ or 0.6 recurring or 0.7	**2**

Question Number	Answer	Mark
2(b)(v)	repeat / use more tubes / eq(1)	**1**

Question Number	Answer	Additional guidance	Mark
2(c)	A description that makes reference to the following • change the temperature /use (at least) 2 different temperatures / eq (1) • use beaker with thermometer / use water baths eq (1) • use same concentration / same number of drops / same volume / eq(1)	allow amount as it is drops	**3**

(Total for Question 2 = 16 marks)

Question Number	Answer	Mark
3(a)(i)	An explanation that makes reference to two of the following • show no starch present / starch is used up / leaf is destarched / eq (1) • by respiration / eq (1) • to make it a fair test / make test valid / any starch produced is from photosynthesis / eq (1)	**2**

Question Number	Answer	Additional guidance	Mark
3(a)(ii)	An explanation makes reference to two of the following • no photosynthesis / no carbon dioxide / eq (1) • no carbohydrate / no starch / negative /eq (1) • iodine solution unchanged / leaf brown / yellow / orange /eq (1)	requires CO_2 for photosynthesis	**2**

Question Number	Answer	Additional guidance	Mark
3(a)(iii)	A description that includes the following • plant in dark / leaf with foil covering / leaf with stencil / eq (1) • access to CO_2 / no soda lime / eq (1)		**2**

Question Number	Answer	Additional guidance	Mark
3(b)	An explanation that includes three of the following • photosynthesis only provides C H O / other elements required for growth / eq (1) • nitrate required for amino acids / proteins / enzymes / new cells / eq (1) • magnesium required for chlorophyll / chloroplasts / for photosynthesis / eq (1) • phosphate for ATP /cell membranes / DNA / eq (1)	no credit for nitrogen no credit for phosphorous allow iron for chlorophyll / chloroplasts / photosynthesis /respiration (1) calcium for cell walls/cell membranes (1) potassium for water balance / enzymes /photosynthesis /respiration (1)	**3**

Question Number	Answer	additional guidance	Mark
3(c)	An explanation that includes three of the following: • upper epidermis / upper layer so light passes through / transparent / eq (1) • waxy layer so reduces water loss / eq (1) • cells arranged vertically / packed together so absorbs most light /eq (1) • contains chloroplasts / chlorophyll so traps light / absorbs light energy / eq (1) • near upper surface so more light penetrates / reaches / eq (1)	adaptation **and** how it helps not region A	**3**

(Total for Question 3 = 12 marks)

Question Number	Answer	Additional guidance	Mark
4(a)	<u>glucose</u> ⟶ <u>ethanol and carbon dioxide</u>	one mark for each side no credit for glucose + oxygen on LHS allow correct formula for reactants and products	**2**

Question Number	Answer	Mark
4(b)(i)	• mass of seeds / volume of seeds / species of seeds /type of seeds/ number of seeds / size of seed / age of seed /eq(1)	**1**

Question Number	Answer	additional guidance	Mark
4(b)(ii)	calculation method not marking points 1108-564=544 544 ÷ 180 = 3.0 (2)	full marks for correct answer allow 1 mark for 544 or ÷ 180 allow 544 from table allow 3 or 3.02 or 3.022 allow from table	**2**

Question Number	Answer	additional guidance	Mark
4(b)(iii)	An answer that makes reference to five of the following 1. high CO_2 / most change (in CO_2) produced in respiring seeds /eq (1) 2. low CO_2 / less change (in CO_2) / produced in dry seeds / eq (1) 3. no change (in CO_2) normal air / eq (1) 4. as dry seeds are not respiring / respiring very slowly / eq (1) 5. enzymes are not active / less active / (in dry seeds) eq (1) 6. no water for chemical / metabolic reactions / hydrolysis (in dry seeds) / eq (1) 7. experiment not repeated / not reliable / eq (1) 8. only done for short period / 3 minutes / eq (1) 9. temperature not controlled / not stated / eq (1) 10. could be aerobic or anaerobic / eq (1)	slightly higher change in CO_2 than no seeds ignore respiration	**5**

(Total for Question 4 = 10 marks)

Question Number	Answer	Mark
5(a)(i)	cell wall / eq(1)	**1**

Question Number	Answer	Mark
5(a)(ii)	glycogen (1)	**1**

Question Number	Answer	additional guidance	Mark
5(b)	A description that makes reference to three of the following: • (enzymes in yeast) convert starch in flour to sugars / maltose/ glucose/ eq (1) • yeast (cells) respire / eq (1) • to produce carbon dioxide /eq (1) • trapped in dough / dough rises / bread rises / eq (1) • ethanol produced is evaporated / eq (1)	allow aerobic and anaerobic	**3**

Question Number	Answer	Mark
5(c)(i)	An explanation that makes reference to three of the following: • milk is heated at 70-95 °C / pasteurised / eq (1) • to kill any microorganisms / bacteria / eq (1) • cooled / kept at 40-45°C /eq(1) • so *Lactobacillus* bacteria added can survive/ eq (1) • provide optimum temperature for enzymes / optimum temperature for respiration / optimum temperature for fermentation / eq (1)	**3**

Question Number	Answer	Mark
5(c)(ii)	An explanation that makes reference to two of the following: • milk has a pH of 6.7 / 7 / about neutral / eq (1) • lactic acid produced / eq (1) • this makes the pH drop / become more acidic / eq (1) • stops other bacteria growing / preserves the yoghurt / clots milk / makes solid / eq (1)	**2**

(Total for Question 5 = 10 marks)

Question Number	Answer	Mark
6(a)	**C (mackerel)** *A is not the answer as cod is the tertiary consumer* *B is not the answer as krill is the primary consumer* *D is not the answer as seal is the quaternary consumer*	**1**

Question Number	Answer	Additional guidance	Mark
6(b)	• correct shape (1) • correct order / (PKMCS) labelled (1)	correct order phytoplankton at bottom =1	**2**

Question Number	Answer	Mark
6(c)	An explanation makes reference to two of the following • organism mass / size varies / eq (1) • number of producers may be small / one oak tree / eq (1) • so base may be narrow / pyramid (**of numbers**) can be inverted / not pyramid shape / numbers can increase/ don't always decrease / eq (1) • **biomass** always greater for producers / decreases up trophic levels / eq (1)	**2**

Question Number	Answer	Additional guidance	Mark
6(d)	An explanation makes reference to four of the following 1. variation in temperature / lower temperatures in winter / colder in winter / eq (1) 2. variation in / fewer hours of daylight /darker days / eq (1) 3. variation in light / sun less bright / less intense / doesn't penetrate as deep / eq (1) 4. less photosynthesis / photosynthesis varies /eq (1) 5. fewer producers / phytoplankton / plants die / eq (1) 6. less food (for consumers / krill) / eq (1) 7. more heat loss / energy loss/ eq (1) 8. less energy for next level / eq (1) 9. animals migrate / eq (1) 10. ref to breeding season affecting animal numbers / eq (1)	 allow higher / warmer in summer more in summer more in summer more in summer more in summer more in summer less in summer more in summer	**4**

Question Number	Answer	Additional guidance	Mark
6(e)	An answer that makes reference to two of the following • ocean / sea / water absorbs more heat (than land) / eq (1) • ice caps melting / eq (1) • ocean currents changed /eq (1) • increase in sea levels /eq (1) • acidification / carbon dioxide builds up killing organisms / bleaching coral / eq (1)	has high heat capacity allow less oxygen (at warmer temperatures) / eq (1) land animals can better adapt / move to other region/eq (1)	**2**

(Total for Question 6 = 11 marks)

Question Number	Answer	Additional guidance	Mark
7(a)	any order • nervous / nerve (1) • hormonal / endocrine (1)	any order allow circulatory / circulation (1) excretory / excretion (1)	**2**

Question Number	Answer	Mark
7(b)	**B** maintaining body temperature *A is not correct as lifting a weight is not restoring internal balance* *C is not correct as releasing saliva is not balance* *D is not correct as withdrawing your hand is not restoring internal balance*	**1**

Question Number	Answer	Mark
7(c)(i)	**B (G)** *A is not correct as F does not detect light* *C is not correct as H does not detect light* *D is not correct as J does not detect light*	**1**

Question Number	Answer	additional guidance	Mark
7(c)(ii)	An explanation makes reference to four of the following • ciliary muscles contract / eq (1) • less tension in suspensory ligaments / loosen / slacken / eq (1) • lens becomes wider / more convex / rounder / fatter / thicker / eq (1) • light is refracted more / bent more / eq (1) • accommodation (1)	ignore changes in pupil ignore relax	**4**

Question Number	Answer	additional guidance	Mark
7(d)	An answer that makes reference to two of the following • wash away / remove dust / pollen / foreign bodies / dilute toxins / eq (1) • keep moist / hydrates / lubricated /prevent drying out / eq (1) • kill bacteria / microorganisms / prevent infection / eq (1) • digest / break down proteins / carbohydrate/ lipid / eq (1)	allow digest bacterial cell walls	**2**

(Total for Question 7 = 10 marks)

Question Number	Answer	Mark
8(a)	growth response / grows towards or away from a stimulus/ eq (1)	**1**

Question Number	Answer	additional guidance	Mark
8(b)	A description that includes two of the following • auxin moves away from light / collects on shaded side / eq (1) • auxin stimulates growth / elongation /eq (1) • grows more on shaded side / side away from light / bends / grows towards light / positive (photo)tropic response / eq (1)	assume shoot unless root stated grows towards light scores mp2 and mp 3 for root mp 1 same mp 2 inhibits mp 3 grows less on shaded side/ bends away	**2**

Question Number	Answer	Additional guidance	Mark
8(c)(i)	An explanation that makes reference to five of the following 1. **A** grows straight / up / eq (1) 2. **A** no bend as always has gravity in same direction / eq (1) 3. auxin stimulates growth / cell elongation / eq (1) 4. as in **A** auxin evenly distributed / in middle / eq (1) 5. negatively geotropic / gravitropic /(1) 6. **B** bends <u>upwards</u> / grows <u>upwards</u> / eq (1) 7. **B** as auxin moves to lower part of stem / eq (1) 8. **C** grows straight (out) / sideways / horizontal / eq (1) 9. **C** as each side / upper lower subject to equal gravity directions / eq (1) 10. in **C** auxin evenly distributed / even growth / eq (1) 11. no role of light / phototropism as evenly illumination /eq(1)		**5**

Question Number	Answer	**Mark**
8(c)(ii)	A description that includes two of the following • expose roots / use clear pot / eq (1) • do in dark / no light / uniform light / eq (1) • keep roots moist / eq (1)	**2**

(Total for Question 8 = 10 marks)

Question Number	Answer	Mark
9(a)	**C two X chromosomes and 22 pairs of other chromosomes** *A one X chromosome and 22 other chromosomes is not correct* *B one Y chromosome and 22 other chromosomes is not correct* *D two Y chromosome and 22 pairs of other chromosomes is not correct*	**1**

Question Number	Answer	Additional guidance	Mark
9(b)(i)	• parent genotypes XX and XY / eq (1) • gametes X and X or Y / eq (1) • offspring XX and XY / eq (1)	Allow mp 1 2 3 from Punnet square **No ECF** For gametes either circled or clear separation of X Y No credit for other letters	**3**

Question Number	Answer	Additional guidance	Mark
9(b)(ii)	calculation method not marking points ½ × ½ × ½ × ½ 0.0625 or 1/16 or 6.25% (2)	full marks for correct answer allow 1 mark for 0.5 or ½ or 50% in working	**2**

Question Number	Answer	Additional guidance	Mark
9(c)	calculation method not marking points 320 122: 304 706 =1.05 (2)	full marks for correct answer one mark for 320 122÷ 304 706 or 320 122: 304 706 1.1 or 1.051 or 1.0506 or 1.05059 or 1.050593 or 1.0505930 or 1.05059303 etc	**2**

Question Number	Answer	additional guidance	Mark
9(d)	An explanation that makes reference to three of the following • mitosis for asexual reproduction / eq (1) • produces <u>genetically</u> identical offspring / cells / eq (1) • produces clones / eq (1) • (mitosis) in zygote / zygote divides / fertilised egg divides (by mitosis)/ eq (1) • growth of embryo / produces embryo / eq (1)	allow growth of foetus	**3**

(Total for Question 9 = 11 marks)

Question Number	Answer	Mark
10(a)	• sulfur dioxide from burning fossil fuels / eq (1) • reacts with water in clouds / dissolves / eq (1) • forms / produces sulphuric acid / H_2SO_4 / eq (1) • kills organisms / plants / animals / damages organisms / plants / animals / forests / eq (1)	**3**

Question Number	Answer	additional guidance	Mark
10(b)	An explanation that makes reference to three of the following • less burning / combustion / use of fossil fuels / eq (1) • less / no carbon dioxide / eq (1) • less global warming / climate change / greenhouse effect / less greenhouse gases / eq (1) • less / no release of sulfur dioxide / nitrous oxide / eq (1) • less noise pollution /eq (1) • less / no particulate pollution / eq (1) • more efficient / less energy wasted / eq (1)	allow converse for petrol / diesel	**3**

(Total for Question 10 = 6 marks)

Question Number	Answer	Additional guidance	Mark
11	An answer that refers to six of the following: C change speed of fan / move fan away / place in different wind conditions / with and without fan / eq (1) O same species / same type / same size flowers / eq (1) R repeat / (calculate mean for each different speed) / eq (1) M1 measure mass of flower / pollen released use slide to collect pollen and count numbers /eq (1) M2 in stated time period / minutes / eq (1) S1 and S2 same temperature / same light intensity / same season / weather / same water (humidity) / eq (2)	must state how wind speed is changed not just count alone not just same time two of ignore soil , minerals / CO_2	**6**

(Total for Question 11 = 6 marks)