Mark Scheme (Results)

October 2025

Pearson Edexcel International Advanced Level in Biology
WBI16/01A

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications are awarded by Pearson, the UK's largest awarding body. We provide a wide range of qualifications including academic, vocational, occupational and specific programmes for employers. For further information visit our qualifications websites at www.edexcel.com or www.btec.co.uk. Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus

Pearson: helping people progress, everywhere

Pearson aspires to be the world's leading learning company. Our aim is to help everyone progress in their lives through education. We believe in every kind of learning, for all kinds of people, wherever they are in the world. We've been involved in education for over 150 years, and by working across 70 countries, in 100 languages, we have built an international reputation for our commitment to high standards and raising achievement through innovation in education. Find out more about how we can help you and your students at: www.pearson.com/uk

October 2025
Question Paper Log Number P87417A
Publication Code WBI16_01A_2510_MS
All the material in this publication is copyright
© Pearson Education Ltd

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	Additional Guidance	Mark
1ai	• 168 (hours) (1)	Accept 7 days Accept the range of 144 to 192 (hours) (not a single number in this range) Do not accept after 168 hours	**1 exp**

Question Number	Answer	Additional Guidance	Mark
1aii	• correct answer (1) • appropriate units (1)	0.3 / 0.33 / 0.333 e.g. mm hour^{-1} / mm per hour / mm/hour Accept mm hr^{-1} / mm h^{-1} / hour(s) in all forms of unit	**2 exp**

Question Number	Answer	Additional Guidance	Mark
1bi	An answer that includes two of the following: • temperature (1) • oxygen {concentration / level} (1) • {humidity / moisture (of air) / water vapour (in air)} (1) • mass of food (1) • {intensity / wavelength} of light (1)		**2 exp**

Question Number	Answer	Additional Guidance	Mark
1bii	• description of an appropriate method of control (1)	Allow ecf for inappropriate variable but correct method of control temperature: use incubator / TC water bath / AC room oxygen concentration: use an air-line / gas supply in incubator humidity: use AC room mass of food: use balance light intensity: use same wattage bulb / at same distance wavelength of light: use same filter / same coloured bulb	**1 exp**

Question Number	Answer	Additional Guidance	Mark
1c	A description that includes three of the following: • use maggots that have hatched at the same time (1) • measure the length of (a sample of) maggots every 24 hours (1) • use several maggots to calculate mean values (1) • carry out investigation with both types of meat (1)	 Accept maggots of the same species / age Ignore same time interval unqualified / any time apart from 24 hours Accept repeating experiment to calculate mean	**3 exp**

(Total for question 1 = 9 marks)

Question Number	Answer	Additional Guidance	Mark
2a	An answer that includes one of the following: • the animals may {be harmed / fight} (1) • the other fish may {become habituated / change its behaviour} (1)	Ignore not an ethical procedure / less stressful for fish Accept reflection will not cause harm Accept cannot control the behaviour of the other fish	**1 exp**

Question Number	Answer	Additional Guidance	Mark
2b	A description that includes six of the following: • add mirror to tank (1) • record duration of threat display (1) • {remove / cover} mirror (1) • {let fish rest before next trial / leave for stated time} (1) • repeat (for same fish) until there is no response (1) • repeat with other fish (of the same species) (1) • identification of two variables to be controlled (1)	Accept time for fins to go back to normal / how long the fins are spread Ignore time for fins to extend / amount of extension of fins Ignore acclimatisation Accept repeat (for same fish) (at least) five times Do not accept to calculate {mean / SD} eg temperature / pH / oxygen concentration / light intensity / age of fish / {tank size / volume of water}	**6 exp**

Question Number	Answer	Additional Guidance	Mark
2c	An explanation that includes the following: • so less energy used (on threat behaviour) (1) • so other behaviours are possible (1) • reduces chance of {damage / harm} to fish (1)	 Accept less energy wasted eg feeding / reproduction / avoiding predators Accept more time for feeding etc Accept avoids damage to fins Ignore stress to fish Ignore reference to uptake of oxygen	**3 exp**

(Total for question 2 = 10 marks)

Question Number	Answer	Additional Guidance	Mark
3a	• there is no (significant) difference between the (mean) biomass of fields with cows and without cows (1)	Ignore effect Accept comparison of any two eg 2 and 4 / 2 and 0 / 4 and 0 Accept between 2, 4 and 0 cows / number of cows in field Accept grazed and ungrazed fields Ignore fields A, B and C unqualified Accept there is no (significant) correlation between the (mean) biomass of fields and the **number** of cows (being grazed in them)	**1** **exp**

Question Number	Answer	Additional Guidance	Mark
3b	• table with complete headings and units (1) • data entered correctly (1) • means calculated correctly (1)	Biomass / gm^{-2} and fields A, B, C or 2,4,0 cows Mean A 174.2, Mean B 136.**0,** Mean C 190.2 Accept 174 136 190	**3** **exp**

Question Number	Answer	Additional Guidance	Mark
3c	• bar graph with a scale **starting at zero** and axes labelled (fields A, B, C or 2,4,0 cows), with units (1) • means plotted correctly on linear scale (1) • range bars plotted correctly (1)	Accept mean biomass / gm^{-2} and fields A, B, C or 2,4,0 cows Accept scatter graph with axes labelled (0, 2, 4 cows), with units Ignore line if plotted Allow ecf for wrongly calculated means in 3b A 148 – 212 B 118 – 158 C 145 – 211	**3** **exp**

Question Number	Answer	Additional Guidance	Mark
3di	• correct substitution of given $(S_A)^2$ and $(S_B)^2$ (1) • correct answer (1)	Allow ecf if incorrect means used in formula Mean 174.2 and 136.0 / 174 and 136 2.53 (2.5324127) / 2.52 (2.519154)	**2** **exp**

Question Number	Answer	Additional Guidance	Mark
3dii	An answer that includes two of the following: • a field with 4 cows has a lower (mean) biomass than a field with 2 cows (1) • the calculated value of *t* (2.53) is more than the critical value **2.31** (1) • therefore reject the null hypothesis, so the difference in biomass (between fields A and B / between 4 cows and 2 cows) is **significant** (1)	Allow ecf for wrong *t* value carried forward Accept fields A and B Accept critical value indicated in table Accept 2.53 > 2.31 Do not accept reference to {field C / 0 cows} and significance Ignore reference to range bars	**2 exp**

Question Number	Answer	Additional Guidance	Mark
3e	An answer that includes two of the following: • change the {number / type} of cows (1) • increase the number of samples of biomass (from 5) (1) • take samples at different time intervals (1) • change the species of grass (1)	Accept increase the number of cows (to give more data for a correlation test) Accept different {species / sex} of cattle Ignore other grazing species eg goats Accept at different {times of year / seasons} Accept repeat in {different / more} fields Ignore repeat unqualified / bigger fields	**2 exp**

(Total for question 3 = 13 marks)

Question Number	Answer	Additional Guidance	Mark
4a	A description that includes the following: • {disaccharide formed from / contains two} (alpha) glucose molecules (1) • (joined by) 1-4 glycosidic bond (1)	 Do not accept beta glucose Do not accept 1-6 glycosidic bond	**2 exp**

Question Number	Answer	Additional Guidance	Mark
4bi	A description that includes two of the following: • find a method to measure the digestion of starch (1) • find suitable conditions for {this method / germination} (1) • find a suitable time for {starch digestion / germination} (1) • find a suitable mass of wheat to use (1)	 Accept method to calculate rate of digestion (of starch) Accept temperature / pH Accept find a suitable concentration of starch to use	**2 exp**

Question Number	Answer	Additional Guidance	Mark
4bii	An answer that includes nine of the following: • clear statement of the **dependent** variable e.g. area of starch digested in {stated / unit} time (1) • use of (petri dish with) starch agar (1) • {germinate grains / soak grains in gibberellin} (1) • use of standardised method of preparing wheat grains to be placed on agar (1) • {use / description} of aseptic technique (1) • use iodine solution (to test for starch) (1) • method of calculating rate (of digestion) (1) • one variable and its method of control (1) • second variable and its method of control (1) • carry out with both varieties of wheat (1) • repeat the experiment to give {mean **and** SD} (1)	Accept {diameter / area} of clear zone **after {stated / unit} time** Do not accept ZOI Ignore rate e.g. surface sterilisation / cutting and placing cut side down Ignore surface sterilisation of grain Accept potassium iodide solution Accept measure {diameter / area} of {clear zone / ZOI} **and divide by time** Temperature / pH / concentration of starch in agar / size of grains / surface area of grains / mass of grains / age of grains / incubation time Accept repeat to {measure variability of data / carry out a t-test}	**9 exp**

	OR • clear statement of the **dependent** variable e.g. proportion of starch remaining after set time (1) • {germinate grains / soak grains in gibberellin} (1) • leave for {set / stated} time (1) • method of forming extract described (1) • use of iodine solution (to test for starch) (1) • use of {colour standards / colorimeter and calibration curve} (to estimate concentration of starch remaining) (1) • method of calculation of rate (1) • one variable and its method of control (1) • second variable and its method of control (1) • carry out with both varieties of wheat (1) • repeat the experiment to give {mean **and** SD} (1)	Accept collecting results (from a sample) at intervals Accept grind / filter Accept potassium iodide solution Comparison of concentration in two varieties after set time / comparison of gradient on graph if several times Temperature / pH / mass of grains used / volume of water used to make extract / age of grains Accept repeat {to measure variability of data / carry out a t-test}	

Question Number	Answer	Additional Guidance	Mark
4biii	An answer that includes the following: • table for raw data with headings and units, with means calculated from repeats (1) • bar graph with labelled axes (1) • use of a statistical test for difference (1)	Allow ecf for incorrect methods for all marking points Accept description of mean calculated in text or mean on one graph label e.g. t-test	**3** **exp**

Question Number	Answer	Additional Guidance	Mark
4biv	An answer that includes two of the following: • difficult to control one stated aspect of the grain (1) • sample may become contaminated (1) • {difficult to measure diameter of clear zone / clear zone may not be circular} (1)	e.g. age of grain / size of grain / mass of grain / surface area of grain / viability of grain / storage conditions Accept iodine and extract might not be mixed properly Accept difficult to {determine end point / match colour standards}	**2** **exp**

(Total for question 4 = 18 marks)