Mark Scheme

Mock Set 2 – Autumn 2018

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

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

Mock Set 2 – Autumn 2018
Publications Code 1BI0_1H_msc_2018
All the material in this publication is copyright
© Pearson Education Ltd 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.

Mark schemes have been developed so that the rubric of each mark scheme reflects the characteristics of the skills within the AO being targeted and the requirements of the command word. So, for example, the command word 'explain' requires an identification of a point and then reasoning/justification of the point.
Explain questions can be asked across all AOs. The distinction comes whether the identification is via a judgment made to reach a conclusion, or, making a point through application of knowledge to reason/justify the point made through application of understanding. It is the combination and linkage of the marking points that is needed to gain full marks.
When marking questions with a 'describe' or 'explain' command word, the detailed marking guidance below should be consulted to ensure consistency of marking.

Assessment Objective		**Command Word**	
Strand	**Element**	**Describe**	**Explain**
AO1*		An answer that combines the marking points to provide a logical description	An explanation that links identification of a point with reasoning/justification(s) as required
AO2		An answer that combines the marking points to provide a logical description, showing application of knowledge and understanding	An explanation that links identification of a point (by applying knowledge) with reasoning/justification (application of understanding)
AO3	1a and 1b	An answer that combines points of interpretation/evaluation to provide a logical description	
AO3	2a and 2b		An explanation that combines identification via a judgment to reach a conclusion via justification/reasoning
AO3	3a	An answer that combines the marking points to provide a logical description of the plan/method/experiment	
AO3	3b		An explanation that combines identifying an improvement of the experimental procedure with a linked justification/reasoning

*there will be situations where an AO1 question will include elements of recall of knowledge directly from the specification (up to a maximum of 15%). These will be identified by an asterisk in the mark scheme.

Paper 1 Higher SAMs 1812

Question number	Answer	Mark
1(a)(i)	A calorimetry	**(1)**

Question number	Answer	Additional guidance	Mark
1(a)(ii)	An explanation linking: • calculate energy release per gram of snack (1) • to allow the energy content of the snacks to be compared (1) OR • to measure the mass before and after burning (1) • calculate mass of food burnt (1)	accept to burn the same mass of food each time	**(2)**

Question number	Answer	Additional guidance	Mark
1(a)(iii)	An explanation linking: • energy content of B > C > A (1) • B showed the highest temperature rise, then C and A had the lowest temperature rise/ORA (1)		**(2)**
Question number	**Answer**		**Mark**
1(b)	An explanation linking:		**(2)**

	• add Benedict's reagent and heat (1) • compare the change {in colour/from green to yellow to brick red}(1)	

Total for Question 1 = 7 marks

Question number	Answer	Mark
2(a)(i)	bacteria are resistant to the antibiotic /conjunctivitis was caused by a virus (1)	**(1)**

Question number	Answer	Mark
2(a)(ii)	wash hands after touching eye/not sharing anything in contact with the eye (1)	**(1)**

Question number	Answer	Additional guidance	Mark
2(a) (iii)	1 300 000 ÷ 100 x 85 (1) or 1 300 000 x 0.85 (1) and 1 105 000 (cases)	full marks for correct answer with no working accept 1.1 million (cases)	**(2)**

Question number	Answer	Mark
2(a)(iv)	body has an immune response/ the body destroys pathogen /named chemical defences that destroy the pathogen	**(1)**

Question number	Answer	Mark
2(b)(i)	A bacterium	**(1)**

Question number	Answer	Additional guidance	Mark
2(b) (ii)	as age increases the number of cases of stomach ulcers increase (1)		**(1)**

Question number	Answer	Additional guidance	Mark
2(b)(iii)	2.8 (1) 2.8 x 850 = 2380 (men)	full marks for correct answer with no working	**(2)**

(Total for question 2 = 9 marks)

Question number	Answer	Additional guidance	Mark
3(a)(i)	An answer including: • (meiosis produces) haploid cells/half the number of chromosomes/1n (1) • (meiosis produces) cells that are genetically different (1) • (meiosis produces) sex cells/gametes/sperm/egg cells (1)	ignore 23 chromosomes accept meiosis produces 4 cells (1)	**(3)**

Question number	Answer	Mark
3(a)(ii)	mitosis	**(1)**

Question number	Answer	Mark
3(b)(i)	An answer linking: • proteases/named proteases (1) • breakdown proteins (to amino acids)(1)	**(2)**

Question number	Answer	Mark
3(b)(ii)	diffusion/ active transport	**(1)**

Question number	Answer	Mark
3(c)	An explanation linking: • stem cells divide by mitosis to create more cells (1) • stem cells differentiate into specialised cells (1)	**(2)**

(Total for Question 3 = 9 marks)

Question number	Answer	Mark
4(a)(i)	pentadactyl (limb)	**(1)**

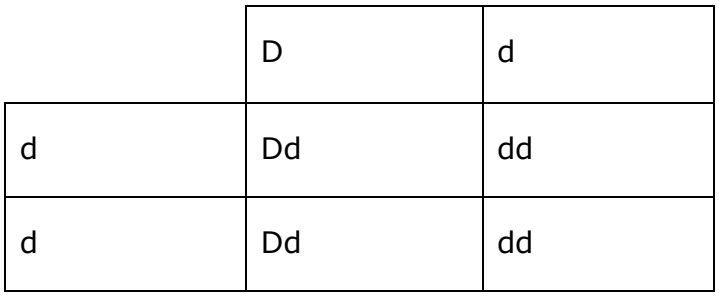
Question number	Answer	Mark
4(a)(ii)	A description including: • complex bone structure is unlikely to have arisen multiple times by chance (1) • suggesting that a common ancestor also had a pentadactyl limb (1)	**(2)**

Question number	Answer	Mark
4(a)(iii)	Any two from: • bird has thin bones for less mass (1) • bird has long digits for large surface area (1) • bird has digits more spaced out for large surface area (1)	**(2)**

Question number	Answer	Mark
4(b)	Any two from: • Wallace and Darwin studied different animals in different areas (1) • Wallace and Darwin came up with the same ideas for evolution independently (1) • Wallace and Darwin both came up with the idea of natural selection (1)	**(2)**

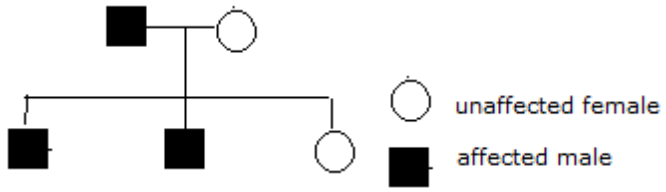
Question number	Answer	Mark
4(c)	An explanation linking four of the following: • sexual reproduction requires two parents (1) • sexual reproduction introduces variation in a population (1) • increases genetic diversity (1) • better adapted organisms survive and reproduce/survival of the fittest (1) • offspring inherit these beneficial characteristics (1)	**(4)**

Total for Question 4 = 11 marks

Question number	Answer	Mark
5(a)(i)	 correct gametes (1) correct offspring (1) Accept dD for Dd	**(2)**

Question number	Answer	Mark
5(a)(ii)	50%	**(1)**

Question number	Answer	Mark
5(a)(iii)	B homozygous recessive	(1)

Question number	Answer	Mark
5 (a)(iv)	 Correct phenotype for parents (1) correct phenotype for the offspring (1) Correct key (1) accept half filled squares for affected individuals	(3)

Question number	Answer	Mark
5(b)	Any two from: • phenotypes controlled by more than one allele (1) • mutations can occur (1) • environmental factors affect phenotype (1)	(2)

Total for question 5 = 9 marks

Question number	Answer	Additional guidance	Mark
6(a)(i)	An answer including: • as axon diameter increases the conduction speed increases (1) • in a linear relationship/as diameter doubles so does speed/correct manipulation of the data (1)		(2)

		speed is directly proportional to axon diameter = 2 marks	

Question number	Answer	Additional guidance	Mark
6(a)(ii)	An explanation linking: • conduction speeds are slower in unmyelinated axon / ORA (1) • there is no myelin sheath to {insulate the axon/speed up conduction of electrical impulses} / ORA (1)		**(2)**

Question number	Answer	Additional guidance	Mark
6(b)	An explanation linking: • signal transmitted as electrical impulses (1) • stimulus is detected by a receptor in the skin (1) • sensory neurone transmits electrical impulses (1) • motor neurone transmits information to the {effector/muscles} (1) • muscles contract to create a response (1) • signal is passed via chemicals between neurones at synapses (1) • (rapid response) protects the body (1)	accept electrical signal	**(4)**

Question number	Answer	Additional guidance	Mark
6(c)	A logical plan including: • measure reaction time at the start (1)		**(3)**

	• complete a controlled activity / control variables for the individuals / stay awake (1) • details of method for measuring reaction time, e.g. dropping ruler or computer programme (1) • repeat reaction time test (when tired) (1)	accept a method of establishing tiredness/named controlled variables for the individuals	

Total for question 6 = 11 marks

Question number	Answer	Mark
7(a)(i)	cerebrum/cortex/cerebral hemisphere	**(1)**

Question number	Answer	Mark
7(a)(ii)	hard to access through the skull/ damages nerve tissue/ nerve tissue does not repair easily accept other valid responses	**(1)**

Question number	Answer	Additional guidance	Mark
7(b)	An explanation linking three from: • radioactive tracer injected into the blood (1) • tracer attached to glucose (1) • taken up by more metabolically active cells/cancerous cells (1)	 accept isotope for tracer accept taken up by respiring cells	**(3)**

	• scanner is used to locate the accumulation of the tracer (1)		

Question number	Indicative content	Mark
***7(c)**	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 therefore not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. **A02 1 6 marks** Production of monoclonal antibodies • antigens from the cancerous cells identified • inject antigen into a mammal • isolate specific B lymphocytes • fuse these with a myeloma/cancerous cell type • creating a hybridoma • hybridoma divides and secretes antibodies Use of monoclonal antibodies • attach a chemotherapy or radiotherapy drug to the monoclonal antibody • inject the monoclonal antibody into the blood stream • monoclonal antibody will bind to the cancerous cell and deliver the drug directly to the affected area • reduces side effects and allows a higher concentration of drug to be used	**(6)**

Level	Mark	Descriptor
	0	• No awardable content
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 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)

Additional Guidance

Level 1	1-2	• A brief explanation of the production of monoclonal antibodies OR the use of monoclonal antibodies. • The indicative content is a coherent statement.
Level 2	3-4	• A brief explanation of the indicative content for the production of monoclonal antibodies and the use of monoclonal antibodies OR a detailed explanation of the production of monoclonal antibodies OR a detailed explanation of the use of monoclonal antibodies.

		• The indicative content is a coherent statement with logical order.
Level 3	5-6	• A detailed explanation for the production of monoclonal antibodies and the use of monoclonal antibodies including the use of key scientific terms. • The response is clear and logically ordered without errors

Total marks for question 7 = 11 marks

Question number	Answer	Additional guidance	Mark
8(a)(i)	0.07 ÷ 2.75 = 0.025 (1) 2.5 (%)	accept additional decimal places award full marks for correct answer with no workings	**(2)**

Question number	Answer	Additional guidance	Mark
8(a)(ii)	An explanation linking: • to remove excess solution (1) • so that an accurate mass is recorded / to allow results to be compared/produce an accurate conclusion (1)		**(2)**

Question number	Answer	Additional guidance	Mark
8 (a)(iii)	An explanation linking three from • water is lost from the parsnip (decreasing the mass) (1) • by osmosis (1)		**(3)**

	• across the partially permeable membrane (1) • from the higher concentration of water molecules to the lower concentration of water molecules (1)	accept the solution has a higher solute potential than the parsnip / parsnip cells have a higher water potential	

Question number	Answer	Additional guidance	Mark
8(a)(iv)	Any two from: • temperature (1) • ripeness/age of vegetables (1) • variety of {carrot/parsnip} (1)	Accept other valid variables	**(2)**

Question number	Answer	Additional guidance	Mark
8(a)(v)	An explanation linking: • 20 cm^3 of the 10% solution of sodium chloride (1) • add 80 cm^3 of water (1)		**(2)**

Total for question 8 = 11 marks

Question number	Answer	Mark
9(a)	C genome	**(1)**

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 therefore not required to include all the material that is indicated as relevant. Additional content included in the response must be scientific and relevant. **A01 1 6 marks** • cut the gene from the genome of one organism • using restriction enzymes • restriction enzymes leave sticky ends • sticky ends are single stranded • remove a plasmid from the bacterium • cut the plasmid with the same restriction enzyme • sticky ends are complementary • insert the gene into the plasmid • use ligase • insert the recombinant plasmid back into the bacterium	**(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 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)

Additional Guidance

Level 1	1-2	• A brief explanation of the process including at least one piece of indicative content • The indicative content is a coherent statement.
Level 2	3-4	• A good explanation of the process which refers to some of the indicative content. • The indicative content is a coherent statement with logical order.
Level 3	5-6	• A detailed explanation of the process which is linked correctly and uses key scientific terms. • The response is clear and logically ordered without errors

Question number	Answer	Additional guidance	Mark
9(c)(i)	cheap to produce/can be produced quickly/large quantities can be produced		**(1)**

Question number	Answer	Additional guidance	Mark
9(c)(ii)	An explanation linking three from: • body recognises protein A as foreign (1) • it stimulates an immune response / the production of antibodies (1) • resulting in the production of memory lymphocytes (1) • memory lymphocytes remain in the body (1)	ignore protein A is an antigen	**(3)**

Total for question 9 = 11 marks

Question number	Answer	Mark
10(a)(i)	C tissue culture	(1)

Question number	Answer	Additional guidance	Mark
10(a)(ii)	An explanation linking: • flame the scalpel/ neck of the bottle/ using an autoclave to prepare the growth medium (1) • kill unwanted microorganisms (1) OR • work close to a Bunsen burner when transferring the explant (1) • convection current reduces contamination in the area (1)	accept named microorganisms	(2)

Question number	Answer	Mark
10(a)(iii)	B it produces identical plants and can be a quick process	(1)

Question number	Answer	Mark
10(b)(i)	less risk to humans during clinical trials/identify dangerous drugs before clinical trials/can test effect on specific cell types	(1)

Question number	Answer	Additional guidance	Mark
10(b)(ii)	4.6% (1) 90 x 0.046 = 4 (drugs)	full marks for correct answer with no working ignore 4.1/ 4.14	**(2)**

Question number	Answer	Additional guidance	Mark
10(c)	An answer including four from: • observation of plants for symptoms of disease (1) • check the field to eliminate an environmental cause of the poor growth (1) • analyse the distribution of affected plants (1) • take a sample from an affected plant (1) • diagnostic testing in a laboratory to identify a pathogen (1)	accept named examples e.g. test the soil	**(4)**

Total for question 10 = 11 marks