

Mark Scheme (Results)

Summer 2016

Pearson Edexcel International GCSE
in Biology (4BIO) Paper 2BR

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

Summer 2016

Publications Code 4BIO_2BR_1606_MS

All the material in this publication is copyright

© Pearson Education Ltd 2016

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	Notes	Marks
1 (a)	1. breakdown / broken down; 2. (large molecules) to small; 3. (insoluble) to soluble;	Complex to simple substances = 0 Ignore examples	Max 2
(b)	1. (no) insulin; 2. high <u>blood</u> glucose level / excess <u>blood</u> glucose / glucose <u>not</u> converted to glycogen / less glucose absorbed by cells; 3. not (re)absorbed (in kidney) / eq;	2. Ignore blood sugar 2. No control of blood glucose = 0	3
(c)	1. amylase / carbohydrase; 2. lipase; 3. protease / trypsin / peptidase;	Ignore maltase Reject list on same line containing incorrect enzyme	Max 2
(d)	insulin/hormone travels in <u>blood</u> / insulin/hormone travels in <u>blood</u> vessels / (pancreas is an) endocrine gland;		1
(e)	1. no injection / inject with water; 2. to show changes are due to insulin / (valid) comparison;	Ignore injecting into dogs with intact pancreas Eg. Compare with dogs that had insulin extract injected	2

(f)	<u>hepatic artery</u> ;		1
(g)	insoluble / does not dissolve / no osmotic effect / eq;	Allow converse for glucose	Max 1
(h)	(i) <u>change</u> in glucose (level) / <u>high</u> glucose / <u>low</u> glucose;	Ignore amount of glucose Ignore amount of glucose eaten	1
	(ii) <u>pancreas</u> / <u>Islets of Langerhans</u> ;		1
	(iii) <u>pancreas</u> / <u>Islets of Langerhans</u> / <u>liver</u> / <u>muscle</u> ;	Ignore negative feedback alone	1
	(iv) insulin release / glucagon release / change in glucose (level) / increase/decrease in glucose (level) / glucose to glycogen / glycogen to glucose / uptake of glucose / glucose levels return to normal / glucose absorbed / eq;		1

Question number	Answer	Notes	Marks
2 (a)	1 / stage 1 / pasteurise; 2 / stage 2 / sterilise;	Ignore order	2
(b)	1. prevent killing / prevent enzyme <u>denaturation</u> ; 2. bacteria / <i>Lactobacillus</i> / <i>Streptococcus</i> ;	Avoid denaturing bacteria = 1 Kill enzyme = 0 Ignore reference to suitable temperature for enzymes	2
(c)	1. less production / product contaminated / spoil taste / eq; 2. (other) bacteria present / bacteria not killed / bacteria would compete / bacteria use lactose / eq;	Contaminated with other bacteria = 2 Allow microorganisms / microbes / fungi	2
(d)	1. less production / take longer / less lactic acid / affect the taste / eq; 2. because bacteria stop growing / bacteria stop reproducing; 3. less enzyme activity / below <u>optimum</u> / less (kinetic) energy / eq;	3. Ignore denature	Max 2
(e)	1. contains vitamin C; 2. prevent scurvy;	Allow vitamin C if in list with other vitamins Allow vitamin A	Max 1

Question number	Answer	Notes	Marks
3 (a) (i)	107:1 / 107 to 1;	Ignore 107 alone	1
(ii)	1. no/less oxygen; 2. respiration / energy / ATP; 3. active transport / active uptake;		3
(b)	chlorophyll; amino acid / protein / peptide / polypeptide / DNA / RNA / nucleic acid;	Ignore chloroplast	2

(d)	<ol style="list-style-type: none">1. ignite seed / eq;2. transfer under tube of water / use of calorimeter;3. quick transfer / complete combustion / relight;4. mass of water / volume of water / eq;5. measure increase in temperature / measure temperature at start and at end;6. repeat / eq;	Allow Mp4 and Mp5 from formula	Max 4
-----	--	--------------------------------	-------

Question number	Answer	Notes	Marks
6	<p>(a)(i) 1. gain entry / break through egg membrane / break into egg / penetrate egg / eq; 2. chromosomes / DNA / genes / alleles / genetic material;</p> <p>(ii) 1. respiration; 2. ATP / energy;</p> <p>(iii) swim / move / eq;</p>	<p>1. Ignore digest / fertilise 2. Ignore nucleus</p>	<p>2</p> <p>2</p> <p>1</p>
	<p>(b) 1. dendrites connect with other neurones / eq; 2. axon carries/allows impulse / eq; 3. myelin sheath for protection / insulation / faster impulse / eq; 4. connected to muscle fibres / allows impulse to reach muscle fibres / enables muscle fibres to contract / synapses with muscle fibres;</p>		<p>Max 2</p>

