

Mark Scheme (Results)

Summer 2013

International GCSE
Biology (4BI0) Paper 1BR

Science Double Award (4SC0)
Paper 1BR

Edexcel and BTEC Qualifications

Edexcel and BTEC qualifications come from Pearson, the world's leading learning company. 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 for our BTEC qualifications.

Alternatively, you can get in touch with us using the details on our contact us page at www.edexcel.com/contactus.

If you have any subject specific questions about this specification that require the help of a subject specialist, you can speak directly to the subject team at Pearson. Their contact details can be found on this link: www.edexcel.com/teachingservices.

You can also use our online Ask the Expert service at www.edexcel.com/ask. You will need an Edexcel username and password to access this service.

Pearson: helping people progress, everywhere

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 2013

Publications Code UG035495

All the material in this publication is copyright

© Pearson Education Ltd 2013

Question number	Answer					Notes	Marks																				
1 (a)	<table border="1"> <thead> <tr> <th>Group</th> <th>Example</th> </tr> </thead> <tbody> <tr> <td>animals</td> <td>human / eq;</td> </tr> <tr> <td>fungi</td> <td><i>Mucor</i> / eq;</td> </tr> <tr> <td>bacteria</td> <td><i>Lactobacillus</i> / <i>Pneumococcus</i> / <i>Salmonella</i> / eq;</td> </tr> <tr> <td>protocists</td> <td><i>Amoeba</i> / <i>Chlorella</i> / <i>Plasmodium</i> / seaweed / algae / eq;</td> </tr> </tbody> </table>					Group	Example	animals	human / eq;	fungi	<i>Mucor</i> / eq;	bacteria	<i>Lactobacillus</i> / <i>Pneumococcus</i> / <i>Salmonella</i> / eq;	protocists	<i>Amoeba</i> / <i>Chlorella</i> / <i>Plasmodium</i> / seaweed / algae / eq;	allow mammals / birds / eq allow mushroom / yeast / mould toadstool / ignore named disease / athlete's foot ignore malaria	4										
Group	Example																										
animals	human / eq;																										
fungi	<i>Mucor</i> / eq;																										
bacteria	<i>Lactobacillus</i> / <i>Pneumococcus</i> / <i>Salmonella</i> / eq;																										
protocists	<i>Amoeba</i> / <i>Chlorella</i> / <i>Plasmodium</i> / seaweed / algae / eq;																										
(b)	<table border="1"> <thead> <tr> <th>Group</th> <th>Are multicellular</th> <th>Cells have nucleus</th> <th>Cells contain chloroplasts</th> <th>Cells have cell walls</th> </tr> </thead> <tbody> <tr> <td>fungi</td> <td>some</td> <td>(all)</td> <td>none</td> <td>(all);</td> </tr> <tr> <td>bacteria</td> <td>none</td> <td>none</td> <td>(some)</td> <td>(all);</td> </tr> <tr> <td>protocists</td> <td>(none)</td> <td>all</td> <td>(some)</td> <td>some;</td> </tr> </tbody> </table>	Group	Are multicellular	Cells have nucleus	Cells contain chloroplasts	Cells have cell walls	fungi	some	(all)	none	(all);	bacteria	none	none	(some)	(all);	protocists	(none)	all	(some)	some;						3
Group	Are multicellular	Cells have nucleus	Cells contain chloroplasts	Cells have cell walls																							
fungi	some	(all)	none	(all);																							
bacteria	none	none	(some)	(all);																							
protocists	(none)	all	(some)	some;																							

Question number	Answer	Notes	Marks
1 (c) (i)	smaller; protein coat / no cell wall / eq; no cell membrane; no cytoplasm / no organelles / no plasmids / no ribosome / eq; no <u>flagellum</u> ;	ignore reference to shape and reproduction ignore nucleus / Golgi / mitochondria / eq allow converse ignore HIV	1
		Total	9

Question number	Answer	Notes	Marks
2 (a) (i)	correctly labelled;	ignore other labels if label line goes to wall and membrane = 0	1
(ii)	cell wall; chloroplast; vacuole;	ignore chlorophyll	3
(b) (i)	LHS / water level lower than RHS / sucrose level;	labelling not required	1
(ii)	<u>osmosis</u> ;	ignore diffusion	1
		Total	6

Question number	Answer	Notes	Marks														
3	<table border="1"> <thead> <tr> <th>event</th> <th>letter</th> </tr> </thead> <tbody> <tr> <td>fertilisation</td> <td>(P)</td> </tr> <tr> <td>release of oestrogen</td> <td>Q; ONLY</td> </tr> <tr> <td>meiosis</td> <td>Q and V; ONLY in any order</td> </tr> <tr> <td>repair of the uterus lining</td> <td>R; ONLY</td> </tr> <tr> <td>implantation of an embryo</td> <td>R; ONLY</td> </tr> <tr> <td>formation of gametes</td> <td>Q and V; ONLY in any order</td> </tr> </tbody> </table>	event	letter	fertilisation	(P)	release of oestrogen	Q; ONLY	meiosis	Q and V; ONLY in any order	repair of the uterus lining	R; ONLY	implantation of an embryo	R; ONLY	formation of gametes	Q and V; ONLY in any order	<p>only give mark if correct letter(s) given one correct and one wrong = 0 allow lower case letters</p>	5
event	letter																
fertilisation	(P)																
release of oestrogen	Q; ONLY																
meiosis	Q and V; ONLY in any order																
repair of the uterus lining	R; ONLY																
implantation of an embryo	R; ONLY																
formation of gametes	Q and V; ONLY in any order																
		Total	5														

Question number	Answer	Notes	Marks
4 (a) (i)	all names present and parakeet in middle; arrows in right direction;		2
(ii)	digested / broken down; amylase / carbohydrase; maltose / glucose / sugar;	ignore enzyme ignore maltase ignore absorbed in small intestine	3
(b) (i)	25.5;;	allow one mark for 2 or 27.5 in working	2
(ii)	increase (volume of oxygen) / eq; (more) respiration; heat loss / eq;	ignore keep warm ignore reference to maintain body temperature	3
		Total	10

Question number	Answer	Notes	Marks
5 (a)	S scale linear + use of at least half grid; L lines on bars neat; A axes correct way; A axes labelled energy + kJ per m ² per year and A,B,C,D / eq; P bars at correct height;	L lost if points plotted allow yr or y for year allow kJ m ⁻² yr ⁻¹	5
(b)	temperature / heat; (sun)light / light intensity; wavelength / colour; water / rain; minerals / ions / salts / named mineral / nutrients;	ignore humidity	3
(c) (i)	(less) pests / disease control / pesticides / eq; biological control / predators; fertiliser / fertile soil / crop rotation / legumes / eq; irrigation / watered; replanting / several plantings per year; GM / species of plant / different strains / eq; weed removal;	ignore pollution / CO ₂ levels or other abiotic factors ignore glasshouse / polythene	2
(ii)	man / human / you / farmer; desired characteristic / named feature / eq; breed / produce offspring / eq; many generations / eq;		4
(d)	several / use more than one / sample / repeat / eq; <u>random</u> ; weigh / method of weighing / scales / eq; remove animals / consumers / soil; multiply to total area / scaling;	allow if implicit ignore count / measure biomass ignore average	Max 4
		Total	18

Question number	Answer	Notes	Marks
6	restriction (enzyme); <u>human</u> DNA / gene / allele; ligase; use <u>same</u> restriction enzyme; plasmid; <u>recombinant</u> (DNA/plasmid); <u>vector</u> ; insulin / factor VIII / named protein;	reject lipase	Max 5
		Total	5

Question number	Answer	Notes	Marks
7 (a)	evaporation / loss of water / diffusion; surface of plant / stomata / from leaves / from plant / eq;		2
(b)	stop water loss (from soil) / stop evaporation (from soil) / water can only be lost through plant / eq;	ignore prevent water into soil	1
(c)	<u>kinetic</u> energy; molecules move faster / eq; stomata; open in light / close in dark; diffusion / evaporation / transpiration;	ignore guard cells	4
		Total	7

Question number	Answer	Notes	Marks
8 (a) (i)	lungs;		1
(ii)	diaphragm;	allow phonetic spelling	1
(iii)	trachea / windpipe;	eg dyaphram	1
(iv)	bronchus / bronchi;	ignore bronchioles / ignore right and left	1
(b)	balloons inflate / air into balloons / eq; <u>volume</u> (in model) increases / more space (in model) / eq; <u>pressure</u> decreases / eq;	ignore vacuum ignore area	3
(c)	(no) ribs / ribcage; (no) (intercostal) muscles; (no) pleural membranes; (no) movement (of chest) / up and out / expansion;	allow converse	2
(d)	1 rest <u>and</u> exercise / range of exercise / jog and run / eq; 2 (how) count breaths / how many breaths / amount of breaths / volume / eq; 3 for time / seconds / minutes / eq; 4 quantification of exercise / jog for 5 minutes / do 10 press ups; 5 repeat (for reliability);	1 allow if implied 2 ignore measure breathing - need method 3 is measure rate mark not exercise quantified 5 allow average	4
		Total	13

Question number	Answer	Notes	Marks
9 (a)	faeces / stool / urine / urea / ammonia / carbon dioxide / eq;	ignore <u>excretion</u> / poo	1
(b) (i)	(maintain) oxygen; (less) decomposition / respiration; bacteria / fungi / microbes / eq;	allow respiration for fish or bacteria ignore disease	2
(ii)	less nutrients / algal growth / eutrophication / eq; kill/less bacteria / pathogens / microbes / eq; (less) disease / infection;	reject kill viruses ignore healthy	2
(c)	bacteria / fungi / microbes / eq; decompose(rs) / decay / rot / breakdown / eq; mineral ions / nutrients / named mineral ion / nitrate / eq; amino acids / proteins; respiration (by bacteria); carbon dioxide; photosynthesis;	ignore fertiliser	Max 4
(d)	separate species / nets / cages / fences / shooting / eq;	ignore intraspecific ignore feed lots separate = 0	1
		Total	10

Question number	Answer	Notes	Marks
10 (a)	1 ZZ ZW; (gender must be clear) 2 Z Z (and) W; 3 ZZ ZW; 4 male female;	X and Y alone = 0 allow 2 and 3 in Punnett square and 1 and 4 if labelled	4
(b) (i)	protein; amino acids / muscles / bone / enzymes / cells / tissues / eq; (ii) fats / lipids / cholesterol / (named) carbohydrate; energy / cell membrane; (iii) respiration; (less) dehydration / eq; protection / less chance of breaking / prevents cracking / eq; cheese / fish / eggs / milk / low-fat spreads / yoghurt / liver / carrots / sweet potatoes / eq; immunity / vision (in dim light) / healthy skin / bone <u>metabolism</u> / gene transcription / embryo development / eq;	ignore calcium ignore vitamins	2 Max 1 2
(c)	meiosis; gametes / sex cells / sperm <u>and</u> egg; haploid / n / half / 23; fertilization / fuse / combine / join / eq; diploid / 2n / full set / 46;		Max 3
		Total	12

Question number	Answer	Notes	Marks
11	<u>nucleus</u> from body cell / <u>nucleus</u> from adult cell / <u>nucleus</u> from adult / eq; egg / ovum; remove nucleus (from egg) / enucleate (from egg); nucleus into (empty) <u>egg</u> cell; electricity; <u>mitosis</u> ; <u>embryo</u> ; uterus / womb; <u>surrogate</u> (mother);		Max 5
		Total	5

Question number	Answer	Notes	Marks
12 (a)	vessel entering is wider / eq; (increased) <u>pressure</u> ; <u>ultrafiltration</u> ;	ignore thicker ignore references to capillary structure	2
(b)	capillary / capillaries;		1
(c) (i)	active transport / active uptake; low to high concentration / against conc. gradient / eq; energy / ATP;	reject if in list	2
(ii)	respiration; energy / ATP; osmotic effect;		Max 2
		Total	7

Question number	Answer	Notes	Marks
13 (a)	right; atrium <u>and</u> ventricle;	allow plural of atria and ventricles	2
(b) (i)	X same <u>and</u> Y up;		1
(ii)	right and left side separate / septum / aorta connected to the left side / no water in LHS / eq;		1
		Total	4

Question number	Answer	Notes	Marks
14	pancreas / Islets of Langerhans / eq; insulin; lower levels; glycogen;		Max 3
		Total	3

Question number	Answer	Notes	Marks
15	C different calcium / range of calcium / eq; O same age / strain / species / gender / eq; R several rats / different groups / eq; M1 mass / eq; M2 one day plus / eq; S1 + S2 same mass food / type of food / diet / water / same cage / temperature / eq;		6
		Total	6
		Total for paper	120

Further copies of this publication are available from
Edexcel Publications, Adamsway, Mansfield, Notts, NG18 4FN

Telephone 01623 467467
Fax 01623 450481
Email publication.orders@edexcel.com
Order Code UG035495 Summer 2013

For more information on Edexcel qualifications, please visit our website
www.edexcel.com

Pearson Education Limited. Registered company number 872828
with its registered office at Edinburgh Gate, Harlow, Essex CM20 2JE

Ofqual




Llywodraeth Cynulliad Cymru
Welsh Assembly Government

