edexcel

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

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>1 (a)</td><td>
<table>
<tr><th>Group</th><th>Example</th></tr>
<tr><td>animals</td><td>human / eq;</td></tr>
<tr><td>fungi</td><td>Mucor / eq;</td></tr>
<tr><td>bacteria</td><td>Lactobacillus / Pneumococcus / Salmonella / eq;</td></tr>
<tr><td>protoctists</td><td>Amoeba / Chlorella / Plasmodium / seaweed / algae / eq;</td></tr>
</table>
</td><td>allow mammals / birds / eq
allow mushroom / yeast / mould
toadstool / ignore named disease / athlete’s foot
ignore malaria</td><td>4</td></tr>
<tr><td>(b)</td><td>
<table>
<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>
<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>protoctists</td><td>(none)</td><td>all</td><td>(some)</td><td>some;</td></tr>
</table>
</td><td></td><td>3</td></tr>
</table>

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 flagellum;	ignore reference to shape and reproduction ignore nucleus / Golgi / mitochondria / eq	1
(ii)	tobacco mosaic / AIDS / influenza / any correct flu / cold / measles / 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)	osmosis;	ignore diffusion	1
		Total	**6**

<table>
<tr><th>Question number</th><th>Answer</th><th>Notes</th><th>Marks</th></tr>
<tr><td>3</td><td>
<table>
<tr><th>event</th><th>letter</th></tr>
<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>
</table>
</td><td>only give mark if correct letter(s) given
one correct and one wrong = 0
allow lower case letters</td><td>5</td></tr>
<tr><td></td><td></td><td>Total</td><td>5</td></tr>
</table>

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; random; 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); human DNA / gene / allele; ligase; use same restriction enzyme; plasmid; recombinant (DNA/plasmid); vector; 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)	kinetic 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; volume (in model) increases / more space (in model) / eq; pressure 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 and 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;	ignore calcium ignore vitamins	2
(ii)	fats / lipids / cholesterol / (named) carbohydrate; energy / cell membrane;		Max 1
(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;		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	nucleus from body cell / nucleus from adult cell / nucleus from adult / eq; egg / ovum; remove nucleus (from egg) / enucleate (from egg); nucleus into (empty) egg cell; electricity; mitosis; embryo; uterus / womb; surrogate (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 and ventricle;	allow plural of atria and ventricles	2
(b) (i)	X same and 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

Rewarding Learning