

Biology B

General Certificate of Secondary Education

Unit **B631/02**: Modules B1, B2, B3 (Higher Tier)

Mark Scheme for June 2011

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of pupils of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, OCR Nationals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

It is also responsible for developing new specifications to meet national requirements and the needs of students and teachers. OCR is a not-for-profit organisation; any surplus made is invested back into the establishment to help towards the development of qualifications and support which keep pace with the changing needs of today's society.

This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by Examiners. It does not indicate the details of the discussions which took place at an Examiners' meeting before marking commenced.

All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

© OCR 2011

Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annesley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

- 1 The **Abbreviations, annotations and conventions** used in the detailed Mark Scheme are:

/	= alternative and acceptable answers for the same marking point
(1)	= separates marking points
not	= answers which are not worthy of credit
reject	= answers which are not worthy of credit
ignore	= statements which are irrelevant
allow	= answers that can be accepted
()	= words which are not essential to gain credit
—	= underlined words must be present in answer to score a mark
ecf	= error carried forward
AW	= alternative wording
ora	= or reverse argument

Question			Expected Answers	Marks	Additional Guidance
1	a	i	retina (1)	1	allow rods / cones
		ii	sensory (neurones) (1)	1	
	b	i	an alternative version of a gene / AW (1)	1	not different genes allow examples eg T and t are alleles for height
		ii	they are different (1)	1	allow e.g. Rr allow one is dominant one is not allow one allele is faulty, one is not allow have (two) different alleles
Total				4	

Question			Expected Answers	Marks	Additional Guidance
2	a	i	carbon monoxide (1)	1	allow CO not Co
		ii	(it is the chemicals in the) tar that cause (lung) cancer / less chance of cancer (1)	1	allow reference to other valid diseases eg emphysema / bronchitis / COPD
	b	i	synapse (1)	1	
		ii	by the diffusion of (neuro) transmitters (1)	1	allow named transmitter
	c	the higher the number of cigarettes smoked the smaller the birth weight / mass / ora (1) idea of considerable variation / scattering of results (1)		2	allow negative correlation / inversely proportional
Total				6	

Question		Expected Answers	Marks	Additional Guidance
3	a	contains most / more vitamin C (1)	1	ignore has a lot of vitamin C 'has most iron and vitamin C' = 0 (con) allow most / more vitamin
	b	RDA is 39(g) (1) diet gives her 45(g) (1)	2	allow diet gives 6(g) more than RDA (2) if just give 39 and 45 (1)
	c	they contain all the essential amino acids / the amino acids that the body can't make (1)	1	ignore they contain more amino acids / they are first class proteins / contains amino acids that are needed
	d	idea that may lead to low self-esteem / poor self image / depression / AW (1) may lead to poor diet / deficiencies / anorexia (1)	2	ignore simply the idea that people may think they need to lose weight allow underweight allow may lead to extreme diets / surgery allow girl in advert is young / advert is targeting young people (1)
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
4	a		2	<p>four correct = 2 marks</p> <p>two / three correct = 1 mark</p> <p>one correct = zero</p> <p>more than 4 lines deduct 1 mark for each extra line (min zero)</p>
	b	tick in second box (1)	1	
	c	concave (lenses) (1)	1	<p>allow diverging (lenses)</p> <p>allow correct diagram</p>
		Total	4	

Question		Expected Answers	Marks	Additional Guidance	
5	a	backbone (1) milk (1) binomial / scientific (1)	3	allow vertebrae / spine / internal skeleton / bony skeleton but not (spinal) cord allow fur / live young / mammary glands allow Latin / species / specific	
	b	i	idea of fish quota (1)	1	allow reduce pollution in sea / water allow protect habitat / fewer trawlers / fewer fishing boats / larger holes in net / fish farms / exclusion zones / return smaller fish / reduce fishing season / fish somewhere else / captive breeding / catch alternative species ignore ban fishing ignore just 'breed' BUT allow breeding programme
	b	ii	idea of one country setting a quota / net size / exclusion zone but another ignores it (1)	1	allow countries need to agree on total catch then divide it fairly allow idea that sea is not owned by any one country (so none has more rights than another) allow idea that one country won't make a difference
Total			5		

Question		Expected Answers	Marks	Additional Guidance
6	a	3.0 (2) but if answer is incorrect total = 24 or incorrect total ÷ 8 (1)	2	allow 3 (2) allow if nothing written on answer lines look in table
	b	i	2	eg the dog whelks will be where their food is eg they dry out because uncovered longer ignore just it's wetter nearer the sea (ie need consequence for whelks) ignore human impact ignore pollution
	b	ii	2	allow small quadrats / small number of results allow not enough results / repeats / samples / quadrats allow reasons for small sample size eg tide came in too fast to count them all allow only sampled at one time of day / year
		Total	6	

Question	Expected Answers	Marks	Additional Guidance
7	any two from: feathery stigma (1) to catch pollen (1) small / light pollen (1) to float in the wind (1)	2	allow two descriptions allow one description (1) and an associated explanation (1) not explanation marks only allow pollen not sticky (1) individual grains can be blown away (1) allow anthers hang out (1) so pollen caught in wind (1) allow stigmas hang out (1) to catch pollen (1) allow no petals (1) so wind can easily blow pollen away (1) ignore any references to seeds
	Total	2	

Question			Expected Answers	Marks	Additional Guidance
8	a	i	<p>correct formula and balanced (2) $6\text{CO}_2 + 6\text{H}_2\text{O} \longrightarrow (\text{C}_6\text{H}_{12}\text{O}_6) + 6\text{O}_2$ either order but correct formula (1) correct balancing (1)</p>	2	<p>balance mark dependent on correct formula BUT allow one mark for correct balanced equation with incorrect use of lower case for C and O e.g. $6\text{Co}_2 + 6\text{H}_2\text{o} \longrightarrow (\text{C}_6\text{H}_{12}\text{O}_6) + 6\text{O}_2$</p>
	a	ii	<p>cellulose (1) for cell walls / support (1) OR fats / oils (1) for storage / water proofing / buoyancy (1) OR protein (1) for growth / repair (1)</p>	2	<p>use must match named molecule to award second mark</p> <p>ignore starch (in question)</p> <p>allow makes leaves / makes new roots etc as alternative to growth</p> <p>allow other molecules eg chlorophyll / amino acids / vitamins / sucrose plus correct use</p> <p>sugar / glucose = 0 but can award second mark for energy / respiration / make ATP / active transport / make nectar (1)</p>
	b		<p>preserved in amber / peat bog / tar pits / ice (1)</p>	1	<p>allow glaciers / tree sap / frozen ignore casts / impressions / desiccated ignore swamps ignore description of conditions e.g. lack of oxygen / microbes ignore implication that humans responsible e.g. put in freezer / mummify</p>
Total				5	

Question		Expected Answers	Marks	Additional Guidance
9		<p>longer the tooth / tusk more likely to breed / mate (1)</p> <p>inheritance of longer tooth or tusk / bigger tusks more frequent in population (1)</p>	2	<p>ignore longer the tooth / tusk more likely to attract mate (in question)</p> <p>allow longer tooth / tusk has a selective advantage</p> <p>ignore references to survival</p> <p>eg passed on the longer tooth characteristic</p>
		Total	2	

Question		Expected Answers	Marks	Additional Guidance	
10	a	tick in second box	1	If more than 1 tick, no mark	
	b	i	14 (months)	1	allow +/- half a month
	b	ii	11.1(%) (2) BUT $\frac{5}{45} \times 100$ (1)	2	allow 11 (2)
	b	iii	provides early warning of growth / development problems / ORA (1)	1	allow check baby is growing properly allow Zoë is outside the normal range allow early signs allow more rapid treatment / intervention idea ignore just 'check for problems'
	c	i	radiation / chemicals / spontaneous (1)	1	allow mutagen allow higher level responses: ionising radiation / UV / X ray / gamma / correct carcinogens e.g. tar / cigarette smoke ignore 'drugs'
	c	ii	changes (DNA) base sequence (1)	1	allow specific examples eg C replaced by T ignore alters genes / alters bases / wrong bases allow alters base code / eg C becomes T allow description of chromosome mutations
		iii	change / prevent production of protein (1)	1	allow changes amino acids in protein
		Total	8		

Question		Expected Answers	Marks	Additional Guidance
11	a	diffusion	1	allow higher level descriptions of diffusion
	b	i	2	allow mitochondria release energy / site of respiration / make ATP not digests (cell) wall BUT releases enzymes to digest wall = 1 ignore eats egg membrane
	b	ii	1	meiosis (1) mark phonetically, do not give mark if contains a 't' allow reduction division
	c	haploid	1	allow underlining of haploid
	d	(large) single cell has smaller surface area to volume ratio so reduced movement of substances in and out of the cell (1)	1	
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
12	a	<p>any one from: be sure of characteristics (1)</p> <p>can mass produce if seeds difficult to cultivate (1)</p>	1	<p>allow will always get the same colour flower allow you know what you will get ignore just they're the same allow genetically identical</p> <p>allow can still grow them if seeds difficult to grow</p> <p>ignore cost allow it's quick(er)</p>
	b	<p>i prevent infection OR stop microbes / bacteria / fungi / viruses (1)</p>	1	
		<p>ii auxins (normally) made in tips of shoots / roots (1)</p>	1	<p>allow no tips allow gene (for auxin) switched off</p>
		<p>iii any two from: mitosis (1) chromosomes are copied (1) segregate into 2 groups / each group moves to opposite poles (1)</p>	2	<p>allow chromosomes / DNA replicate / duplicate allow chromosomes separate</p> <p>allow higher level answers with correct reference to chromatids</p>
	c	<p>plant (cells) retain ability to differentiate / form new types OR animal (cells) lose ability to differentiate / form new types (early in development) (1)</p>	1	
		Total	6	

OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

OCR Customer Contact Centre

14 – 19 Qualifications (General)

Telephone: 01223 553998

Facsimile: 01223 552627

Email: general.qualifications@ocr.org.uk

www.ocr.org.uk

For staff training purposes and as part of our quality assurance programme your call may be recorded or monitored

Oxford Cambridge and RSA Examinations
is a Company Limited by Guarantee
Registered in England
Registered Office; 1 Hills Road, Cambridge, CB1 2EU
Registered Company Number: 3484466
OCR is an exempt Charity



OCR (Oxford Cambridge and RSA Examinations)
Head office
Telephone: 01223 552552
Facsimile: 01223 552553