

Mark Scheme for January 2012

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates 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 2012

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

Annotations

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt not given
	error carried forward
	information omitted
	ignore
	reject
	contradiction

Subject-specific Marking Instructions

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

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

Question		Answer	Marks	Guidance	
1	(a)		2	All 3 correct (2) 1 or 2 correct (1)	
	(b)	(i)	3.4/ 0.25 or 3.4/0.50 ² (1) BUT 13.6 (2)	2	allow 14 (2) but not 14.0
		(ii)	addiction (1)	1	more than one answer circled then no marks
		(iii)	check if harmful / see if safe / it may be toxic / check for side effects / get levels of medication or dosage correct / check it works (1)	1	allow they might be dangerous ignore may affect body / organs unless qualified ignore check for faults
		(iv)	animals harmed in testing / ethical idea e.g. cruel to animals (1)	1	answer must refer to negative aspects of animal testing but ignore just 'because it is tested on animals' allow animals may not behave like humans so unreliable ignore unqualified answers e.g. against religious belief
			Total	7	

Question			Answer	Marks	Guidance
2	(a)	(i)	enzymes work best (at 37 °C) / optimum temperature for enzymes (1)	1	answer must refer to enzymes allow not high enough for enzymes to denature ignore 'enzymes can still function'
		(ii)	any two from: vasoconstriction / blood vessels constrict / blood vessels narrow (1) idea that there is less blood near skin surface (1) less heat loss by radiation (1)	2	allow blood vessels get thinner not blood vessels move away from skin surface ignore no blood near skin surface ignore blood flows away from skin ignore blood not flowing as close to skin surface
		(iii)	hypothermia (1)	1	allow phonetic spellings but not hyperthermia
	(b)		2 (hours) (1)	1	
			Total	5	

Question		Answer	Marks	Guidance
3	(a)	(different) age / gender / level of activity / appropriate medical condition like diabetes etc (1)	1	allow religious / ethical beliefs / allergies / vegetarian / vegan ignore different sizes / masses ignore they need different amounts of energy / protein etc without a reason ignore different lifestyles
	(b)	(i)	1	allow motor nerve
		(ii)	2	allow chemical released allow named transmitter e.g. acetylcholine simply 'transmitter diffuses' = 1 only ignore 'it diffuses across synapse' ignore 'impulse travels across' idea 'impulses diffuse across synapse' = 0
	(c)	$C_6H_{12}O_6 + 6O_2 \rightarrow 6CO_2 + 6H_2O$	2	mark for correct formulae (1) mark for correct balancing (1) dependent on 1 st mark
	(d)	reference to (fatigue caused by) lactic acid / lactate (1) BUT break down lactic acid / oxidise lactic acid / move lactic acid to liver (2)	2	ignore description of other changes e.g. pulse rate slowing 'remove lactic acid' = 1 only (for lactic acid)
		Total	8	

Question			Answer	Marks	Guidance
4	(a)	(i)	<p>any one from: climate change (1) pollution (of rainforest) (1) hunting (1)</p> <p>competition for food / space (1)</p> <p>disease (1)</p>	1	<p>ignore habitat destruction allow global warming / acid rain allow increase in predators but ignore just predators</p> <p>allow decrease in prey / food ignore limited resources ignore just 'competition'</p> <p>allow idea of disturbance from felling (1) allow populations become isolated (1) allow not reproducing fast enough / death rate greater than birth rate (1)</p>
		(ii)	<p>any one from: legal protection / stop hunting (1) idea of education of local people (1) captive breeding programs (1) artificial ecosystems / reserves (1)</p>	1	<p>ignore protection of habitat ignore replant rainforest ignore zoos / enclosures / cage ignore 'conservation programs' ignore tourism</p> <p>allow corridors to prevent isolation (1) allow provide food / feeding stations (1)</p>
	(b)		<p>any two from: (provide jobs in / make money from) tourism (1) protects local human food supply (1) (tourist trade may lead to) improvements in water / electricity supplies (1) can use plants for building materials / fuel (1) can use plants for medicines (1) prevents soil erosion (1)</p>	2	<p>ignore simply 'make money' allow for food</p> <p>ignore use plants for resources</p> <p>ignore references to global warming ignore references to attacks by animals</p>
			Total	4	

Question		Answer	Marks	Guidance
5	(a)	142.9 (%) (2) but $1 \div 0.7 \times 100$ (1)	2	allow 143 or 142.86 (2) but 142 (1) allow $1.7 - 0.7 = 1$ (million) OR increase = 1 (million) (1)
	(b)	acid rain (1)	1	allow description of the effects of acid rain eg acidic lakes / trees die / fish in lakes killed / damage buildings or statues allow idea of more sulfurous / sulfuric acid in atmosphere ignore just 'harmful to animals'
	(c)	(i) any three from: can withstand high body temperatures (1) so does not need to sweat / can store heat at night (1) long eye-lashes / bushy (1) stop sand getting into eyes (1) hair lines nostrils / close nostrils (1) to stop sand getting in (1) large feet / wide feet (1) to stop camel sinking into sand / spread out the load (1) can drink large amounts of water (1) so they can travel further without water (1) large surface area to volume (1) to allow more heat loss (1)	3	allow any three correct ideas allow more sets of eyelids / more eye lashes allow flat feet / webbed feet ignore just 'to walk on sand' ignore stores water / fat in hump but allow reference to fat as a food store / source of metabolic water (1) additional marking points: allow (underside) of body less fur / short fur / thin fur (1) so heat is lost more easily (1) or allow longer fur (on upper side) (1) to keep warm at night (1) ignore no fur

Question		Answer	Marks	Guidance
	(ii)	mammal (1)	1	
	(d) (i)	replaced by minerals (1)	1	not replaced by calcium
	(ii)	<p>any two from: idea of acquired characteristics are not passed on / idea of only genetic characteristics being passed on (1)</p> <p>idea of environmental factors not altering the genes / not controlling characteristics (1)</p>	2	<p>answer must refer to current theories not Lamarck's, e.g. 'acquired characteristics are passed on' = 0</p> <p>allow neck length not controlled by environment / neck length is controlled by genes / stretching neck will not affect genes</p>
		Total	10	

Question			Answer	Marks	Guidance
6	(a)	(i)	water + carbon dioxide (1) glucose + oxygen (1)	2	either order allow sugar ignore food ignore light / chlorophyll allow correct symbols / formulae / a mixture of words and formulae (if give formulae then do not need to be balanced)
		(ii)	(starch is) insoluble / (starch) does not dissolve (1)	1	assume unqualified answer refers to starch allow starch does not affect osmosis / water potential ignore simply 'glucose is soluble' ignore starch is a large molecule
	(b)		3 rd box true, all rest false (1)	1	must have 5 ticks in the correct boxes
	(c)		small sample size / only five repeats (1) sample may be unrepresentative (1)	2	ignore references to size of quadrat allow idea that need random placement of quadrats allow sample may be biased ignore simply 'sample size' or 'randomness'
			Total	6	

Question		Answer	Marks	Guidance
7	(a)	undifferentiated cell / unspecialised cell / cell that can become any (type of) cell (1)	1	not just cell that can divide allow a cell that can differentiate ignore cells with no function
	(b)	meiosis (1)	1	allow spelt phonetically (no 't') allow reduction division
	(c)	(idea that) fertilisation restores the correct number of chromosomes / restores diploid number / to prevent there being too many chromosomes after fertilisation (1)	1	allow reference to specific numbers of chromosomes e.g. so fertilised egg has 46 chromosomes allow so fertilised egg has a full set / amount of DNA ignore simply 'they carry half the number of chromosomes' answer has to have some reference to fertilisation / fertilised egg / zygote / embryo
	(d)	the embryos are killed / believe that they have a right to life / ethically wrong / religious objections (1)	1	allow idea that it's unnatural / immoral / against God / 'playing God' allow embryos are living
	(e)	1737 (1)	1	
Total			5	

Question		Answer	Marks	Guidance
8	(a)	aorta (1)	1	more than one answer circled then no marks
	(b)	has to pump blood further / needs to generate more pressure (1)	1	allow has to work harder / pump blood to (whole) body ignore pump more blood / pumps faster
	(c)	(wire must go through the skin) so possible infection (1)	1	allow reference to battery may be damaged / disconnected allow idea of wire disconnecting or breaking ignore ideas that power may fail
Total			3	

Question			Answer	Marks	Guidance
9	(a)	(i)	glucose, fats, oxygen (1)	1	need all three for 1 mark any other substance negates mark
		(ii)	they (diffuse from) a high(er) concentration to a low(er) concentration (1)	1	need reference to concentration allow there is a lower concentration in the foetus allow there is a higher concentration in the mother allow the concentration in the foetus is low but high in the mother
		(iii)	large surface area / rich blood supply / permeable / small distance (between the two blood systems) / (large) concentration gradient (1)	1	allow thin wall but ignore thin cell wall allow one cell thick / thin cells ignore just 'thin' allow counter-current flow (1)
	(b)	(i)	34 / 34.3 / 34.29 (1)	1	allow 34.28571429 not 34.2 or 34.28 or 34.0 (incorrect rounding)
		(ii)	foetal blood has higher percentage of red blood cells (1) idea that oxygen passes from maternal (oxy) haemoglobin to foetal haemoglobin (1)	2	allow foetal blood has higher concentration of Hb allow foetal blood has more red blood cells (per 100cm ³) allow foetal blood has more Hb (per 100cm ³) ignore answer that quotes figures 34 and 50 but makes no comparison not red blood cells pass from maternal blood to foetal blood ignore simply oxygen passes from maternal blood to foetal blood allow high level answer: higher affinity of foetal Hb (1)
			Total	6	

Question		Answer	Marks	Guidance
10	(a)	any two from: (cell) wall / vacuole / chloroplast / starch granules (1)	1	need two answers for one mark ignore cellulose / chlorophyll
	(b)	(positive) phototropism (1)	1	
	(c)	(i) different proteins are made / protein shape is different (1) may be enzymes / structural proteins (that do not work properly) (1)	2	allow no protein made allow idea that growth hormones may be affected
		(ii) tick in second box (1)	1	more than one tick negates a correct response
	(d)	people will get more vitamin A / less people will develop vitamin A deficiency / night blindness / xerophthalmia (1)	1	ignore rice contains vitamin A ignore just 'vitamin A' allow improves vision at night ignore simply improves vision
		Total	6	

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

OCR Customer Contact Centre

Education and Learning

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

© OCR 2012

