

**Biology B**

General Certificate of Secondary Education

Unit **B632/02**: Modules B4, B5, B6 (Higher Tier)

**Mark Scheme for January 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:

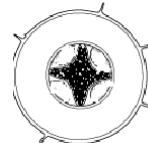
OCR Publications  
PO Box 5050  
Annesley  
NOTTINGHAM  
NG15 0DL

Telephone: 0870 770 6622  
Facsimile: 01223 552610  
E-mail: [publications@ocr.org.uk](mailto:publications@ocr.org.uk)

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

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

Question		Expected Answers	Marks	Additional Guidance
1	(a)	chlorophyll (1) surface (1) stomata / stoma (1)	3	<b>ignore</b> chloroplasts
	(b)	(i) phosphorus (1)	1	<b>not</b> phosphates <b>ignore</b> symbols <b>allow</b> nitrogen / carbon / oxygen / hydrogen (1)
		(ii) (process used) active transport (1)  (needs oxygen) for respiration / <b>release</b> energy / 'pump' minerals (1)	2	<b>allow</b> active uptake (1)  <b>ignore</b> needs / for / creates energy <b>allow</b> because it moves from a lower concentration / AW(1) <b>allow</b> (needs oxygen) to make ATP (1)
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	higher humidity / less water loss(1)	1	<p>must have idea of comparison</p> <p><b>allow</b> no water loss</p> <p><b>allow</b> bag stops water (vapour) escaping / stops water (vapour) moving away</p> <p><b>allow</b> less <b>or</b> no transpiration / moisture loss / evaporation</p> <p><b>ignore</b> bag stops photosynthesis / idea of less gas exchange</p>
	(b)	(i) centre of <b>X</b> in cross at centre (1)	1	<p>anywhere in shaded area</p> <p><b>allow</b> correct label line</p> 
		(ii) hollow (1)  thickened (cell) walls (1)	2	<p><b>allow</b> (narrow) bore (aids capillary rise) / has a lumen (1)</p> <p><b>allow</b> idea it is like a tube / straw (1)</p> <p><b>allow</b> no cross walls (1)</p> <p><b>ignore</b> just holes unless qualified</p> <p><b>allow</b> contain lignin / strong / rigid (1)</p> <p><b>ignore</b> dead / waterproof</p>
	(c)	(i) (+)0.2 4.0 -0.1 3.9	2	<p>4 correct including +/- = 2 marks</p> <p>2 or 3 correct = 1 mark</p>

Question	Expected Answers	Marks	Additional Guidance
	<p>(ii) <b>any two from:</b>  water moves out / lost from the potato(1)   through a partially permeable <b>membrane</b> (1)   water moves from a solution that has a low(er)  (sugar) concentration / ora(1)   or   water moves from a solution that has high(er)  <b>water</b> concentration / ora (1)</p>	<b>2</b>	<p><b>allow</b> semi permeable <b>membrane</b> (1)  <b>ignore</b> semi permeable wall</p> <p>assume concentration refers to sugar concentration unless qualified</p> <p><b>allow</b> water moves from dilute to concentrated solution (1)  <b>but</b> water in the potato moves from dilute to concentrated solution (2)  <b>allow</b> higher level answers e.g. correct idea of water potential (1)</p>
	<b>Total</b>	<b>8</b>	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	may harm other plants / gets into food chain (1)	1	<b>allow</b> may kill his plants <b>allow</b> kills animals / stays in soil for long time <b>allow</b> may damage / harm wildlife <b>allow</b> bioaccumulation <b>ignore</b> bad for / pollutes the environment
	(b)	might not eat the knotweed fast enough / might eat his other plants / might compete with other organisms / might disrupt the food chain (1)	1	<b>allow</b> might not eat all the parts of the plant / might not completely remove knotweed <b>allow</b> might eat <b>useful</b> insects <b>allow</b> might fly away / may be eaten <b>allow</b> insects may become a problem if they have no natural predators / may become a pest <b>allow</b> go out of control  <b>allow</b> takes longer ( than herbicide) <b>but ignore</b> takes time  <b>ignore</b> bad for / pollutes the environment <b>ignore</b> just might not work  <b>not</b> bioaccumulation
	(c)	(i) <b>any two from:</b> microbes / bacteria / fungi / decomposers / saprophytes need oxygen / respire (1)  <b>but</b> microbes / bacteria / fungi / decomposers / saprophytes carry out <b>more</b> respiration (2)  microbes grow at a faster rate (1)	2	<b>ignore</b> germ / viruses <b>ignore</b> detritivores e.g. earth worms <b>allow</b> aerobic bacteria (1)
		(ii) ammonia / ammonium (compounds) (1)  nitrifying (1)	2	<b>allow</b> nitrites (1) <b>allow</b> correct formula (1) <b>allow</b> Nitrosomonas / Nitrobacter
<b>Total</b>			<b>6</b>	

Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	aorta	1	each additional tick loses a mark to max of 1
		(ii)	<p><b>any two from:</b>  less blood flow (1)  less oxygen (carried in blood)(1)  less food (carried in blood) (1)  waste products build up / not removed (1)  (less oxygen / less food means) cells respire less (1)</p>	2	<p><b>ignore no</b> oxygen / blood / food / respiration  <b>unless no</b> oxygen / blood / food / respiration to the heart</p> <p><b>ignore</b> kills heart / heart attack / makes heart work harder</p>
		(iii)	bypass (surgery) (1)	1	<p><b>allow</b> description of bypass surgery e.g. vein transplant  <b>allow</b> angioplasty / stent / /description of process e.g. balloon  <b>allow</b> anti-coagulants / aspirin / warfarin  <b>not</b> artificial heart transplant  <b>ignore</b> just surgery / transplant</p>
	(b)		<p><b>any two from:</b>  shortage of (suitable)donors (leads to long waiting lists) (1)  idea of difficult to find a tissue match (1)  idea of difficult to find a size <b>or</b> age match (1)  more people needing organs (because of obesity/disease from poor lifestyle) (1)</p>	2	<p><b>allow</b> idea that donors have to be dead (1)  <b>allow</b> organ donation is against some people's religion / morals / ethics (1)</p> <p>e.g. more heart disease (1)</p> <p><b>ignore</b> people live longer so fewer hearts available</p>
			<b>Total</b>	<b>6</b>	



Question		Expected Answers	Marks	Additional Guidance
5	(a)	11 (years old) (1)	1	<b>allow</b> +/- half a year (1)
	(b)	$\frac{175 - 142}{4}$ or 33/4 (1) but answer 8.25 (2)	2	<b>allow</b> 8 / 8.3 (2) <b>but</b> 8.2 / 8.30 (1)
	(c)	pituitary (gland)	1	<b>ignore</b> brain <b>ignore</b> endocrine glands
	(d)	(i) <b>any one from:</b> strong(er) (1)  light(er)(1)  can contain bone marrow (1)	1	<b>allow</b> less likely to break (1) <b>ignore</b> less brittle
		(ii) <b>any one from:</b> metal / plastic wears away (1)  bone deteriorates around mechanical replacement / AW (1)	1	<b>allow</b> plastic / metal might break / get damaged (1)  <b>allow</b> body rejects material (1) <b>allow</b> does not grow with you (1) <b>ignore</b> rust / erosion /corrosion / rots /decay
		<b>Total</b>	<b>6</b>	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	oestrogen (1) progesterone (1)	2	
	(b)	<p><b>any two from:</b> it is not a natural process / AW (1)</p> <p>increased chance of multiple births (1)</p> <p>mother <b>or</b> baby at greater risk of ill health (1)</p> <p>increased social pressure (coping with multiple births) / AW (1)</p>	2	<p><b>allow</b> people are against it on moral/religious grounds / not ethical / (1)</p> <p><b>allow</b> may have lots of babies / release more than one egg / eggs wasted (1)</p> <p><b>allow</b> may have side effects for mother <b>or</b> baby (1) <b>ignore</b> mother in danger unless qualified</p> <p><b>allow</b> families may not cope with demands of many babies at same time (1)</p> <p><b>ignore</b> have big families <b>ignore</b> cost unless qualified</p>
		<b>Total</b>	<b>4</b>	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	<p><b>any two from:</b> toxins are removed from blood (1)</p> <p>large molecules / proteins / blood cells are not removed (1) both have to work regularly (1) work at the same temperature (1) both involve diffusion / osmosis (1) both have selective / partially permeable / semi permeable membranes (1) both have homeostatic mechanisms (1) both have large surface area (1)</p>	2	<p><b>allow</b> both remove urea / waste salts / excess water (1) <b>ignore</b> glucose</p> <p><b>ignore</b> they clean the blood / both filter the blood</p> <p><b>ignore</b> reference to pressure</p>
	(b)	<p>glucose / salts must be kept in the blood and not filtered (1)</p> <p>there is no <b>net</b> diffusion (from blood into filtrate or vice versa) (1)</p>	2	<p><b>allow</b> so glucose / salts aren't lost from the blood <b>or</b> so glucose / salts stay in the body (1)</p> <p><b>ignore</b> so they don't diffuse</p> <p><b>allow</b> idea that you don't want to lose too much water from the blood (1)</p> <p><b>ignore</b> reference to blood pressure</p>
		<b>Total</b>	<b>4</b>	

Question			Expected Answers	Marks	Additional Guidance
8	(a)	(i)	provides minerals / nutrients (1)	1	<b>allow</b> improves water-handling <b>allow</b> named minerals / elements <b>ignore</b> fertilisers
		(ii)	25 (1)	1	
		(iii)	they drag the compost under the soil / they aerate the soil / improve drainage / they mix up the soil layers / they neutralise acid soil / increase the surface area of compost (1)	1	<b>ignore</b> just make holes  <b>ignore</b> they eat it  <b>allow</b> breaking down compost
	(b)	(i)	restriction / endonuclease (1)	1	<b>ignore</b> restrictive
		(ii)	<i>Azotobacter / Rhizobium / Clostridium</i> (1)	1	<b>allow</b> Azobacter
			<b>Total</b>	<b>5</b>	

Question			Expected Answers	Marks	Additional Guidance
9	(a)	(i)	lack a (true) nucleus / lack mitochondria (1)	1	<b>allow</b> lacks organelles / has a flagellum <b>allow</b> only have one chromosome  <b>ignore</b> cell wall
		(ii)	<div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><i>Lactobacillus</i> can increase in numbers rapidly.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><i>Lactobacillus</i> cannot move itself around.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;"><i>Lactobacillus</i> does not burst easily.</div> </div> <div style="display: flex; flex-direction: column; align-items: center;"> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">It has a cell wall.</div> <div style="border: 1px solid black; padding: 5px; margin-bottom: 10px;">It does not have a flagellum.</div> <div style="border: 1px solid black; padding: 5px;">It can undergo binary fission.</div> </div>	1	
	(b)	(i)	<b>B</b> (1)	1	
		(ii)	milk / contains (more) lactose (1)  cats cannot digest lactose / are lactose intolerant / cannot make lactase (1)	2	<b>allow</b> idea that yoghurt does not contain lactose e.g. lactose has been changed to lactic acid in yogurt (1)
<b>Total</b>				<b>5</b>	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	bacteria (1)	1	<b>allow</b> <i>Vibrio</i>
	(b)	(i)	1	<b>allow</b> mineral levels / named minerals/ nutrients / fertilisers / pH / carbon dioxide / predation  <b>ignore</b> pollution / temperature
		(ii)	2	<b>allow</b> when temperatures are high there is more cholera (1)
		number of cases of cholera follows the same pattern as ocean temperature / AW (1)  warmer temperature allows more plankton (and so transmit more cholera ) /AW (1)		
		<b>Total</b>	<b>4</b>	

Question			Expected Answers	Marks	Additional Guidance
11	(a)	(i)	LHS glucose (1)  RHS ethanol / alcohol + carbon dioxide (1)	2	<b>allow</b> sugar / fructose / sucrose <b>not</b> yeast + glucose  <b>allow</b> correct symbol equation
		(ii)	4 (1)	1	
		(iii)	the alcohol kills the yeast (1)	1	<b>allow</b> alcohol denatures enzymes <b>but not</b> yeast denature
	(b)	(i)	distillation (1)	1	
		(ii)	it is illegal / needs a licence (1)	1	<b>allow</b> could produce a harmful product  <b>ignore</b> dangerous / harmful  <b>ignore</b> harmful effects of alcohol e.g. cirrhosis
			<b>Total</b>	<b>6</b>	

**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](mailto:general.qualifications@ocr.org.uk)

**[www.ocr.org.uk](http://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**