

Biology B

General Certificate of Secondary Education

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

Mark Scheme for January 2011

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

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

/	= 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
<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

B632/02

Mark Scheme

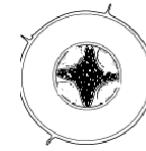
January 2011

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

B632/02

Mark Scheme

January 2011

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

B632/02

Mark Scheme

January 2011

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

B632/02

Mark Scheme

January 2011

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

B632/02

Mark Scheme

January 2011

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

B632/02

Mark Scheme

January 2011

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

B632/02

Mark Scheme

January 2011

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

B632/02

Mark Scheme

January 2011

Question		Expected Answers	Marks	Additional Guidance
7	(a)	any two from: toxins are removed from blood (1) 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)	2	allow both remove urea / waste salts / excess water (1) ignore glucose ignore they clean the blood / both filter the blood ignore reference to pressure
	(b)	glucose / salts must be kept in the blood and not filtered (1) there is no net diffusion (from blood into filtrate or vice versa) (1)	2	allow so glucose / salts aren't lost from the blood or so glucose / salts stay in the body (1) ignore so they don't diffuse allow idea that you don't want to lose too much water from the blood (1) ignore reference to blood pressure
		Total	4	

B632/02

Mark Scheme

January 2011

Question		Expected Answers	Marks	Additional Guidance
8	(a)	(i) provides minerals / nutrients (1)	1	allow improves water-handling allow named minerals / elements ignore 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	ignore just make holes ignore they eat it allow breaking down compost
	(b)	(i) restriction / endonuclease (1)	1	ignore restrictive
		(ii) <i>Azotobacter / Rhizobium / Clostridium</i> (1)	1	allow Azobacter
		Total	5	

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

B632/02

Mark Scheme

January 2011

Question		Expected Answers	Marks	Additional Guidance
10	(a)	bacteria (1)	1	allow <i>Vibrio</i>
	(b)	(sun)light / food levels (1)	1	allow mineral levels / named minerals/ nutrients / fertilisers / pH / carbon dioxide / predation ignore pollution / temperature
	(ii)	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)	2	allow when temperatures are high there is more cholera (1)
		Total	4	

B632/02

Mark Scheme

January 2011

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

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