

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Mark Schemes for the Units

June 2008

J643/MS/R/08

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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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GCSE Gateway Biology B J643

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Mark Scheme Guidance

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

 = underlined words must be present in answer to score a mark

ecf = error carried forward

AW = alternative wording

ora = or reverse argument

B631/01 Unit 1: Modules B1, B2 and B3 Foundation Tier

Question		Expected Answers	Marks	Additional Guidance
1	a	eye (1)	1	
	b	pancreas (1)	1	
	c	liver (1)	1	
	d	ovary (1)	1	
		Total	4	

2	a	virus (1)	1	
	b	mucus is made (1)	1	
	c	(using a) thermometer (1)	1	allow any correct device eg strip (1)
	d	white (blood) cells / phagocytes / lymphocytes (1)	1	not blood cells
	e	athlete's foot M cholera M cystic fibrosis I sickle-cell anaemia I	2	all correct = 2 3 correct = 1
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
3	a	<p>Nick's heart beats faster</p> <p>Nick breathes faster</p> <p>Nick's muscles respire faster</p> <p>This removes more carbon dioxide from his lungs</p> <p>This supplies his muscles with more glucose</p> <p>This releases more energy from his food</p>	2	two or three correct = 2 one correct = 1
	b	pulse rate recovery time (1)	1	
	c	i	2	allow correct formulae allow sugar ignore balancing
		ii	1	allow anaerobic respiration / oxygen debt (1) ignore there is no oxygen getting to the muscles
		Total	6	

Question		Expected Answers	Marks	Additional Guidance	
4	a	(lung) cancer / bronchitis / emphysema (1)	1	allow asthma / COPD (1) not smokers cough	
	b	i	65 (years) (1)	1	allow +/- one year
		ii	any two from: efficiency of the lungs will not decline so rapidly (1) will become disabled at an older age / less likely to die from lack of lung efficiency (1) will not recover to become as efficient as a non-smoker (1) quantitative mark i.e. when they become disabled (85 years old) or how much longer they stay ok for (20 years) (1)	2	ignore efficiency of the lungs will improve allow longer life expectancy / stay healthy for longer not will prevent any disabilities
Total			4		

Question		Expected Answers	Marks	Additional Guidance
5	a	they are endangered (1)	1	
	b	food / water / shelter / place to breed (1)	1	allow correctly named food / habitat / territory
	c	i	1	allow monocular vision (1) ignore good vision / hearing / sense of smell
		ii	1	need qualified answer i.e. sharp claws / hooked beak ignore good vision / hearing / sense of smell
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
6	a	the place where they / animal / plant lives (1)	1	allow home
	b	frog (1)	1	
	c	net (1)	1	
	d	bars correctly drawn at 3, 2, (0), 2, (2)	2	deduct one mark for each error allow +/- half a square
	e	fewer animals / species / no water boatman (in pond b) (1)	1	allow found less
Total			6	

7	a	oxygen (1)	1	
	b	faster in winter (1)	1	
	c	cellulose (1) for cell walls (1) OR fats / oils (1) for storage / water proofing / buoyancy (1) OR protein (1) for growth / repair (1)	2	allow other molecules e.g. chlorophyll / amino acids / vitamins / water / carbon dioxide plus correct use allow sucrose but not sugar use must match named molecule to award second mark but always allow energy / respiration / make ATP (1) allow makes leaves / makes new roots etc as alternative to growth ignore transport
	d	(to release) energy (1)	1	allow use of energy such as active uptake / make ATP ignore to stay alive not energy for photosynthesis / to make food
Total			5	

Question		Expected Answers	Marks	Additional Guidance
8	a	have a common ancestor (1)	1	allow Perissodactyl is related to both / both come from Perissodactyl
	b	body covered in sediment / mud / sand / silt / ice / peat / tar / resin / amber (1) plus max one from: soft parts decay (1) hard parts don't decay or decay slowly (1) hard parts replaced by minerals (1) sediments become rocks (1)	2	ignore earth / rocks / soil / dirt allow bone or shell for hard parts allow hard parts remain 'bones become rock' = 0 'mud hardens' = 0
	c	i	1	allow eats wax ignore just cleans
		ii	1	allow mutualism / symbiosis
		Total	5	

9	a	right side pumps blood to lungs (1)	1	
	b	i	1	
		ii	1	mark b(i) and b(ii) independently allow make blood flow in the correct direction/ one direction ignore stop flow
	c	i	1	allow sheep
		ii	1	examples: unnatural / against God / against their beliefs ignore cruel / unfair / harmful 'health problems' = 0 allow all (may be) susceptible to same disease(s)
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
10	a	chloroplast (1) vacuole (1)	2	
	b	any two from: cut piece / skin / slice / epidermis (with knife) (1) place on (microscope) slide (1) add a drop of iodine solution (1) lower cover slip over / put cover slip on (1)	2	allow other valid stains e.g. methylene blue
Total			4	

11	a	nucleus (1)	1	
	b	i	speeds them up / changes their rate (1)	1 allow catalyses them (1) ignore reference to digestion
		ii	flowering / fruit / seed development (1)	1 allow high level answers such as apical dominance / leaf fall ignore growth references or tropisms
	c	A (1) DNA / sample / fingerprint / pattern is the same (as DNA from crime scene) (1)	2	note 2 marks for question need A to get second marking point ignore 'it's the same', 'they are the same', 'same match' ignore genes are in the same places
Total			5	

Question		Expected Answers	Marks	Additional Guidance
12	a	spartan (1)	1	
	b	cannot be machine harvested / picking more labour intensive (1)	1	allow <u>only</u> medium sized / not large / crop at same time as other varieties
	c	bluecrop and toro / spartan and toro (1)	1	
	d	i	2	
		ii	1	allow expensive / technically difficult ignore time consuming allow unknown consequences ignore ethical argument / may go wrong / may not work / harmful allow could be harmful / maybe harmful ignore mutations
		Total	6	
		Section Total	60	

B631/02 Unit 1: Modules B1, B2 and B3 Higher Tier

Question			Expected Answers	Marks	Additional Guidance
1	a	i	liver (1)	1	
		ii	liver and pancreas (1)	1	either order but must have both
		iii	eye (1)	1	
	b		some of the genes are switched off / only some of the genes are switched on (1)	1	allow alternative wording for gene e.g. code / DNA
			Total	4	

2	a	i	LHS = glucose (1) RHS = water (1)	2	allow sugar allow correct formulae ignore balancing
		ii	(muscles) cannot get enough oxygen (1)	1	allow anaerobic respiration / oxygen debt ignore there is no oxygen getting to the muscles
	b		1 st box / cyclist C is healthier than cyclist A (1)	1	more than one tick = 0
	c		liver (1)	1	
			Total	5	

Question		Expected Answers	Marks	Additional Guidance
3	a	65 (years) (1)	1	allow +/- one year
	b	<p>any two from:</p> <p>efficiency of the lungs will not decline so rapidly (1)</p> <p>will become disabled at an older age / less likely to die from lack of lung efficiency (1)</p> <p>will not recover to become as efficient as a non-smoker (1)</p> <p>quantitative mark i.e. when they become disabled (85 +/- 1 years old) or how much longer they stay ok for (20 +/-2 years) (1)</p>	2	<p>ignore efficiency of the lungs will improve</p> <p>allow longer life expectancy / stay healthy for longer</p> <p>not will prevent any disabilities</p>
		Total	3	

Question			Expected Answers	Marks	Additional Guidance									
4	a	i	a change in the base sequence / base code / DNA / gene / chromosome / chromosome number (1)	1	ignore simply change in code / information allow DNA damaged									
		ii	cell unable to make the protein / enzyme OR cell makes a faulty protein / enzyme (1)	1	allow make different / wrong protein allow not enough protein made									
	b	(digested in) small intestine / ileum (1) by lipase (1) (bile) increases the surface area of the droplets / breaks large droplets into small droplets / emulsifies (1)	3	allow intestine / duodenum not large intestine e.g. stomach and intestine = 0 'lipase digests fatty acids' = 0 but 'lipase digests fatty acids in small intestine' = 1 (i.e. only penalise for fatty acid error once) allow neutralise (acid / contents from stomach)										
	c	i	it is recessive (1)	1	ignore not dominant allow need 2 (alleles) to show disorder									
		ii	25% / 0.25 / $\frac{1}{4}$ / 1 in 4 / 1:3 (2) <table border="1" style="margin-left: auto; margin-right: auto;"> <tr> <td></td> <td>N</td> <td>n</td> </tr> <tr> <td>N</td> <td>NN</td> <td>Nn</td> </tr> <tr> <td>n</td> <td>Nn</td> <td>nn</td> </tr> </table> (1)		N	n	N	NN	Nn	n	Nn	nn	2	correct answer, no / incorrect working = 2 not 1:4 / 1 in 3 / $\frac{1}{3}$ if probability is incorrect then diagram must be fully correct for 1 mark allow the two rows reversed (i.e. row beginning with n to come first) allow nN
	N	n												
N	NN	Nn												
n	Nn	nn												
Total				8										

Question		Expected Answers	Marks	Additional Guidance
5	a	cellulose (1) for cell walls (1) OR fats / oils (1) for storage / water proofing / buoyancy (1) OR protein (1) for growth / repair (1)	2	allow other molecules e.g. chlorophyll / amino acids / vitamins / water / carbon dioxide plus correct use allow sucrose but not sugar use must match named molecule to award second mark but always allow energy / respiration / make ATP (1) allow makes leaves / makes new roots etc as alternative to growth ignore transport
	b	(to release) energy (1)	1	allow use of energy such as active uptake / make ATP ignore to stay alive not energy for photosynthesis / to make food
	c	A - light is the limiting factor / limits rate OR CO ₂ / temperature is not limiting (1) B - light is not the limiting factor / does not limit the rate OR CO ₂ / temperature is limiting rate (1)	2	maximum 1 mark if don't include light ignore water
		Total	5	

Question		Expected Answers	Marks	Additional Guidance	
6	a	have a common ancestor (1)	1	allow Perissodactyl is related to both / both come from Perissodactyl	
	b	body covered in sediment / mud / sand / silt / ice / peat / tar / resin / amber (1) plus max one from: soft parts decay (1) hard parts don't decay or decay slowly (1) hard parts replaced by minerals (1) sediments become rocks (1)	2	ignore earth / rocks / soil / dirt allow bone or shell for hard parts allow hard parts remain 'bones become rock' = 0 'mud hardens' = 0	
	c	genes / chromosomes (1)	1	ignore DNA / double helix	
	d	i	mutualism / mutualistic (1)	1	allow symbiosis allow mutual relationship ignore cleaner species
		ii	feed on living organism / host causing harm (1)	1	allow idea that parasite benefits and host is harmed ignore symbiosis
		Total	6		

Question		Expected Answers	Marks	Additional Guidance
7	a	fur / hair / have a placenta / produce milk / mammary glands (1)	1	allow give birth to live young but "live young" = 0, 'give birth to young' = 0 allow external ears ignore warm-blooded / backbone etc
	b	any two from: eat similar / same food OR compete for food (1) live in similar / same habitat OR compete for habitat (1) similar / same role (1)	2	just 'compete' = 0 allow same place / shelter / correct named habitat e.g. trees ignore environment / ecosystem if don't get 1 st or 3 rd mark, allow play same part in a food web ignore idea that look similar
	c	any two from: they can feed on unripe acorns / digest acorns <u>better</u> / eat food reds do not eat (i.e. nuts/flowers/shoots/fruit/roots) / ORA (1) they have (access to) more food / feeding season lasts <u>longer</u> / ORA (1) idea that some of the food eaten by red squirrel is not found in oak wood (1)	2	assume unqualified answer (e.g. 'they') refers to greys note comparatives, i.e. 'better', 'longer' ignore greys have greater variety of food 'reds have less food' = 1 'reds have no food' = 0
		Total	5	

Question			Expected Answers	Marks	Additional Guidance
8	a	i	leave enough to reproduce (and maintain species) (1)	1	allow increase in numbers
		ii	restrict season / restrict fishing area / nets with large holes (1)	1	allow fish farming / protect (breeding) areas / captive breeding / education / artificial ecosystem / legal protection / keep in captivity allow only catch older / larger fish ignore idea of total (fishing) ban ignore simply 'conservation programme'
	b		any two from: other countries may keep fishing (1) people may fish illegally (1) habitat destruction (1) disease (1) pollution (1) global warming (1) lack of food (1) too late to recover / population too small to recover (1)	2	if 1 st or 2 nd mark not given, allow fishing still occurs ignore simply 'environmental change' allow competition for food between cod allow interruption to food chain ignore not breeding enough ignore predators / competitors
Total				4	

Question			Expected Answers	Marks	Additional Guidance
9	a	i	<u>semi-lunar</u> (valve) (1)	1	
		ii	prevent backflow (1)	1	mark (i) and b(ii) independently allow make blood flow in the correct direction / one direction ignore stop flow
	b		has to pump blood further / round (whole) body / at <u>high</u> er pressure / pump <u>hard</u> er (1)	1	allow reverse argument applied to right ventricle assume unqualified answer refers to left ventricle ignore simply it's stronger 'blood at high pressure' = 0
	c		need to wait for a (suitable) donor / shortage of donors / need correct size / need correct tissue type (1)	1	allow poor funding of NHS / lack of resources allow fewer people die with healthy hearts allow need wait for right heart ignore need to wait for someone to die ignore blood group
Total				4	

Question		Expected Answers	Marks	Additional Guidance
10	a	nucleus removed from egg (cell) of sheep (A) (1) nucleus from body cell / sheep B placed in egg (cell) (1) egg (cell) implanted / put into surrogate sheep (1)	3	award no marks at all if completely wrong context, e.g. selective breeding ignore embryo 'body cell and egg cell put into surrogate' = 0
	b	B because the DNA / genes / chromosomes came from sheep B (1)	1	correct sheep and explanation for 1 mark ignore nucleus ignore codes / information with no reference to genes
	c	religious or ethical suggestion / disease risk linked to transplanted organs / money could be better spent on new medicines / reduces variation / possible abnormalities or premature aging (1)	1	examples: unnatural / against God / against their beliefs ignore cruel / unfair / harmful 'health problems' = 0 allow all (may be) susceptible to same disease(s)
Total			5	

11	a	A (1) DNA / sample / fingerprint / pattern is the same (as DNA from crime scene) (1)	2	note 2 marks for question need A to get second marking point ignore 'it's the same', 'they are the same', 'same match' ignore genes are in the same places
	b	copied (many times) / amplified / PCR OR add (restriction) enzyme (1) separate fragments / apply electric charge (1)	2	allow endonuclease allow electrophoresis allow apply electricity ignore incorrect mechanism of separation
Total			4	

Question	Expected Answers	Marks	Additional Guidance
12 a	chloroplast / vacuole / (cell) wall (1)	1	ignore chlorophyll
b i	(vitamin) A (1)	1	
ii	provides them with a vitamin normally missing from their diet / prevents deficiency disease (1)	1	ignore better diet / gives the vitamins they need ignore 'provides vitamin A' allow provides extra vitamin A / extra vitamins
iii	maybe unexpected (harmful) effects / may escape into the wild / breed with wild plants / could overdose on vitamin A which is toxic (1)	1	allow expensive / technically difficult ignore time consuming allow unknown consequences ignore ethical argument / may go wrong / may not work / harmful allow could be harmful / maybe harmful ignore mutations
	Total	4	

13 a	any two from: large surface area (1) permeable surface (1) blood flow maintains concentration gradient (1) short distance between gut and blood supply / thin wall / wall 1 cell thick (1) microvilli (1)	2	ignore capillaries are permeable ignore simply 'good blood supply' allow thin / 1 cell thick ignore thin cell wall / permeable cell wall ignore many / moist
b	any one from: permeable (wall) / many (of them) / large surface area / narrow / thin wall / wall 1 cell thick plus for exchange of substances / AW (1)	1	need adaptation plus explanation ignore simply 'diffusion' allow thin / 1 cell thick ignore thin cell wall / permeable cell wall
	Total	3	

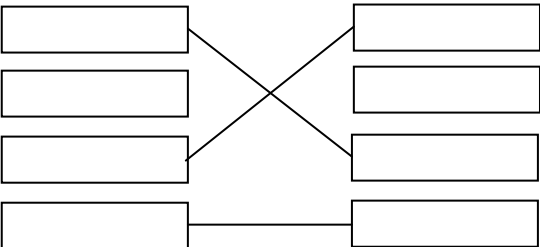
	Section Total	60	
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B632/01 Unit 2: Modules B4, B5 and B6 Foundation Tier

Question		Expected Answers	Marks	Additional Guidance
1	a	bacteria / fungi (1)	1	allow higher level answers e.g. saprophyte or named microbe e.g. mucor, bacilli allow decomposers
	b	i	1	allow higher level answers e.g. microbes multiply more quickly allow more energy / more heat / it is hot(er) ignore more light
		ii	1	allow aerated / (more) air
	c	(no - no mark) won't decay / take long time to decay (1)	1	allow (yes) if they are biodegradable
Total			4	

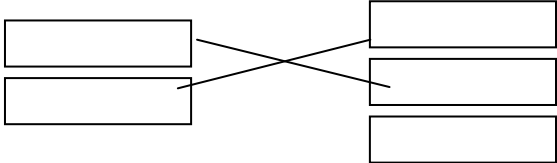
2	a	pesticide (1)	1	more than one answer (0) allow other ways of showing correct answer
	b	using other living things to kill pests (1)	1	allow specific examples e.g. ladybirds to kill greenflies / fungi to kill caterpillars assume it refers to the insects
	c	phosphate (1) potassium (1)	2	lose one mark for every extra answer allow other ways of showing correct answer
Total			4	

Question			Expected Answers	Marks	Additional Guidance
3	a	i	make own food / photosynthesise (1)	1	allow produce food ignore it is at the bottom / start of food change
		ii	(get food) by eating (other things)	1	ignore consumes others ignore hunts
	b	i	110 (kJ) (1)	1	ignore working mark answer on line first, if answer not on line then look for answer in working
		ii	any one from: more through growth because growing more / still growing / growing faster (1) more through heat / respiration because more active / playing (1) less through heat / respiration because less active / not hunting (1) more through heat / respiration because greater SA:vol ratio (1) less through waste because feeding on milk / more digestible food (1)	1	need both difference and explanation e.g. more active = 0 but more through respiration because they are more active (1) assume unqualified answer refers to cubs but allow converse argument if they refer to adults e.g. the adults lose less energy from respiration because they are less active
Total				4	

Question		Expected Answers	Marks	Additional Guidance
4	a	 <p>3 correct (2) 1 or 2 correct (1)</p>	2	if more than 3 lines drawn, deduct 1 mark for each incorrect line (minimum = 0)
	b	<p>any two from:</p> <p>wide / broad / large surface (area) - to absorb light / energy (1)</p> <p>chlorophyll / chloroplasts - to absorb light (1)</p> <p>thin - for gas exchange / absorb CO₂ / release O₂ / diffusion of gases / movement of gases (1)</p> <p>veins - to transport sugar / food / water(1)</p> <p>stomata / pores - for gas exchange / absorb CO₂ / release O₂ / diffusion of gases (1)</p>	2	<p>assume it refers to leaves ignore references simply to flowers / plants ignore photosynthesis in answers since in question</p> <p>allow sunlight / sun's rays but ignore sun ignore flat / big / large leaves allow catch / capture / exposed to / hit by / take in light but ignore attracts light</p> <p>ignore chlorophyll for photosynthesis ignore green allow higher level answers e.g. more chlorophyll near top surface of leaf</p> <p>allow xylem to transport water allow phloem to transport sugar / food ignore phloem to transport water</p> <p>allow correct reference to arrangement i.e. avoid overlapping – to absorb light (1) allow correct reference to orientation i.e. leaves move towards light – to absorb light (1) allow transparent epidermis to allow light to enter leaf (1) ignore cuticle</p>

Question		Expected Answers	Marks	Additional Guidance
4	c	any two from : evaporation (inside leaf) (1) diffusion (outside) (1) through stomata / pores / between guard cells (1)	2	
	d	fewer roots / fewer root hairs / fewer roots / less SA (1) slower / less uptake of water (1)	2	more lost from leaves than taken in by roots = 2 allow it is in a hot place / AW (1) allow over-watering (1) allow no roots (1) so cannot absorb water (1) allow don't get enough water (1) ignore roots are broken of / not many roots ignore nutrients
		Total	8	

Question		Expected Answers	Marks	Additional Guidance
5	a	egg(s) and sperm (1) join together (1)	2	allow higher level answers e.g. nuclei fuse =2 allow ovum / female and male gametes allow sperm enters egg (1) ignore meets e.g. egg and sperm meet =1 but egg and sperm meet and join =2
	b	testis / testes (1)	1	
	c	ovary / ovaries (1)	1	
Total			4	

6	a	68 (per min) (1)	1	
	b	rate increasing between 1 and 3 min (+/- 0.5 minute) (1) rate decreasing to original level at 8 min (+/- 0.5 minute) (1)	2	first mark is for an increase line that stops between 2.5 and 3.5 second mark is for a line that starts to fall between 2.5 and 3.5 and reaches normal level between 7.5 and 8.5 if line continues after 8 it must be a horizontal line at normal level but ignore small dip before returning to normal
	c	 <p>1 mark for each correct line (2)</p>	2	if more than 2 lines drawn deduct 1 mark for each incorrect line (minimum = 0)
Total			5	

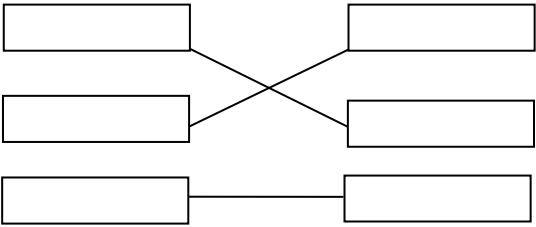
Question			Expected Answers	Marks	Additional Guidance
7	a		bronchiole (1)	1	more than one answer (0)
	b	i	moving air in <u>and</u> out (of lungs) (1)	1	allow ventilation / expiration <u>and</u> inspiration / inhalation <u>and</u> exhalation (1) reject any mention of taking in oxygen and letting out carbon dioxide
		ii	releasing energy (from food / sugar) (1)	1	allow correct word or symbol equation (balancing not necessary) allow oxidation of food not produce / make energy
	c		water / H ₂ O / carbon dioxide / CO ₂ (1)	1	allow water vapour (1)
			Total	4	

Question			Expected Answers	Marks	Additional Guidance
8	a		cartilage (1) ligaments (1) internal (1)	3	more than one answer on a line = 0 for that line
		i	white (blood cell) (1)	1	allow higher level answer e.g. named type of WBC
		ii	red (blood cell) (1)	1	
	c		closely related / similar genes / similar antigens / tissue match / bone marrow not rejected (1) fit / healthy / disease-free (1)	2	allow no moral objections e.g. not a Jehovah's witness allow same (type) of (bone) marrow but similar bone marrow = 0 ignore same blood type / blood group / same age / same size / organ match ignore reference to strong bone allow healthy bone / healthy marrow
		Total	7		

9	a	i	phytoplankton (1)	1	more than one answer (0)
		ii	fungi (1)	1	more than one answer (0)
		iii	bacteria (1)	1	more than one answer (0)
	b		any two from: chemical produced from the fungus / mould (1) which killed bacteria (1) named chemical e.g. penicillin / antibiotic (1)	2	simply 'fungus' = 0, 'bacteria' = 0 ignore 'microbes' fungi kills bacteria = 1 but chemical from fungi kills bacteria = 2 fungus makes penicillin = 2 but fungus is penicillin = 0 allow description of dishes: bacteria-free area around fungus (1)
		Total	5		

Question		Expected Answers	Marks	Additional Guidance
10	a	malted barley (1)	1	more than one answer (0)
	b	carbon dioxide / CO ₂ (1)	1	
	c	fungus / fungi (1)	1	
	d	3 (1)	1	more than one answer (0)
		Total	4	

11	a	digester (1)	1	more than one answer (0)
	b	any animal or plant material / waste (1)	1	allow faeces / dead organisms ignore rubbish
	c	may lack (mains) electricity or gas or sewers / lack of other fuels / fossil fuels too expensive (1)	1	ignore idea of renewable energy source e.g. it is renewable (0) but e.g. it is renewable so can be used because there are no other fuels (1) ignore cheap unless qualified e.g. it is cheaper than fossil fuels (1) e.g. cannot afford fossil fuels (1) allow produce electricity (1) allow to power a machines e.g. generators / cookers (1)
	d	methane / CH ₄ (1)	1	allow carbon dioxide and methane, i.e. ignore carbon dioxide
		Total	4	

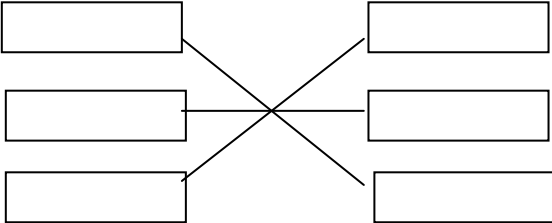
Question		Expected Answers	Marks	Additional Guidance
12	a	alginate (1)	1	more than one answer (0)
	b	it is easier to separate the enzyme from the milk / no need to separate enzyme and milk / milk not contaminated (1)	1	allow enzyme protected in bead / not denatured / not lost allow can reuse enzymes allow filter to get enzyme back but simply 'you can filter it' = 0 ignore works faster / more efficient
	c	to measure the level of glucose in their blood (1)	1	more than one answer (0)
Total			3	
13	a	 <p>3 correct (2) 1 or 2 correct (1)</p>	2	if more than 3 lines drawn, deduct 1 mark for each incorrect line (to minimum = 0)
	b i	transgenic (1)	1	allow genetically modified or GM ignore genetically engineered
	ii	for improved crops / food (1)	1	allow specific examples that are not medicines e.g. to produce organ for donation but ignore transplants
Total			4	
Section Total			60	

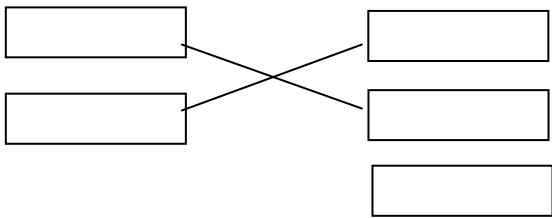
B632/02 Unit 2: Modules B4, B5 and B6 Higher Tier

Question			Expected Answers	Marks	Additional Guidance
1	a	i	(earthworms) feed on / digest / break down leaves / cuttings / waste material(1) increase surface area (for decay) (1)	2	ignore churn up leaves / mixing soil / decay / decompose ignore decomposers break down waste material allow aerate / drainage / (aeration) provides O ₂ for (microbial) respiration (1)
		ii	detritivores (1)	1	if not ringed allow any other unambiguous indication e.g. underlining
	b	i	nitrogen-fixing (bacteria) (1)	1	allow named example e.g. Azotobacter, Clostridium, Rhizobium
		ii	nitrifying (bacteria) (1)	1	allow named example e.g. Nitrosomonas, Nitrobacter
Total				5	

2	a	i	110 (kJ) (1)	1	ignore working mark answer on line first, if answer not on line then look for answer in working
		ii	any one from: more through growth because growing more / still growing / growing faster (1) more through heat / respiration because more active / playing (1) less through heat / respiration because less active / not hunting (1) more through heat / respiration because greater SA:vol ratio (1) less through waste because feeding on milk / more digestible food (1)	1	need both difference and explanation e.g. more active = 0 but more through respiration because they are more active (1) assume unqualified answer refers to cubs but allow converse argument if they refer to adults e.g. the adults lose less energy from respiration because they are less active
	b	i	100 x 40/1000 (1) BUT 4 (%) (2)	2	correct answer, no working (2)
		ii	food is more indigestible / can not digest cellulose (1)	1	ignore respiration ignore zebras are herbivores / eat grass / different food from lions
Total				5	

Question		Expected Answers	Marks	Additional Guidance	
3	a	<p>any two from:</p> <p>wide / broad / large surface (area) - to absorb light / energy (1)</p> <p>chlorophyll / chloroplasts - to absorb light (1)</p> <p>thin - for gas exchange / absorb CO₂ / release O₂ / diffusion of gases / movement of gases (1)</p> <p>veins - to transport sugar / food / water(1)</p> <p>stomata / pores - for gas exchange / absorb CO₂ / release O₂ / diffusion of gases (1)</p>	2	<p>assume it refers to leaves ignore references simply to flowers / plants ignore photosynthesis in answers since in question</p> <p>allow sunlight / sun's rays but ignore sun ignore flat / big / large leaves allow catch / capture / exposed to / hit by / take in light but ignore attracts light</p> <p>ignore chlorophyll for photosynthesis ignore green allow higher level answers e.g. more chlorophyll near top surface of leaf</p> <p>allow xylem to transport water allow phloem to transport sugar / food ignore phloem to transport water</p> <p>allow correct reference to arrangement i.e. avoid overlapping – to absorb light (1) allow correct reference to orientation i.e. leaves move towards light – to absorb light (1) allow transparent epidermis to allow light to enter leaf (1) ignore cuticle</p>	
	b	<p>any two from :</p> <p>evaporation (inside leaf) (1)</p> <p>diffusion (outside) (1)</p> <p>through stomata / pores / between guard cells (1)</p>	2		
	c	i	C (1)	1	
		ii	turgid (1)	1	if not ringed allow any other unambiguous indication e.g. underlining
		Total		6	

Question			Expected Answers	Marks	Additional Guidance
4	a	i	 <p>3 correct (2) 1 or 2 correct (1)</p>	2	if more than 3 lines drawn, deduct 1 mark for each incorrect line (to minimum = 0)
		ii	xylem (1)	1	not phloem, i.e. xylem and phloem = 0
	b		(better) control of minerals / control of disease (1)	1	allow no leaching / no disease ignore references / cost / yield / quality / profit ignore references to water availability / protection from pests
Total				4	

Question		Expected Answers	Marks	Additional Guidance
5	a	rate increasing between 1 and 3 min (+/- 0.5 minute) (1) rate decreasing to original level at 8 min (+/- 0.5 minute) (1)	2	first mark is for an increase line that stops between 2.5 and 3.5 second mark is for a line that starts to fall between 2.5 and 3.5 and reaches normal level between 7.5 and 8.5 if line continues after 8 it must be a horizontal line at normal level but ignore small dip before returning to normal
	b	 <p>1 mark for each correct line (2)</p>	2	if more than 2 lines drawn deduct 1 mark for each incorrect line (minimum = 0)
	c	<p>max two from: SAN (cells) (1) send / generate impulses (1) causing atria to contract / pump blood (1)</p> <p>max two from: AVN (cells) (1) send / generate impulses (1) causing ventricles to contract / pump blood (1)</p> <p>plus idea that (SAN) stimulates (AVN) (1)</p>	3	<p>question max 3</p> <p>ignore signals / messages allow electrical signals / messages ignore electric current</p> <p>allow higher level answers referring to impulses travelling through Purkinje fibres / bundle of His (1)</p>
Total			7	

Question		Expected Answers	Marks	Additional Guidance
6	a	3 rd row / relaxes, contracts (1)	1	
	b	i	1	
		ii	1	allow too much friction / too painful to move / bones rub together allow converse answer written in terms of what synovial fluid does
	c	closely related / similar genes / similar antigens / tissue match / bone marrow not rejected (1) fit / healthy / disease-free (1)	2	allow no moral objections e.g. not a Jehovah's witness allow same (type) of (bone) marrow but similar bone marrow = 0 ignore same blood type / blood group / same age / same size / organ match ignore reference to strong bone allow healthy bone / healthy marrow
		Total	5	

7	a	3.5 (+/- 0.2) (litres) (1)	1	
	b	air that remains in lungs / is not removed from lungs / AW (1)	1	
	c	2 nd row / increases, decreases (1)	1	
	d	1 st box / increased CO ₂ concentration in the blood (1)	1	
		Total	4	

8	a	for (fertilised) egg / zygote / embryo to implant / AW (1)	1	allow attachment to lining / held by lining ignore protection / support / cushioning / settling on lining
	b	increases it (1)	1	ignore maintains lining
	c	any two from maintains lining (1) so embryo can grow / develop / AW (1) avoid miscarriages (1)	2	ignore increases lining allow (fertilised) egg / zygote / baby / foetus ignore simply 'protection'
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
9	a	i	<u>millipedes</u> (1)	1	
		ii	<u>bacteria</u> (1)	1	
	b		any two from: chemical produced from the fungus / mould (1) which killed bacteria (1) named chemical e.g. penicillin / antibiotic (1)	2	<p>simply 'fungus' = 0, 'bacteria' = 0 ignore 'microbes'</p> <p>fungi kills bacteria = 1 but chemical from fungi kills bacteria = 2</p> <p>fungus makes penicillin = 2 but fungus is penicillin = 0</p> <p>allow description of dishes: bacteria-free area around fungus (1)</p>
Total				4	

10	a		transgenic (1)	1	allow genetically modified or GM ignore genetically engineered
	b		<u>restriction</u> (enzyme) (1)	1	
	c		only some of the chicks inherited the gene (1)	1	allow the gene did not always express itself / gene not switched on ignore gene doesn't work not the allele / gene is recessive ignore mutation ignore any reference to mother
Total				3	

Question		Expected Answers	Marks	Additional Guidance
11	a	3 (1)	1	more than one answer = 0
	b	4 (1)	1	more than one answer = 0
	c	any two from: distillation (1) heated so that alcohol evaporate (1) and then condenses (1)	2	allow cools and turns to liquid
Total			4	

Question		Expected Answers	Marks	Additional Guidance
12	a	methane / CH ₄ (1)	1	allow carbon dioxide and methane, i.e. ignore carbon dioxide
	b	2 nd box / enzymes best at a particular temperature (1)	1	
	c	biogas can be produced as fast as it is used (1) natural gas (does pollute because it) increases carbon dioxide levels / biogas does not increase carbon dioxide levels (1)	2	allow we can make (more) biogas allow biogas is renewable allow idea that material in digester is renewable / more can be produced ignore natural gas gives off (more) carbon dioxide allow idea that biogas is carbon neutral
Total			4	
13	a	lactase (1) glucose and galactose (1)	2	not lactose
	b	it is easier to separate the enzyme from the milk / no need to separate enzyme and milk / milk not contaminated (1)	1	allow enzyme protected in bead / not denatured / not lost allow can reuse enzymes allow filter to get enzyme back but simply 'you can filter it' = 0 ignore works faster / more efficient
	c	cats cannot digest lactose / cannot digest the sugar in milk / cannot make lactase / cannot make the enzyme that breaks down the sugar in milk (1) if present they get diarrhoea / wind (1)	2	allow cats are lactose-intolerant allow get gas ignore get ill
Total			5	
Section Total			60	

Grade Thresholds

General Certificate of Secondary Education
Biology B (Specification Code J643)
June 2008 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B631/01	Raw	60	-	-	-	38	32	26	20	14	0
	UMS	69	-	-	-	60	50	40	30	20	0
B631/02	Raw	60	44	37	29	21	15	12	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B632/01	Raw	60	-	-	-	33	26	20	14	8	0
	UMS	69	-	-	-	60	50	40	30	20	0
B632/02	Raw	60	44	36	28	21	15	12	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B635/01	Raw	60	53	49	44	40	35	30	25	20	0
	UMS	100	90	80	70	60	50	40	30	20	0
B636/01	Raw	60	52	47	41	36	30	24	18	12	0
	UMS	100	90	80	70	60	50	40	30	20	0

B635 & B636 - The grade thresholds have been decided on the basis of the work that was presented for award in June 2008. The threshold marks will not necessarily be the same in subsequent awards.

Specification Aggregation Results

Overall threshold marks in UMS (ie after conversion of raw marks to uniform marks)

	Maximum Mark	A*	A	B	C	D	E	F	G	U
J643	300	270	240	210	180	150	120	90	60	0

The cumulative percentage of candidates awarded each grade was as follows:

	A*	A	B	C	D	E	F	G	U	Total No. of Cands
J643	20.6	48.2	72.6	88.6	94.8	97.9	99.2	99.7	100.0	10672

10815 candidates were entered for aggregation this series

For a description of how UMS marks are calculated see:

http://www.ocr.org.uk/learners/ums_results.html

Statistics are correct at the time of publication.

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