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RECOGNISING ACHIEVEMENT

GCSE

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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GCSE Gateway Biology B J643

MARK SCHEMES FOR THE UNITS

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		Nick's heart beats faster → This removes more carbon dioxide from his lungs Nick breathes faster → This supplies his muscles with more glucose Nick's muscles respire faster → This releases more energy from his food	2	two or three correct = 2 one correct = 1
	b		pulse rate recovery time (1)	1	
	c	i	LHS = glucose (1) RHS = water (1)	2	**allow** correct formulae **allow** sugar **ignore** balancing
		ii	(muscles) cannot get enough oxygen (1)	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	**any one from**: eyes at side of head (1) camouflage (1) built for speed / agile / fast / quick reactions (1)	1	**allow** monocular vision (1) **ignore** good vision / hearing / sense of smell
		ii	**any one from**: eyes at front of head / binocular vision (1) sharp claws (1) built for speed / agile / fast / quick reactions (1) hooked beak (1) camouflage (1)	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	removes the insects / reference to prevents deafness / infection / itching (1)	1	**allow** eats wax **ignore** just cleans
		ii	cleaner (species) (1)	1	**allow** mutualism / symbiosis
			Total	**5**	

9	a		right side pumps blood to lungs (1)	1	
	b	i	<u>semi-lunar</u> (valve) (1)	1	
		ii	prevent backflow (1)	1	mark b(i) and b(ii) independently **allow** make blood flow in the correct direction/ one direction **ignore** stop flow
	c	i	Dolly (1)	1	**allow** sheep
		ii	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**	

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	transfer / changing of genes / DNA (1) from one organism to another (1)	2	
		ii	maybe unexpected (harmful) effects / may escape into the wild / breed with wild plant (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	**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		1st 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		**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 +/- 1 years old)) or how much longer they stay ok for (20 +/-2 years) (1)	2	**ignore** efficiency of the lungs will improve **allow** longer life expectancy / stay healthy for longer **not** will prevent any disabilities
			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 / ¼ / 1 in 4 / 1:3 (2) (1)	2	correct answer, no / incorrect working = 2 **not** 1:4 / 1 in 3 / 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
			Total	**8**	

	N	n
N	NN	Nn
n	Nn	nn

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 1st or 3rd 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 better / eat food reds do not eat (i.e. nuts/flowers/shoots/fruit/roots) / ORA (1) they have (access to) more food / feeding season lasts longer / 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 1st or 2nd 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	semi-lunar (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 higher pressure / pump harder (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**	

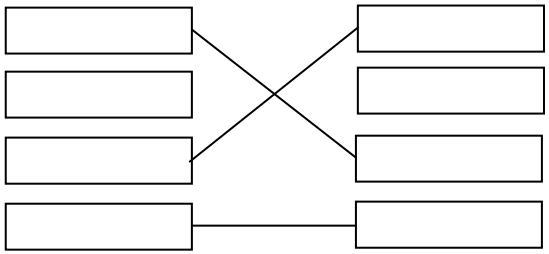
Question			Expected Answers	Marks	Additional Guidance
12	a		chloroplast / vacuole / (cell) wall (1)	1	**ignore** chlorophyll
	b	i	(vitamin) A (1)	1	
		ii	provides them with a vitamin normally missing from their diet / prevents deficiency disease (1)	1	**ignore** better diet / gives the vitamins they 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**	

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	warm(er) (1)	1	**allow** higher level answers e.g. microbes multiply more quickly **allow** more energy / more heat / it is hot(er) **ignore** more light
		ii	(more) oxygen (1)	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**	

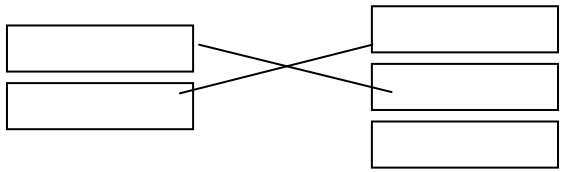
2	a		pesticide (1)	1	more than one answer (0) **allow** other ways of showing correct answer
	b		using other living things to kill pests (1)	1	**allow** specific examples e.g. ladybirds to kill greenflies / fungi to kill caterpillars assume it refers to the insects
	c		phosphate (1) potassium (1)	2	lose 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		 3 correct (2) 1 or 2 correct (1)	2	if more than 3 lines drawn, deduct 1 mark for each incorrect line (minimum = 0)
	b		**any two from**: wide / broad / large surface (area) - to absorb light / energy (1) chlorophyll / chloroplasts - to absorb light (1) thin - for gas exchange / absorb CO_2 / release O_2 / diffusion of gases / movement of gases (1) veins - to transport sugar / food / water(1) stomata / pores - for gas exchange / absorb CO_2 / release O_2 / diffusion of gases (1	2	assume it refers to leaves **ignore** references simply to flowers / plants **ignore** photosynthesis in answers since in question **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 **ignore** chlorophyll for photosynthesis **ignore** green **allow** higher level answers e.g. more chlorophyll near top surface of leaf **allow** xylem to transport water **allow** phloem to transport sugar / food **ignore** phloem to transport water **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

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		 1 mark for each correct line (2)	2	if more than 2 lines drawn deduct 1 mark for each incorrect line (minimum = 0)
			Total	**5**	

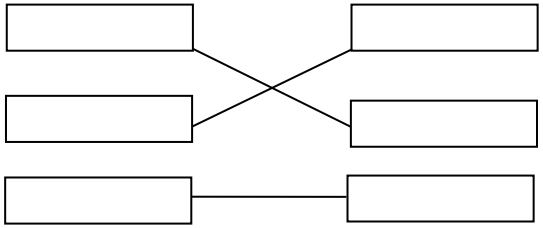
Question			Expected Answers	Marks	Additional Guidance
7	a		bronchiole (1)	1	more than one answer (0)
	b	i	moving air in and out (of lungs) (1)	1	**allow** ventilation / expiration and inspiration / inhalation and exhalation (1) **reject** any mention of taking in oxygen and letting out carbon dioxide
		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_2O / 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
	b	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		 3 correct (2) 1 or 2 correct (1)	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**	

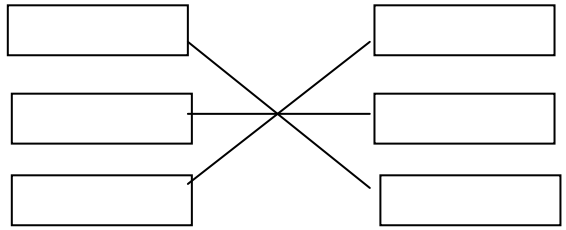
			Section Total	**60**	

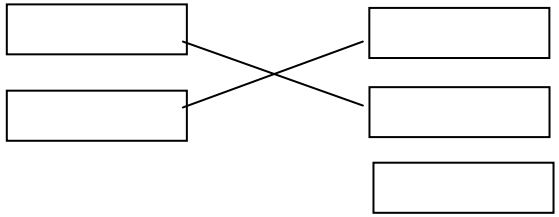
B632/02 Unit 2: Modules B4, B5 and B6 Higher Tier

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		**any two from**:	2	assume it refers to leaves **ignore** references simply to flowers / plants **ignore** photosynthesis in answers since in question
			wide / broad / large surface (area) - to absorb light / energy (1)		**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
			chlorophyll / chloroplasts - to absorb light (1)		**ignore** chlorophyll for photosynthesis **ignore** green **allow** higher level answers e.g. more chlorophyll near top surface of leaf
			thin - for gas exchange / absorb CO_2 / release O_2 / diffusion of gases / movement of gases (1)		
			veins - to transport sugar / food / water(1)		**allow** xylem to transport water **allow** phloem to transport sugar / food **ignore** phloem to transport water
			stomata / pores - for gas exchange / absorb CO_2 / release O_2 / diffusion of gases (1)		**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
	b		**any two from :** evaporation (inside leaf) (1) diffusion (outside) (1) through stomata / pores / between guard cells (1)	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	 3 correct (2) 1 or 2 correct (1)	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		 1 mark for each correct line (2)	2	if more than 2 lines drawn deduct 1 mark for each incorrect line (minimum = 0)
	c		**max two from**: SAN (cells) (1) send / generate impulses (1) causing atria to contract / pump blood (1) **max two from**: AVN (cells) (1) send / generate impulses (1) causing ventricles to contract / pump blood (1) **plus** idea that (SAN) stimulates (AVN) (1)	3	**question max 3** **ignore** signals / messages **allow** electrical signals / messages **ignore** electric current **allow** higher level answers referring to impulses travelling through Purkinje fibres / bundle of His (1)
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
6	a		3rd row / relaxes, contracts (1)	1	
	b	i	cartilage (1)	1	
		ii	lack of lubrication / AW / ORA (1)	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		2nd row / increases, decreases (1)	1	
	d		1st 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	millipedes (1)	1	
		ii	bacteria (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	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	**4**	

10	a		transgenic (1)	1	**allow** genetically modified or GM **ignore** genetically engineered
	b		restriction (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		2nd 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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