OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Mark Scheme for the Units

June 2009

J643/MS/R/09

Oxford Cambridge and RSA Examinations

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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		fat (1)	1	**allow** lipid
	b	i	needs **more** energy / is **more** active / plays **more** sport (1)	1	**need** comparison **ignore** simply 'carbohydrates give energy' **ignore** growth **ignore** he's bigger / older / fitter / stronger
		ii	growing **more** (quickly) / **more** repair (1)	1	**need** comparison **ignore** simply 'proteins needed for growth' **ignore** he's bigger / older / fitter **allow** he's stronger / bigger muscles **allow** in puberty / AW
	c		<u>breathing rate:</u> get oxygen **more** quickly / remove carbon dioxide **more** quickly (1) <u>pulse rate</u>: to get oxygen to the muscles more quickly / transport oxygen more quickly / to remove carbon dioxide from muscles more quickly / transport carbon dioxide more quickly / to get sugar / glucose to the muscles more quickly / transport sugar / glucose more quickly (1)	2	**allow** get **more** oxygen / remove **more** carbon dioxide **allow** get lots of oxygen / remove lots of carbon dioxide simply 'to get oxygen / remove carbon dioxide' = 0 **allow** higher level answers referring to greater rate of respiration **ignore** just 'get oxygen / glucose to muscles' / 'more oxygen' / 'more glucose' **ignore** just 'remove carbon dioxide from muscles' / 'more carbon dioxide' **allow** remove lactic acid from muscles / move to liver **ignore** just 'remove lactic acid' **allow** remove heat from muscles more quickly / get heat to skin more quickly / transport heat more quickly / transport more heat **allow** get more oxygen / sugar / glucose to muscles **allow** get more carbon dioxide / heat from muscles **allow** transport more oxygen / transport more carbon dioxide **ignore** heart is beating faster / working harder

Question			Expected Answers	Marks	Additional Guidance
	d		sweating / more blood flowing close to surface of skin / vasodilation (1)	1	**allow** panting / go red / hairs lay flat / cold drink / (splash) cold water **ignore** drink **allow** conduction / convection / radiation / evaporation
	e	**i**	stop entry of pathogens / micro-organisms / bacteria / viruses (1)	1	**allow** fungi / germs / stop infection / stop going septic / stop getting disease / keep sterile
		ii	clots (1)	1	**allow** forms a scab / coagulates / platelets (form a barrier) **allow** higher level answers e.g. reference to fibrin **ignore** cut heals **ignore** reference to blood cells
			Total	**8**	

Question			Expected Answers	Marks	Additional Guidance
2	a	i	glass (falling) / light (1)	1	**allow** cup
		ii	eye / retina (1)	1	**allow** rods / cones / fovea **not** neurone / optic nerve **ignore** light receptor
		iii	hand / arm / fingers / muscles (1)	1	
	b	i	5 (1)	1	
		ii	drinks contain different concentrations / percentages / strengths (of alcohol) / AW (1)	1	**ignore** whisky has more alcohol than beer / reference to amounts of alcohol / they had different types of drinks
	c		temazepan (1)	1	ticks in more than one box = 0
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
3	a		genes (1) environment (1) environment (1)	3	> 1 tick per line = 0
	b		carry instructions / carry information / code / tell cells what to do / control features / control characteristics (1) DNA (1) on chromosomes / in nucleus (1)	3	**allow** higher level answer: code for protein (1) **allow** higher level answer: made of bases (1) **ignore** in cells DNA made from genes = 1 DNA made from chromosomes = 1 genes made from chromosomes = 0 code for DNA = 1
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
4	a		vertebrates (1)	1	**allow** any unambiguous indication e.g. underlining
	b		eyes at side of head (1) stripes for camouflage (1)	2	mark the answer lines and ignore any other indications if nothing written on answer lines then look if any indication in list
	c		**any one from**: sharp teeth (1) sharp claws (1) camouflage (1) built for speed / (run) fast / strong legs (1) eyes at front of head / binocular vision / able to judge distance (1)	1	**ignore** 'teeth', 'claws', 'good eyesight' **allow** strong / intelligent **allow** features of other predators apart from lions, e.g. sharp beak
	d		hot / dry / desert / named desert / arid (1)	1	
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
5	a	i	find food / to give birth / reproduce (1)	1	**allow** more sheltered / shallower / warmer water / find safety
		ii	(make money from) tourism (1)	1	**allow** may eat local fish stocks / for hunting / to catch / for food / for oil / for cosmetics / to study them / to supply a correct named product
	b	i	close to extinction / not many left / dying out (1)	1	**ignore** numbers gone down **allow** numbers are low
		ii	osprey (1)	1	
	c		mammals (1)	1	
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
6	a		420 (2) BUT 30 x 28 / 2 (1)	2	correct answer no working out gains two marks
	b		**any one from**: bigger population / more people (1) more packaging used (1) more produce bought / less is home produced (1) people are keeping / reusing less stuff (1)	1	
	c		**any two from**: they / some are resistant / unaffected by poison (1) they / some have a gene which protects them / (resistance) is inherited (1) (gene) due to mutation (1)	2	**not** immune **allow** tolerant (1) **allow** (resistance is) passed on **allow** alternative wording to genes eg DNA / chromosome **allow** they do not eat enough (1) examples: Inherited immunity = 1 Inherited mutation = 2 Inherited resistance = 2 Inherited immunity due to mutation = 2
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
7	a		minerals (1)	1	
	b		**any two from**: chlorophyll (1) carbon dioxide (1) water (1)	2	**allow** magnesium / iron / minerals needed to make chlorophyll (2) **ignore** magnesium / iron / minerals on own **allow** correct formulae **ignore** light **ignore** 'green pigment / colour'
	c		fewer other plants / other plants die (1) less food (1)	2	fewer plants they can eat = (2) **ignore** 'outcompete other plants' **not** 'no food'
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
8	a		A (1) long(er) tail / big tail / can swim faster / better (1)	2	2nd mark dependent on 1st
	b		fertilisation (1) division (1) differentiation (1)	3	
	c	i	mother (1)	1	**allow** higher level answers: placenta / mother's blood **allow** umbilical / cord
		ii	pump / move (1) blood (1)	2	**allow** movement of substances / oxygen / food / waste etc. (2) produce blood = 0 control amount of blood = 0 so blood can travel = 2 beats blood around body = 2
			Total	**8**	

Question			Expected Answers	Marks	Additional Guidance
9	a		**any three from:** potatoes / tubers form (1) rest of plant dies (1) (each) potato / tuber produces new plants (1) new plants grow from buds / eyes (1)	3	**allow** points from a clear diagram
	b		mutation / different genes / faulty genes (1)	1	**allow** alternative wording for gene: DNA / base sequence / bases **allow** valid reference to different environment, e.g. lack / presence of certain mineral(s) / soil pH / disease / amount of light / 'different environmental conditions'
	c		3rd point: produce many potatoes on one plant (1) 4th point: resistant to disease (1)	2	
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	at least 4 points correctly plotted (1) **but** all points correctly plotted (2) smooth curve through all points (1)	3	**allow** +/- half square **allow** +/- half square **not** lines with ruler between points
		ii	7.5 (1)	1	**allow** answer in range 7.0 - 8.0 (1) **allow** a range
	b	i	diffusion (1)	1	**allow** active transport **ignore** absorption or a description
		ii	plasma (1)	1	**allow** the liquid part / water
			Total	**6**	

			Paper Total	**60**	

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

Question			Expected Answers	Marks	Additional Guidance
1	a	i	glass (falling) / light (1)	1	**allow** cup
		ii	eye / retina (1)	1	**allow** rods / cones / fovea **not** neurone / optic nerve **ignore** light receptor
		iii	hand / arm / fingers / muscles (1)	1	
	b	i	5 (1)	1	
		ii	drinks contain different concentrations / percentages / strengths (of alcohol) / AW (1)	1	**ignore** whisky has more alcohol than beer / reference to amounts of alcohol / they had different types of drinks
	c		temazepan (1)	1	ticks in more than one box = 0
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
2	a		glucose (1)	1	**allow** sugar / correct formula **not** food
	b	i	insufficient supply of oxygen / lack of oxygen (1)	1	**not** no oxygen / insufficient blood / not enough time to get oxygen **ignore** in oxygen debt
		ii	**any two from:** lactic acid (accumulates) (1) (which is) painful / cramp / (causes) fatigue / aches (1) oxygen debt occurs (1)	2	 **ignore** toxic / poisonous / harmful / damage
	c		**any two from:** more heat is generated / lose extra heat / increase heat loss (1) to maintain body temperature / homeostasis / prevent heat stroke (1) vasodilation / blood vessels widen (1) controlled by brain / hypothalamus (1)	2	 **ignore** gets hotter **ignore** just lose heat **ignore** cool down **allow** cool down faster **not** blood vessels move closer to surface
	d		stay hydrated / rehydrate / avoid dehydration / maintain internal environment / balance inputs and outputs / homeostasis (1)	1	**allow** because he has lost water / replace lost water
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
3	a		parents = Ff (1) gametes = F and f from each parent (1) offspring = FF, Ff, Ff, ff (1) probability = 1 in 4 / 0.25 / 25% / 1/4 / 1:3 (1)	4	must state parent genotypes separately to gametes **not** 1 in 3 or 1:4 or 1/3
	b	i	A, T, C, G (any order) (1)	1	
		ii	different sequence / order / pattern (1)	1	**allow** some are missing **not** different bases / different combinations / linked differently
	c		to prevent resistant strains spreading / being selected for / AW (1)	1	**not** reference to the person becoming resistant / the disease becoming resistant **allow** bacteria can develop resistance **not** to stop bacteria mutating
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
4	a		it cannot make its own food (1)	1	ticks in more than one box = 0
	b	i	they are (two) different species / it is a hybrid (1)	1	**allow** high level answers e.g. idea of incomplete set of homologous chromosomes / odd number of chromosomes / meiosis unable to occur (1) **ignore** crossbreed
		ii	has features / chromosomes of horse and zebra / it is a hybrid / made from (two) different species (1)	1	**ignore** it is a mixture of both unless qualified eg a mixture of horse and zebra = 0 a mixture of two species = 1 **ignore** half horse / half zebra **ignore** crossbreed
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
5	a		(make money from)tourism (1)	1	**allow** may eat local fish stocks / for hunting / to catch / for food / for oil / for cosmetics / to study them / to supply a correct named product
	b	i	**any two from**: pollution / named pollutant (1) climate change (1) competition / reduction of food (1) disturbance from ships / sonar / collisions / fishing nets (1)	2	**ignore** habitat destruction unless qualified **ignore** scientific research mark two parts of answer as one (two marks can be scored in **1** or **2**)
		ii	reducing pollution / reducing climate change / protect food source / stop overfishing / education programs / raising awareness / (captive) breeding programs / use alternatives to whale based products (1)	1	**allow** ban hunting in other parts of the world (1)
	c		mammals (1)	1	
	d		migration (patterns) / survival at extreme depths / ability to stay under water for long time(1)	1	**allow** AW eg pressure / lack of breathing **not** how they breathe underwater
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
6	a		420 (2) BUT 30 x 28 / 2 (1)	2	correct answer no working out gains two marks
	b	i	**any two from**: they / some are resistant / unaffected by poison (1) they / some have a gene which protects them / (resistance) is inherited / (1) (gene) due to mutation (1) they do not eat enough (1)	2	 **not** immune / fight off **allow** tolerant (1) **allow** (resistance is) passed on **allow** alternative wording to genes eg DNA / chromosome examples: Inherited immunity = 1 Inherited mutation = 2 Inherited resistance = 2 Inherited immunity due to mutation = 2
		ii	acquired characteristics not passed on / have no genetic basis / not controlled by genes (1)	1	**allow** he thought that acquired characteristics are passed on **not** characteristics are not passed on
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
7	a		$6CO_2 + 6H_2O \longrightarrow C_6H_{12}O_6 + 6O_2$ (2)	2	balancing = (1) formulae (1) If formulae mark is not given then cannot award balancing mark
	b		**any two from**: starch is insoluble (1) stays in the cell (1) does not affect osmosis / water potential / water is not drawn into the cell (1)	2	**allow** converse answers for glucose
	c		coloured (petals) / nectar / scent / smell / 'sticky' pollen / honey guides / landing platforms / anther or stigma in correct position to be touched (by insect) (1)	1	
	d		sugar / glucose / sucrose (1)	1	**allow** anaerobic conditions **ignore** energy / somewhere safe to live / food / water **not** starch / protein / oxygen
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
8	a	i	at least 4 points correctly plotted (1) **but** all points correctly plotted (2) smooth curve through all points (1)	3	**allow** +/- half square **allow** +/- half square **not** lines with ruler between points
		ii	7.5 (1)	1	**allow** answer in range 7.0 - 8.0 (1) **allow** a range
	b	i	diffusion (1)	1	**allow** active transport **ignore** absorption or a description
		ii	plasma (1)	1	**allow** the liquid part / water
			Total	**6**	

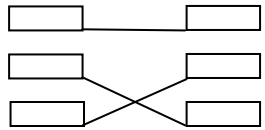
Question			Expected Answers	Marks	Additional Guidance
9	a	i	3, 5, 4, 1, 2 (1)	1	
		ii	<u>advantage:</u> can produce more / can produce a selected sex / does not risk prize cow during birth (1) <u>disadvantage:</u> lack of variation / if one has weakness all will / expensive / needs technical equipment (1)	2	**ignore** references to identical individuals **allow** no variation / smaller gene pool
		iii	(Dolly) involved cloning an adult / body cell / involved removing nucleus from cell / does not involve sperm / fertilization / did not involve splitting embryos (1)	1	**ignore** is asexual
	b	i	mitosis (1)	1	mark phonetic spellings eg mytosis, meitosis **not** meiosis / meiotsis
		ii	greater surface area (to volume ratio) / materials move in or out of cells quicker / allow specialisation / become more complex / advanced / developed (1)	1	**ignore** increase in size
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
10	a		positive phototropism (1)	1	ticks in more than one box = 0
	b		(auxin) accumulates on shaded side (1) increased (growth by) cell elongation (1)	2	**allow** sent to / shaded side gets more / more on shaded side **not** more auxin made on shaded side **allow** left side / side away from sun
	c		D (1)	1	
			Total	**4**	

11	a		**max two from:** reduced gene pool / less variation (1) diseases might wipe out population (1) (increased risk of) genetic diseases / harmful alleles combining / genetic abnormalities (1) **but** combining of harmful recessive alleles / increased risk of recessive (genetic) diseases / increased risk of harmful recessive characteristics showing = (2)	2	**ignore** no variation **not** causes mutations
	b	i	permeable / moist / large surface area / good blood supply / thin wall / (wall) one cell thick (1)	1	**not** thin cell walls
		ii	blood at higher pressure (1)	1	
			Total	**4**	

			Paper Total	**60**	

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

Question			Expected Answers	Marks	Additional Guidance
1	a		flower = to reproduce stem = for support roots = to take in water	2	all three correct = 2 one or two correct = 1 
	b		absorb / take in light (energy) (1)	1	**allow** make sugar / glucose / combine water and oxygen (1) **allow** contain chlorophyll (1) **ignore** catch light, gain light, collect light
	c		root (1)	1	**allow** root hair (cell) **not** just hairs
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
2	a		evaporates (1) from leaves (1)	2	**allow** high level answers e.g. diffuses (1) through stomata/through the (open) guard cells (1)
	b		**any two from:** cool plant (1) support / keep cells turgid / turgor (1) movement of minerals / nutrients (1)	2	**ignore** photosynthesis / make food **allow** control temperature **ignore** strengthen / give structure **allow** translocation / movement of sugar transport of 2 valid substances e.g. minerals and sugar = 1 'transport of substances' = 0 additional mark: cell elongation **but ignore** just growth **max one additional mark from:** acts as a solvent (1) medium for chemical reactions (1)
	c	i	10.6 (1)	1	look in table
		ii	increases (transpiration) (1)	1	**allow** more water lost / more mass lost / increases evaporation / increases diffusion
	d		humidity (1)	1	
	e		control / compare effect of no plant / show water loss is due to plant (1)	1	**Ignore** fair test unless qualified **allow** see the difference when a plant added, to see how much it changes without a plant
			Total	**8**	

Question			Expected Answers	Marks	Additional Guidance
3	a		wood (1)	1	
	b	i	insecticides / pesticides (1)	1	**allow** named pesticide e.g. DDT **ignore** poison, ant killer
		ii	**any one from:** upsets food chain / web (1) cane toad may not have a predator / cane toad population rises (1) may not feed on the insects / may feed on something else / AW (1) out compete native species/ AW (1)	1	**ignore** just 'affects food chain' **allow** they become pests themselves (1) **allow** may move away (1) **allow** take long(er) time (to work than pesticides) (1) **allow** can't eat insects higher up the plants (1) **allow** does not eat all the insects (1) **allow** may eat insects that are not pests (1) **ignore** cost
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
4	a		bacteria / fungi (1)	1	**allow** named examples of bacteria/fungi **ignore** microbes
	b	i	oxygen / tick in 4th box (1)	1	
		ii	moisture / warmth (1)	1	**allow** water / heat / temperature **allow** pH **allow** (coarse stone) filter
	c	i	yellow leaves (1)	1	**ignore** any reference to growth e.g. small size / small leaves etc **ignore** discoloured leaves / loss of colour / pale green
		ii	potassium / magnesium (1)	1	**allow** correct formulae **ignore** other minerals / elements
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
5	a		trachea (1) air sacs (1)	2	
	b		cystic fibrosis / bronchitis / (lung) cancer emphysema / asbestosis / pneumonia / TB (1)	1	**ignore** smoking but **allow** smoking related diseases
	c	i	the slower he blows out the worse his asthma is / the narrower his airways are / ora OR asthma restricts the ability to breathe (1)	1	i.e. that breathing is poorer / more difficult with asthma / narrow airways
		ii	to widen/open his airways / bronchi / bronchioles (1)	1	**allow** relax (smooth) muscle **ignore** trachea **ignore** just ' eases breathing' **ignore** increases lung volume airways relax = 0 **ignore** clears airways
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
6	a	i	increased risk of blood clots (1)	1	**allow** risk of blood clots **allow** correct ringed/underlined answer
		ii	to carry oxygen / to combine with oxygen (1)	1	**allow** to form oxyhaemoglobin **allow** provides oxygen if use formula must be correct **ignore** carbon dioxide transport oxygen and glucose = 0 (con)
	b		astronauts have weak(er) bones / can study effect of weightlessness on bone density (1)	1	**allow** people with osteoporosis also) have weak(er) bones **ignore** references to weaker muscles but links to other body changes negates the mark
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
7	a	i	testes / testis (1)	1	**allow** testicles **not** scrotum
		ii	sperm duct (1)	1	**allow** vas deferens **ignore** sperm tube
	b		urea (1)	1	**allow** ringed/underlined correct answer
			Total	**3**	

Question			Expected Answers	Marks	Additional Guidance
8	a		20 (years) (1)	1	**allow** answer in range 19-20
	b		adolescence / puberty (1)	1	**ignore** teenager / youth
	c		**any three from**: her diet (1) - reference to how much proteins / vitamins / minerals / energy(carbohydrate/fat) (1) exercise (1) reference to muscle growth / fat reserves (1) hormones (1) - reference to growth / sex hormone (1) disease / named disease (1) effects of drugs on body (1)	3	**allow** type of food **ignore** eating habits **allow** active lifestyle **ignore** how hard they work **ignore** healthy lifestyle unless qualified **allow** not enough sleep **allow** stress **allow** smoking/passive smoking **allow** drinking through pregnancy
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
9	a		transfusions / used in operations / used for injured people (1)	1	**allow** blood transplants **allow** people with blood loss, people who need blood
	b		Tony is blood group O and rhesus negative (1)	1	
	c		0.5 litres (1)	1	
	d		anaemia / (low) rbc count / (low) wbc count / (low) platelet count / pathogens / HIV / haemophilia / diabetes / iron (deficiency) / (low) cholesterol / sickle-cell (anaemia) / thrombosis (1)	1	**allow** AIDS / named blood-borne disease / named blood-borne pathogens **allow** drug use **ignore** just 'disease' **ignore** blood group **ignore** references to blood pressure
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	A (1)	1	**allow** correct ringed/underlined answer
		ii	3 thousandths of a mm (1)	1	**allow** correct ringed/underlined answer
	b	i	bars correctly drawn (2) (July= 500, August= 300)	2	**allow** bars of any width drawn to correct height (+ half square)
		ii	July and August (1)	1	**allow** answers either way around
		iii	boat yard no mark because most coliforms/bacteria are found in A /nearby (1)	1	
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
11	a		(polluted) water (1)	1	**ignore** uncooked food **ignore** other methods of transmission
	b		natural disasters / poor sanitation / sewers damaged / sewers not working properly / lack of knowledge about hygiene / poor hygiene (1)	1	**allow** examples of natural disasters: earthquake / flood / drought **allow** poor water supply **ignore** poverty **ignore** high temperature **ignore** poor immune systems
	c	i	genetic engineering / modification (1)	1	**allow** GM
		ii	transgenic (1)	1	
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
12	a	i	enzyme (1)	1	**ignore** catalyst
		ii	**any two from**: test their urine / blood (1) for sugar / glucose (1) so they know how much insulin to inject (1)	2	**allow** higher level answers e.g. because they cannot control blood sugar (1) **allow** test blood sugar (levels) = (2)
		iii	low temperature and neutral pH (1)	1	**allow** correct ringed/underlined answers
	b		biological washing powder contains protease / ora (1) this digests / breaks down the gelatine / protein / ora (1)	2	**ignore** just 'contains enzymes' **allow** correct examples e.g. pepsin **ignore** dissolves / liquifies / decomposes / gets rid of / eats away protein / gelatine biol' washing powder contains protein-digesting enzymes = 2 biol' washing powder contains enzymes that digest proteins = 2 biol' washing powder contains enzymes that digest gelatine = 1
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
13	a	i	yeast (1)	1	
		ii	gasohol (1)	1	
	b	i	bacteria (1)	1	**allow** methanobacter **ignore** decomposers
		ii	no (net) carbon dioxide released / less particulates produced / it is renewable / sustainable / gets rid of waste / qualified cost (1)	1	**allow** carbon neutral **allow** does not cause global warming **ignore** less / no pollution / cleaner **ignore** releases less carbon dioxide **ignore** mass production
			Total	**4**	

			Paper Total	**60**	

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

Question			Expected Answers	Marks	Additional Guidance
1	a	i	respiration / decay / decomposition / rotting / fermentation / volcanic eruption / weathering (1)	1	**allow** breathing **ignore** combustion / burning **ignore** deforestation **ignore** excretion BUT **allow** excretion of carbon dioxide **allow** methane production / belching / passing wind **ignore** death
		ii	photosynthesis (1)	1	**allow** dissolves in water
	b		denitrifying (bacteria) (1)	1	**ignore** examples
	c		increase temperature / aerate / provide oxygen (1)	1	**allow** add worms / detritivores / manure / soil / microorganisms **allow** increase surface area or description e.g. break up compost **allow** warm temperature / more heat **ignore** high temperature **ignore** just 'optimum temperature' **ignore** add water / damp / moist
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
2	a		**any two from:** cool plant (1) support / keep cells turgid / turgor (1) movement of minerals / nutrients (1)	2	**ignore** photosynthesis / make food **allow** control temperature **ignore** strengthen / give structure **allow** translocation / movement of sugar transport of 2 valid substances e.g. minerals and sugar = 1 'transport of substances' = 0 additional mark: cell elongation **but ignore** just growth **max one additional mark from:** acts as a solvent (1) medium for chemical reactions (1)
	b	i	24.48 (2) BUT 10.6 / 43.3 x 100 (1)	2	mark answer line first but credit final answer written above if unambiguous correct answer, no working = 2 **allow** 24.5 (2) 24 or 24.4 (with or without working) = 1 no ecf for 2nd mark
		ii	increases (transpiration) (1)	1	**allow** more water lost / more mass lost / increases evaporation / increases diffusion
	c		(starting) mass(es) are all different (1)	1	**allow** not fair test / to make a fair comparison 'to compare them' = 0 bigger plants will lose more water = 1 the amount of water lost depends on the size of the plant = 1
	d		xylem (1)	1	xylem and phloem = 0
			Total	**7**	

Question			Expected Answers	Marks	Additional Guidance
3	a	i	**any two from:** pesticides / animals / insects containing the pesticide are eaten (1) pesticides accumulate / build up / concentration increases (1) pesticides do not breakdown / are not excreted / are stored / are persistent (1)	2	**allow** pesticide passes up the food chain **allow** bioaccumulation **ignore** just 'pesticide gets stronger' the animals higher up eat a lot of insects containing pesticides = 2 (1st and 2nd marking points) = 2 **allow** if insects are killed their predators have no / less food (1) **ignore** just the statement that pesticide kills animals (in question) **BUT allow** pesticides may be directly toxic to animals other than pests e.g. pesticides get into lakes and kill small animals there (1)
		ii	**any one from:** upsets food chain / web (1) cane toad may not have a predator / cane toad population rises (1) may not feed on the insects / may feed on something else / AW (1) out compete native species/ AW (1)	1	**ignore** just 'affects food chain' **allow** they become pests themselves **allow** may move away (1) **allow** take long(er) time (to work than pesticides) (1) **allow** can't eat insects higher up the plants (1) **allow** does not eat all the insects (1) **allow** may eat insects that are not pests (1) **ignore** cost
	b		**any one from:** eaten (1) used as animal food (1) building (1) save seeds for next year (1)	1	**ignore** as fuel / burnt / produce electricity / provide energy **ignore** alcohol unless clearly intended to be consumed **allow** as fertiliser / compost (1)
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
4	a		proteins and urea (1)	1	**two answers needed for one mark** **allow** peptides / enzymes / amino acids **ignore** ammonium compounds
	b	i	yellow leaves (1)	1	**ignore** any reference to growth e.g. small size / small leaves etc **ignore** discoloured leaves / loss of colour / pale green
		ii	potassium / magnesium (1)	1	**allow** correct formulae **ignore** other minerals / elements
	c		**any two from:** active transport / active uptake (1) against concentration gradient / up the concentration gradient / from lower concentration / to higher concentration (1) using energy (1)	2	**not** osmosis **ignore** diffusion **ignore** just 'against the gradient'
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
5	a		the slower he blows out the worse his asthma is / the narrower his airways are / ora OR asthma restricts the ability to breathe (1)	1	i.e. breathing is poorer / more difficult with asthma / narrow airways
	b	i	4 (litres) (1)	1	
		ii	(1.2 / 3 =) 0.4 (1) moderate (asthma) (1)	2	**second mark is dependent on the first** **ignore** '0.55-0.30' but can still get second mark ecf for second mark if calculation gives wrong answer e.g. 0.6, mild = 1
		iii	to widen / open his airways / bronchi / bronchioles (1)	1	**allow** relax (smooth) muscle **ignore** trachea **ignore** just ' eases breathing' **ignore** increases lung volume airways relax = 0 **ignore** clears airways
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
6	a	i	increased risk of blood clots (1)	1	**allow** unambiguous reference to blood clots
		ii	to carry oxygen / to combine with oxygen (1)	1	**allow** to form oxyhaemoglobin **allow** provides oxygen if use formula must be correct **ignore** carbon dioxide transport oxygen and glucose = 0 (con)
	b		astronauts have weak(er) bones / can study effect of weightlessness on bone density (1)	1	**allow (**people with osteoporosis also) have weak(er) bones **ignore** references to weaker muscles but links to other body changes negates the mark
	c		lower blood pressure / ora (1) pressure is needed to filter the blood (1)	2	**ignore** lower heart rate / blood clotting but any other body changes negate first mark **allow** AW e.g. (high pressure) squeezes out blood contents 'lower blood pressure so they can not filter blood (properly)' = 2 **ignore** just glomeruli don't work (properly) **allow alternative answer:** blood clotting in glomeruli blocking flow (1) blocked flow reduces filtration (1)
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
7	a	i	0.5 litres (1)	1	more than one answer = 0
		ii	anaemia /(low) rbc count / (low) wbc count / (low) platelet count / pathogens / HIV / haemophilia / diabetes / iron (deficiency) / (low) cholesterol / sickle-cell (anaemia) / thrombosis (1)	1	**allow** AIDS / named blood-borne disease / named blood-borne pathogens **allow** drug use **ignore** just 'disease' **ignore** blood group **ignore** references to blood pressure
	b	i	he is a universal donor / his blood can be (successfully) given to all / anyone can receive this blood (1)	1	**allow** it's the only blood that O- can receive
		ii	it would not be successful / he would react against / rejection / blood would clot / clump / agglutinate (1) make antibodies / his antibodies react (1) against the antigens / agglutinins (on the rbcs) (1)	3	**ignore** he would die / be ill antigens and antibodies must be in correct context, e.g. Tony makes antigens against the donor antibodies = 0
			Total	**6**	

Question			Expected Answers	Marks	Additional Guidance
8	a		it happens outside the body (1)	1	**allow** it happens in a dish / test tube **ignore** it happens outside womb **ignore** it happens in a lab
	b	i	success rate is higher using donor eggs (1) success rate with own eggs falls (quicker) with age but success rate with donor eggs stays constant / falls less (1) OR the difference increases with the age of the mother (1)	2	 need comparison for second mark
		ii	no genetic link to mother / doesn't have mother's DNA / genes / chromosomes (1)	1	**allow** doesn't have mother's features **allow** ethical issues / religious issues / unnatural / qualified financial e.g. have to pay donor **allow** the woman is not the biological mother **allow** the baby is not genetically / biologically the couple's **allow** baby only has half its genes from the couple **ignore** just 'baby not genetically related to couple'
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
9	a		(polluted) water (1)	1	**ignore** uncooked food **ignore** other methods of transmission
	b		natural disasters / poor sanitation / sewers damaged / sewers not working properly / lack of knowledge about hygiene / poor hygiene (1)	1	**allow** examples of natural disasters: earthquake / flood / drought **allow** poor water supply **ignore** poverty **ignore** high temperature **ignore** poor immune systems
	c	i	transgenic (1)	1	more than one answer = 0
		ii	restriction / endonucleases (1)	1	**not** restricting / restrictive
			Total	**4**	

Question			Expected Answers	Marks	Additional Guidance
10	a	i	sucrase (1)	1	**not** sucrose **allow** invertase
		ii	product is much sweeter / less sugar needed (1)	1	**allow** same sweetness but less calories **allow** very sweet **ignore** just 'less calories / low energy content' **ignore** just 'better for diabetics' **ignore** easier to digest
	b	i	enzymes are denatured (in acidic conditions) (1)	1	**allow** reference to changes in shape / active site **ignore** enzymes don't work as well / are damaged **ignore** powder is denatured **not** enzymes killed
		ii	biological washing powder contains protease / ora (1) this digests / breaks down the gelatine / protein / ora (1)	2	**ignore** just 'contains enzymes' **allow** correct examples e.g. pepsin **ignore** dissolves / liquifies / decomposes / gets rid of / eats away protein / gelatine biol' washing powder contains protein-digesting enzymes = 2 biol' washing powder contains enzymes that digest proteins = 2 biol' washing powder contains enzymes that digest gelatine = 1
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
11	a		biogas (1)	1	
	b	i	(needs to be that high) to burn (1) if too low it is explosive / low energy value (1)	2	**not** if higher will explode / otherwise it would explode **ignore** references to efficiency / works well
		ii	no (net) carbon dioxide released / less particulates produced / it is renewable / sustainable / gets rid of waste / qualified cost (1)	1	**allow** carbon neutral **allow** does not cause global warming **ignore** less / no pollution / cleaner **ignore** releases less carbon dioxide **ignore** mass production
		iii	releases less energy (when burnt) / ora (1)	1	**allow** less efficient 'not as powerful' = 0
			Total	**5**	

Question			Expected Answers	Marks	Additional Guidance
12	a	i	dysentery (1)	1	**ignore** diarrhoea
		ii	tick in second box (1)	1	more than one tick = 0
		iii	(lives in the human body and) so has similar concentration to surroundings (1)	1	**ignore** does not live in water
	b	i	30 (1)	1	**allow** 2/3 (less) / 67% (less) **allow** it is a third / 33% of the original
		ii	in the more concentrated salt solution the amoeba takes up water more slowly (by osmosis) / ora (1) (because) in the more concentrated salt solution there is less difference in concentration / ora (1)	2	**allow** in more concentrated salt solution amoeba takes up less water
			Total	**6**	

			Paper Total	**60**	

Grade Thresholds

General Certificate of Secondary Education
Biology B (Specification Code J643)
June 2009 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B631/01	Raw	60	-	-	-	38	31	25	19	13	0
	UMS	69	-	-	-	60	50	40	30	20	0
B631/02	Raw	60	43	36	29	22	16	13	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B632/01	Raw	60	-	-	-	31	24	17	11	5	0
	UMS	69	-	-	-	60	50	40	30	20	0
B632/02	Raw	60	43	35	27	20	14	11	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B635/01	Raw	60	55	51	46	42	37	32	27	22	0
	UMS	100	90	80	70	60	50	40	30	20	0
B636/01	Raw	60	54	49	43	38	32	26	20	14	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 2009. 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	18.0	46.8	74.0	91.0	96.6	98.6	99.5	99.9	100.0	13115

13233 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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