

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Mark Scheme for the Units

January 2010

J643/MS/R/10J

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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)	(i)	(Jody =) 48 (1) (Rejna = 105) (1)	2	
		(ii)	Nicola (1)	1	Mark the line first. If no answer look for unambiguous indication in the table allow ecf from 1a(i)
	(b)		max two from oxygen to the muscles (1) glucose to the muscles (1) carbon dioxide from the muscles (1) lactic acid from the muscles (1) plus any from (glucose / oxygen) needed for respiration / energy / muscle contraction / to do work (1) (oxygen) prevents lactic acid build-up / muscles hurting / tiring / cramp (1) (carbon dioxide) is a waste product / toxic (1)	3	Direction substance is moving must be clear in answer allow glucose is a fuel
Total				6	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	<u>virus</u>	1	allow ringed, underlined more than 1 answer = 0
	(b)		2	All three correct = (2) marks One or two correct = (1) mark
	(c)	(passive immunity) the immunity lasts for a short time / antibodies from someone else / have not made own antibodies (1)	1	assume unqualified answer refers to passive immunity allow injected with antibody allow antibodies pass from mother (to baby in breast milk) ignore immunity from another person for active immunity allow lasts longer / makes own antibodies
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	reflex (1)	1	allow automatic / protective (1) ignore fast / quick
	(b)	(i) (drawing) pin (1)	1	allow pressure / pain allow putting her finger on the pin e.g. she touches the pin = 1 not receptor
		(ii) (arm) muscle (1)	1	allow biceps ignore arm / hand
	(c)	(i) <u>aspirin</u> (1)	1	allow ringed / underlined more than one answer scores 0
		(ii) block (nerve) impulses (1)	1	allow blocks impulses in the brain allow higher level answers for effect on synapse: blocks receptors / blocks transmitter chemicals ignore blocks nerves / messages / signals
Total			5	

Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	ovum / egg (cell) (1)	1	allow (female) gamete / sex cell (1)
		(ii)	in the blood (stream / vessels) / in the plasma (1)	1	ignore just 'vessels' / named examples
	(b)		46 / 23 pairs (1)	1	allow 44 +XX / 22 pairs+XX (1) not 46 pairs +XX not '23' on its own
	(c)		scar (1)	1	
	(d)		X(X) (chromosomes) (1)	1	
			Total	5	

Question		Expected Answers	Marks	Additional Guidance
5	(a)	A = wentletrap (1) C = tellin (1)	2	
	(b)	invertebrates (1)	1	
	(c)	gull (1) crab (1)	2	if more than two ticks, deduct one mark for each incorrect tick
		Total	5	

Question			Expected Answers	Marks	Additional Guidance
6	(a)	(i)	glucose / starch / carbohydrate / sugar (1)	1	allow correct formula ignore protein / fat / oil / cellulose
		(ii)	oxygen (1)	1	allow correct formula
	(b)		a substance used (by man) / AW (1) (but) does not run out / can be produced again / renewable / AW (1) BUT produced as fast as it is used (or faster) (2)	2	ignore can use again allow examples, e.g. trees cut down and replanted = 2
	(c)		more light / more warmth / longer days (1)	1	allow (more) water available / more photosynthesis / more food ignore photosynthesis better allow easier to photosynthesise ignore more sun
Total				5	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	any two from sharp teeth (1) built for speed / streamlined / (swims) fast / AW (1) forward facing eyes (1)	2	ignore just teeth allow powerful jaws / large jaws (1) allow large (size) / (15 m) long (1)
	(b)	(i) extinct (1)	1	not endangered ignore dead
		(ii) fossils (1)	1	allow bones / skeleton ignore skin
Total			4	

Question			Expected Answers	Marks	Additional Guidance
8	(a)	(i)	9/45 x 100 (1) BUT 20(%) (2)	2	correct answer, no working = 2 allow correct answer in table if answer line is blank
		(ii)	Chapmanstow (1)	1	allow 25(%) allow ecf if answer to (i) is incorrect i.e. town with highest percentage only allow Chapmanstow if it is the highest % allow Chapmanstow if (a)(i) is blank
	(b)		mutualism / mutualistic (1)	1	allow symbiosis / symbiotic ignore mutual relationship / mutual
	(c)		any two from: (too much) competition (1) (competition from) grass / plants (1) idea that light is blocked (1) (less light) so less photosynthesis (1)	2	allow no stem / no roots (1) ignore other species plants / grass must be qualified e.g. there are plants = 0 but too many plants = 1 competition from plants = 2 allow get more (sun) light on wall (1) ignore more sun photosynthesis must be linked to less light idea e.g. less photosynthesis = 0 but less light so less photosynthesis (2) ignore reference to sulphur dioxide
Total				6	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	carry / transport oxygen (1)	1	allow carry haemoglobin / oxyhaemoglobin
	(b)	capillary / vein (1)	1	allow arteriole / venule
	(c)	heart (1)	1	allow ventricle(s)
	(d)	control the cell / carry genetic material (1)	1	allow tell cell what to do / give instructions allow contains genes / chromosomes / DNA (1) ignore 'it's the brain' ignore contains information
	(e)	tick in 1st box (1)	1	more than 1 tick = 0
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	<p>any two from:</p> <p>choose the strongest dogs from the offspring (1)</p> <p>breed offspring (1)</p> <p>repeat breeding process (1)</p>	2	<p>allow stronger but not just strong ignore best / desired characteristics e.g. choose best offspring = 0 choose best offspring and breed = 1</p> <p>allow mate / reproduce. Must be clear that it is the best dogs are being bred</p> <p>cannot score repeat mark without reference to selection e.g. they are bred again and again (1)</p> <p>but the best offspring are chosen and bred, this is done again and again (2)</p>
	(b)	asexual reproduction (1)	1	allow unambiguous indication more than one answer = 0
	(c)	same genes / DNA (1)	1	ignore just 'it's a clone' not similar genes
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	replace worn out cells / repair damaged tissue (1)	1	allow correct examples e.g. to make new blood cells / to make sex cells
	(b)	any two from: tail – for swimming / to move / locomotion (1) nucleus – to carry genetic information / genes / chromosomes / DNA (1) small size / streamlined – for easy swimming / move fast / move more easily (1)	2	must have feature linked to correct reason allow high level answers eg mitochondria to provide energy / respiration (1) acrosome / enzymes to digest egg membrane (1) ignore pointy heads
	(c)	cell differentiation (1)	1	allow unambiguous indication more than one answer = 0
	(d)	cell that has not specialised / not differentiated (1)	1	allow a cell with the ability to turn into different types / kinds of cells ignore turn into any / another cell ignore reference to tissues / organs
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	flowering / tick in 2nd box (1)	1	more than 1 tick = 0
	(b)	(percentage increase in length) increases then decreases (as concentration of hormone increases) (1) maximum increase at 100(ppm) / idea of peak at 100(ppm) (1)	2	allow less growth at high and low concentrations (1) not shoot becomes shorter (after 100ppm) not length decreases (after 100ppm) e.g. increase in length until 100(ppm) then decreases (1) (mark is given for 100) e.g. increase until 100(ppm) then decreases (2) e.g. increases in length then decreases (0) (no mark because length decreases) e.g. increases then decreases (1) (mark given because no mention of getting shorter) e.g. goes up then down (0)
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
13	(a)	respiration (1)	1	not anaerobic respiration
	(b)	speed them up (1)	1	allow control / regulate
	(c)	growth / repair (1)	1	allow higher level answers eg enzymes / hormones / pigments ignore DNA
		Total	3	

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

Question		Expected Answers	Marks	Additional Guidance
1	(a)	from anaerobic (respiration) (1)	1	allow lack of oxygen / not enough oxygen ignore no oxygen ignore oxygen debt
	(b) (i)	all points correctly plotted (1) smooth curve drawn through most points (1)	2	not extrapolation of line
	(ii)	6 (minutes) (1)	1	
	(c)	any two from need more / extra oxygen (after exercise) (1) (repay) <u>oxygen debt</u> (1) lactic acid built up / made or produced (during run) (1) (because of) anaerobic respiration (1) (oxygen needed) to break down / remove lactic acid (to liver) / oxidise lactic acid (1)	2	ignore to recover ignore reference to aerobic respiration ignore just oxygen / enough oxygen ignore not enough oxygen
		Total	6	

Question		Gd	Expected Answers	Marks	Additional Guidance
2	(a)		D	1	<p>allow destroy / kill cells (1)</p> <p>allow replicate inside cells (1)</p> <p>allow stops the cells working correctly (1)</p> <p>ignore attack cells</p> <p>ignore reference to tissue / organs</p>
	(b)	(i)	AA	2	<p>if more than two boxes ticked, each additional tick loses one mark</p>
		(ii)	C	1	<p>assume unqualified answer refers to passive immunity</p> <p>allow injected with antibody (1)</p> <p>allow antibodies pass from mother to baby (in breast milk) (1)</p> <p>but not from parents / parent unqualified</p> <p>ignore immunity from another person</p> <p>for active immunity allow lasts longer / makes own antibodies</p>
			Total	4	

Question			Expected Answers	Marks	Additional Guidance
3	(a)	(i)	(drawing) pin (1)	1	allow pain / pressure allow putting her finger on the pin e.g. she touches the pin = 1 not receptor
		(ii)	(arm) muscle (1)	1	allow biceps ignore arm / hand
	(b)		<u>aspirin</u> (1)	1	allow ringed / underlined more than one answer scores 0
	(c)	(i)	synapse (1)	1	allow synaptic cleft / gap (1)
		(ii)	any two from : caffeine is a <u>stimulant</u> (1) idea of acting on the synapse (1) more (neuro)transmitter released (1)	2	allow stimulates synapse (1) e.g. more neurotransmitter (molecules) cross the synapse (2)
Total				6	

Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	<u>ovulation</u>	1	
		(ii)	sex hormones / oestrogen / progesterone / FSH (1)	1	allow female hormones / reproductive hormones (1) ignore LH
	(b)		46 / 23 pairs (1)	1	allow 44 +XX / 22 pairs+XX (1) not 46 pairs +XX not '23' on its own
	(c)		X(X) (chromosomes) (1)	1	
Total				4	

Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	9/45 x 100 (1) BUT 20(%) (2)	2	correct answer, no working = 2 allow correct answer in table if answer line is blank
		(ii)	Chapmanstow (1)	1	allow 25(%) allow ecf if answer to (i) is incorrect i.e. town with highest percentage only allow Chapmanstow if it is the highest percentage allow Chapmanstow if (a)(i) is blank
		(iii)	bigger sample size / more representative sample (1)	1	allow more towns / more areas counted ignore repeats ignore same number of graves in each town
(b)	(i)	mutualism / mutualistic (1)	1	allow symbiosis / symbiotic ignore mutual relationship / mutual	
	(ii)	can not move (1) can not make food / photosynthesise (1)	2	allow reproduce using spores / cells have walls (1) ignore do not have compact bodies allow do not have cellulose cell walls / made of hyphae / made of mycelium / no leaves / no roots / no chloroplasts (1) ignore not green	
(c)		any two from: (too much) competition (1) (competition from) grass / plants (1) idea that light is blocked (1) (less light) so less photosynthesis (1)	2	allow no stem / no roots (1) ignore other species plants / grass must be qualified e.g. there are plants = 0 but too many plants = 1 competition from plants = 2 allow get more (sun) light on wall (1) ignore more sun photosynthesis must be linked to less light idea e.g. less photosynthesis = 0 but less light so less photosynthesis (2) ignore reference to sulphur dioxide	
Total				9	

Question			Expected Answers	Marks	Additional Guidance
6	(a)	(i)	wind (1)	1	allow by air
		(ii)	tick in 3rd box (lightweight and small) (1)	1	more than one box ticked scores zero
	(b)	(i)	water (1) oxygen (1)	2	allow correct formulae
		(ii)	insoluble (1)	1	allow does not affect water potential
		(iii)	rises (to peak) at midnight and then returns to original value at midday (1)	1	peak / plateau should be above the word midnight
Total				6	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	<p>any two from: buried / covered in sediment / sand (1)</p> <p>soft tissues decay (1)</p> <p>hard tissue / bone replaced by <u>minerals</u> (1)</p>	2	<p>ignore soil / rock / dirt</p> <p>buried must be qualified e.g. they are buried = 0 but buried under sand = 1</p> <p>allow flesh decays (1) ignore body / animal decays but body decays leaving bone = 1</p> <p>ignore space replaced by minerals ignore reference to imprints.</p>
	(b)	environmental change (1)	1	<p>allow volcanic eruptions / SO₂ levels too high / disease / lack of food / loss of habitat (1) allow could not adapt to change (1) allow climate change / correct named example of climate change e.g. it went too cold (1) not hunted by humans but allow (hunted by) more predators (1)</p>
	(c)	2, 4, (1), 3	1	
	(d)	went against religious / accepted ideas (1)	1	<p>allow they had other ideas such as creationism (1) allow they thought it suggested man evolved from apes (1) allow not enough proof / evidence (1) ignore thought it was wrong</p>
Total			5	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	flexible shape / change shape to engulf (microorganism) (1)	1	allow change shape so it can wrap around microorganisms / can change shape to leave blood vessels (1) allow produce antibodies / antitoxins (1)
	(b)	any two from : combine / joins / reacts with oxygen (in lungs) (1) forms oxyhaemoglobin (1) releases oxygen in tissue / cells (that need it) (1)	2	ignore absorbs / carries / picks up oxygen ignore reference to red blood cells ignore oxygen taken to muscle but allow releases oxygen into muscle (1)
	(c)	large <u>lumen</u> to reduce restriction of flow (1) valves prevent backflow (1)	2	must have explanation e.g. large lumen = 0 but large lumen to allow blood to flow more freely = 1 allow large lumen to allow more blood to flow (with less pressure) (1) ignore reference to thickness of muscle wall
		Total	5	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	<p>any two from:</p> <p>choose the strongest dogs from the offspring (1)</p> <p>breed offspring (1)</p> <p>repeat breeding process (1)</p>	2	<p>allow stronger but not just strong ignore best / desired characteristics e.g. choose best offspring = 0 choose best offspring and breed = 1</p> <p>allow mate / reproduce Must be clear that it is the best dogs are being bred</p> <p>cannot score repeat mark without reference to selection.</p> <p>e.g. the offspring bred again and again (1)</p> <p>but the best offspring are chosen and bred this is done again and again (2)</p>
	(b)	<p>nucleus from skin cell Butch placed into egg cell / AW (1)</p> <p>(egg) cell implanted into another dog / electric current passed through (egg cell) (1)</p>	2	must be correct order
		Total	4	

Question			Expected Answers	Marks	Additional Guidance
10	(a)	(i)	mitosis (1)	1	
		(ii)	<p>any one from: (chromosomes) are copied (1)</p> <p>divide to (opposite poles) (1)</p>	1	<p>allow duplicate / replicate (1) not multiply allow DNA replicated / copied (1) ignore they double up not form double chromosomes</p> <p>allow split apart but ignore just 'split' allow they shorten / line up on equator / move towards poles</p>
	(b)		acrosome (1)	1	
	(c)		cell that has not specialised / not differentiated (1)	1	<p>allow a cell with the ability to turn into different types / kinds of cell ignore turn into any / another cell ignore reference to tissues / organs</p>
Total				4	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	tick in 1st box (they are involved in photosynthesis) (1)	1	more than one tick scores zero
	(b)	(percentage increase in length) increases then decreases (as concentration of hormone increases) (1) maximum increase at 100 (ppm) / idea of peak at 100 (ppm) (1)	2	allow less growth at high and low concentrations (1) not shoot becomes shorter (after 100ppm) not length decreases (after 100ppm) e.g. increase in length until 100 (ppm) then decreases (1) (mark given for 100) e.g. increase until 100 (ppm) then decreases (2) e.g. increases in length then decreases (0) (no mark because length decreases) e.g. increases then decreases (1) (mark given because no mention of getting shorter) e.g. goes up then down (0)
		Total	3	

Question		Expected Answers	Marks	Additional Guidance
12	(a)	respiration (1)	1	not anaerobic respiration
	(b)	(i) 3 (1)	1	
		(ii) T G (1)	1	both correct for one mark
	(c)	synthesis (1)	1	
Total			4	

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

Question			Expected Answers	Marks	Additional Guidance
1	(a)	(i)	part A (1)	1	allow ringed, underlined allow flowers (1) ignore petals
		(ii)	support / transport (1)	1	allow holds up flower / holds up leaves (1) allow moves water / sugars (1)
	(b)		(absorbs) through the roots / from soil / from water (1)	1	allow higher level responses eg dissolved in water (1)
	(c)		nitrogen (1)	1	allow nitrates (1) eg ammonium nitrates ignore N unless qualified
			Total	4	

Question			Expected Answers	Marks	Additional Guidance
2	(a)		18(mm) (1)	1	
	(b)		evaporation (1)	1	allow transpiration / diffusion (1)
			Total	2	

Question		Expected Answers	Marks	Additional Guidance
3	(a)	grass clippings(1) leaves from hedge trimming (1)	2	allow correct answer ringed, underlined
	(b)	microorganisms / bacteria / fungi / mould (1)	1	allow higher level answer saprophytes (1) ignore worms / germs
	(c)	oxygen (1)	1	allow O ₂ (1)
Total			4	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	any three from: use natural / organic fertilisers (1) use manure / silage / compost (1) use biological control (1) introduce predators to reduce pests / use scarecrows / bird scarers / deer and rabbit proof fencing (1) hoeing to remove weeds / mowing to remove weeds(1)	3	allow no artificial fertilisers(1) allow no pesticides used (1) allow no herbicides used (1)
	(b)	carbon (1)	1	allow C (1)
		Total	4	

Question		Expected Answers	Marks	Additional Guidance	
5	(a)	<p>adaptation</p> <p>chlorophyll</p> <p>network of veins</p> <p>stomata</p> <p>thin</p> <p>how it helps photosynthesis</p> <p>short distance for gases to travel</p> <p>to absorb light</p> <p>to transport water</p> <p>to exchange gases</p>	2	All three correct = (2) marks One or two correct = (1) mark	
	(b)	(i)	3980 <u>kJ</u>	1	must give units allow 3980 KJ/kj
		(ii)	energy transferred to less useful forms / heat / (energy from) respiration / egestion / excretion / movement (1)	1	allow not all parts of worm are useful for energy / other things eat worms / worms may die or decay without being eaten ignore just 'energy is lost' ignore waste
	(c)		grow without soil / grow in artificial soil / growing in nutrient solution (1)	1	ignore only in water ignore just 'grow in gel / beads'
	(d)		movement of water / movement of minerals (1)	1	allow transpiration ignore direction of movement allow support / keep upright ignore just 'transport'
Total				6	

Question			Expected Answers	Marks	Additional Guidance
6	(a)	(i)	skin (1)	1	
		(ii)	heart (1)	1	
		(iii)	a muscle and a bone (1)	1	both needed for one mark
	(b)	(i)	coronary heart disease / heart attack / irregular heart beat / hole in heart / damaged or weak valves (1)	1	not just heart disease allow angina
		(ii)	any two from shortage of donors / people don't want to donate (1) need a correct tissue match / same tissue type (1) must be the correct size / age (1)	2	allow reasons for not donating e.g. religion ignore simply 'ethical issues' ignore reference to rejection unless refers to tissue match ignore references to blood type allow donor heart must be undamaged / disease-free / healthy (1)
			Total	6	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	In vitro fertilisation (1)	1	
	(b)	(i) ovaries (1)	1	
		(ii) an egg is released (from an ovary) (1)	1	ignore any references to uterus or other body changes, unless clear contradiction, e.g. release and menstruation = 0 allow follicle burst if site of release is given, it must be correct
	(c)	(i) sperm (1)	1	allow male gametes / semen
		(ii) <u>mitosis</u> (1)	1	allow phonetic spelling
Total			5	

Question			Expected Answers	Marks	Additional Guidance
8	(a)	(i)	oxygen (1)	1	allow correct formula
		(ii)	carbon dioxide (1)	1	allow correct formula allow water vapour
	(b)	(i)	inhaler / nebuliser (1)	1	allow intal / becotide / bronchodilators / ventalin / salbutamol allow oxygen allow (muscle) relaxant ignore pump / puffer / inhalation not paper bag
		(ii)	trachea (1) bronchus (1)	2	allow pharynx (1) windpipe (1) throat (1) not bronchitis
			Total	5	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	platelets (1)	1	
	(b)	anticoagulant (1)	1	allow named drug eg heparin, streptokinase, warfarin, aspirin (1)
	(c)	AB (1)	1	not rhesus
	(d)	an inherited condition that prevents... / fourth box (1)	1	
		Total	4	

Question		Gd	Expected Answers	Marks	Additional Guidance	
10	(a)	G	fermentation (1)	1	more than one answer = 0	
	(b)	G	apples (1)	1	allow any named apple variety (1) allow pears (1)	
	(c)	(i)	G	12 (1)	1	
		(ii)	D	steeper line drawn (1)	1	must start at origin ignore the point where it stops as long as it stays above original line
	(d)	(i)	F	gasohol	1	
		(ii)	D	less / no particulates / petrol / fossil fuels are finite / non renewable / (most) carbon dioxide released has been absorbed recently (1)	1	allow less carbon dioxide produced / added to environment allow less effect on the greenhouse effect / less effect on global warming / smaller carbon footprint but ignore <u>no</u> effect on global warming / greenhouse effect / carbon footprint allow reduces use of finite resources / fossil fuels allow petrol / oil will last longer allow plants grown to make fuel take in carbon dioxide ignore less pollution / cleaner / environmentally friendly ignore cost unless qualified e.g. uses cheaper raw materials ignore <u>biofuel</u> is (more) renewable / sustainable / carbon-neutral allow <u>alcohol</u> is renewable / sustainable / carbon-neutral
			Total	6		

Question		Gd	Expected Answers	Marks	Additional Guidance
11	(a)	F	DNA / genetic material (1)	1	allow genes / (bacterial) chromosome (1) ignore nucleus
	(b)	G	yoghurt (1)	1	more than one answer = 0
	(c)	G	food poisoning (1)	1	more than one answer = 0
			Total	3	

Question		Gd	Expected Answers	Marks	Additional Guidance
12	(a)	G	phytoplankton (1)	1	more than one answer = 0
	(b)	CC	<p>any two from more (sun) light / longer days / brighter light (1)</p> <p>warmer / more heat / higher temperature (1)</p> <p>more / faster photosynthesis (1)</p>	2	<p>need comparison with winter ignore light / warmth ignore more sun / sunnier</p> <p>allow more energy from sun (1) but not in addition to more light or more heat marks</p> <p>allow making more food allow easier to photosynthesise ignore better photosynthesis/ better conditions for photosynthesis</p> <p>ignore more minerals</p>
	(c)	C	water provides support (1)	1	<p>allow weigh less (in water) / (water) makes them lighter ignore float (in water) / buoyancy / spread out weight (in water) / water is more dense</p>
			Total	4	

Question			Gd	Expected Answers	Marks	Additional Guidance
13	(a)	(i)	E	any one from: make cheese (1) make fruit juice (1) change flavour (1) make fat free milk / cat milk (1)	1	allow specific named examples eg pectin / lactose (1) ignore sucrose / make food sweeter
		(ii)	E	test (urine / blood) for glucose (1)	1	allow sugar ignore to control their sugar levels
	(b)	(i)	G	alginate (1)	1	more than one answer = 0
		(ii)	C	mixture does not become contaminated / can use continuous flow process (1)	1	allow enzyme can be easily separated from mixture / enzyme can be used again (1)
	(c)		FEE	code (1) gene (1) light / luciferin (1)	3	allow alternatives that are not in passage eg allow make up / information (1) allow DNA
Total					7	

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

Question		Expected Answers	Marks	Additional Guidance	
1	(a)	<p>adaptation how it helps photosynthesis</p>	2	All three correct = (2) marks One or two correct = (1) mark	
	(b)	(i)	3980 kJ (1)	1	must give units allow 3980 KJ/kj
		(ii)	energy transferred to less useful forms / heat / (energy from) respiration / egestion / excretion / movement (1)	1	allow not all parts of worm are useful for energy / other things eat worms / worms may die or decay without being eaten ignore just 'energy is lost' ignore waste
	(c)		grow without soil / grow in artificial soil / growing in nutrient solution (1)	1	ignore only in water ignore just 'grow in gel / beads'
	(d)		movement of water / movement of minerals (1)	1	allow transpiration ignore direction of movement allow support / keep upright ignore just 'transport'
Total				6	

Question		Expected Answers	Marks	Additional Guidance
2	(a)	last 4 points correctly plotted (4,15), (5,19), (6,24), (7,28) (1) best straight line through origin (1)	2	allow +/- 0.5 square
	(b)	transpiration (1)	1	ignore evaporation allow diffusion
	(c)	(more) stomata on lower leaf surface / fewer or no stomata on upper surface (1) lower side is cooler (1) stomata / stomatal pore made smaller / close stomata (1) guard cells becoming flaccid / less turgor pressure (1)	3	marks to be awarded in context of reducing water loss, not just mechanism for opening / closing stomata allow sunken stomata / stomata in pits allow simply 'less stomata' ignore correct references to being open, e.g. opens in day for photosynthesis / gas exchange ignore correct references to being turgid, e.g. stomata open when guard cells are turgid
		Total	6	

Question			Expected Answers	Marks	Additional Guidance
3	(a)	(i)	amount of nitrogen (1)	1	allow underlined > 1 answer = 0
		(ii)	saprophytic (nutrition) (1)	1	allow extracellular digestion (or description)
		(iii)	increase SA / aerate / let oxygen in (1)	1	allow break into smaller pieces ignore break down (compost) allow improve drainage ignore make holes / mix compost up
	(b)		enzyme (1)	1	allow proteins / amino acids / ATP (1) ignore chlorophyll / nitrates
	(c)		active transport stops (1) energy needed to pump against gradient / can not move against gradient (1)	2	allow reverse argument, e.g. need active transport to take up nitrogen compounds / minerals / nitrates ignore just 'active transport' ignore respiration releases energy
Total				6	

Question		Expected Answers	Marks	Additional Guidance
4	(a)	nitrogen-fixing (bacteria) (1)	1	allow named examples of nitrogen-fixing bacteria eg azotobacter / clostridium / rhizobium
	(b)	convert ammonium (compounds) into nitrates (1)	1	allow converts decaying products into nitrates allow convert ammonia (compounds) into nitrates allow ammonium / ammonia / decaying products into nitrites allow nitrites into nitrates ignore just make nitrates / nitrification
		Total	2	

Question			Expected Answers	Marks	Additional Guidance
5	(a)	(i)	liver (1)	1	> 1 answer = 0
		(ii)	(a) bone (1)	1	> 1 answer = 0
	(b)	(i)	ECG / electrocardiogram / echocardiogram (1)	1	allow X rays / radio-opaque dyes / ultrasound ignore listening to heart / taking pulse rate / heart monitor
		(ii)	any two from shortage of donors / people don't want to donate (1) need a correct tissue match / same tissue type (1) must be the correct size / age (1)	2	allow reasons for not donating e.g. religion ignore simply 'ethical issues' ignore reference to rejection unless refers to tissue match ignore references to blood type allow donor heart must be undamaged / disease-free / healthy (1)
	(c)		for: more organs would be available / more transplants / more lives saved / more donors (1) against: some people may have their organs removed against their wishes / (some people think) removing organs is against religion / unethical (1)	2	allow easier to get organs ignore may be against wishes of family
Total				7	

Question		Expected Answers	Marks	Additional Guidance
6	(a)	in vitro fertilisation / second box (1)	1	> 1 answer = 0
	(b)	(i) an egg is released (from an ovary) (1)	1	ignore any references to uterus or other body changes, unless clear contradiction, e.g. release and menstruation = 0 allow follicle burst if site of release is given, it must be correct
	(c)	(i) FSH / follicle-stimulating hormone (1)	1	
		(ii) (worry that) high levels of hormones might be harmful / may cause side effects (1)	1	ignore safer / lower levels of hormone / don't need injections
Total			4	

Question		Expected Answers	Marks	Additional Guidance
7	(a)	inhaler / nebuliser (1)	1	allow intal / becotide / bronchodilators / ventalin / salbutamol allow oxygen allow (muscle) relaxant ignore pump / puffer / inhalation not paper bag
	(b)	any two from (asthma attack) caused by muscle contracting / tightening (1) inflammation of lining (1) (airways / bronchioles) decrease in diameter / become narrower / constrict (1) less air / oxygen exchanged / restricts air movement (1)	2	ignore references to chest muscles ignore airways swell up ignore get thinner / smaller / decrease in size / shrink / tighten / contract allow closes but not becomes closed ignore harder to breathe not no air enters lungs ignore references to what happens inside alveoli
	(c)	waft / move mucus (upwards / along) (1)	1	allow beat / brush mucus allow (re)move bacteria / viruses / microbes / pathogens / germs / dirt / dust not trap bacteria / viruses etc not move mucus downwards
		Total	4	

Question		Expected Answers	Marks	Additional Guidance
8	(a)	heparin / aspirin / warfarin (1)	1	ignore anticoagulant
	(b)	an inherited condition that prevents... / fourth box (1)	1	> 1 answer = 0
	(c)	reduce the chance of rejection / agglutination / clumping (1) (blood groups refer to) agglutinins / antigens / chemical groups on (red) blood cells (1) are attacked by antibodies (in recipient) (if not matched) (1)	3	allow reduce chance of clotting allow only transfusions between certain blood groups are successful / AW allow idea that antibodies involved in response, just the word 'antibodies' = 0
Total			5	

Question		Expected Answers	Marks	Additional Guidance
9	(a)	$C_2H_5OH + CO_2$ (1) BUT with correct balancing (2)	2	$2C_2H_5OH + 2CO_2$ scores 2 marks symbols must be accurate and formulae numbers subscript
	(b)	(i) 20 / 12 (1) BUT 1.67 (2)	2	correct answer with no working out score 2 marks allow answer in range 1.6 – 1.7
		(ii) steeper line drawn (1)	1	must start at origin ignore the point where it stops as long as it stays above original line
	(c)	any one from less / no particulates (1) petrol / fossil fuels are finite / non renewable (1) (most) carbon dioxide released has been absorbed recently (1)	1	allow less carbon dioxide produced / added to environment allow less effect on the greenhouse effect / less effect on global warming / smaller carbon footprint but ignore <u>no</u> effect on global warming / greenhouse effect / carbon footprint allow reduces use of finite resources / fossil fuels allow petrol / oil will last longer allow plants grown to make fuel take in carbon dioxide ignore less pollution / cleaner / environmentally friendly ignore cost unless qualified e.g. uses cheaper raw materials ignore <u>biofuel</u> is (more) renewable / sustainable / carbon-neutral allow <u>alcohol</u> is renewable / sustainable / carbon-neutral
		Total	6	

Question		Expected Answers	Marks	Additional Guidance
10	(a)	control the cell / replicate cell (1)	1	allow contains genes / hold (genetic) information / (genetic) instructions / codes for proteins / codes for enzymes (1) ignore made of DNA allow replicate DNA ignore controls what enters / leaves cell
	(b)	prevent contamination / stop or kill (growth of) unwanted / harmful bacteria (1)	1	allow safe to eat as no pathogens ignore to kill bacteria ignore (make) safe to eat ignore stop yoghurt being infected
	(c)	(i) Vibrio (1)	1	more than one answer = 0 allow ringing / underlining but mark answer line first
		(ii) damage to water supply / lack of clean water / water contaminated (by faeces) (1)	1	allow overcrowding / disruption to health service allow water is polluted ignore damage to electrical supply or food supply / <i>damage to drains / damage to sewage pipes</i>
Total			4	

Question		Expected Answers	Marks	Additional Guidance
11	(a)	phytoplankton (1)	1	ignore producer
	(b)	any two from more (sun) light / longer days / brighter light (1) warmer / more heat / higher temperature (1) more / faster photosynthesis (1)	2	need comparison with winter ignore light / warmth ignore more sun / sunnier allow more energy from sun (1) but not in addition to more light or more heat marks allow making more food allow easier to photosynthesise ignore better photosynthesis/ better conditions for photosynthesis ignore more minerals
	(c)	water provides support (1)	1	allow weigh less (in water) / (water) makes them lighter ignore float (in water) / buoyancy / spread out weight (in water) / water is more dense
	(d)	true false false false	2	all 4 correct = 2 marks 2 or 3 correct =1 mark
Total			6	

Question			Expected Answers	Marks	Additional Guidance
12	(a)	(i)	glucose <u>and</u> fructose(1)	1	both answers required for mark
		(ii)	mixture does not become contaminated (with sucrase) / can use continuous flow process (1)	1	allow enzyme can be easily separated from product / enzyme can be used again allow less likely to denature
	(b)	(i)	lipase (1)	1	
		(ii)	soluble molecules (1)	1	allow molecules can dissolve allow hydrophilic/don't repel water ignore smaller molecules
			Total	4	

Grade Thresholds

General Certificate of Secondary Education
Biology B (Specification Code J643)
January 2010 Examination Series

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B631/01	Raw	60	-	-	-	34	27	21	15	9	0
	UMS	69	-	-	-	60	50	40	30	20	0
B631/02	Raw	60	43	34	25	17	11	8	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0
B632/01	Raw	60	-	-	-	36	29	22	15	8	0
	UMS	69	-	-	-	60	50	40	30	20	0
B632/02	Raw	60	45	37	29	21	15	12	-	-	0
	UMS	100	90	80	70	60	50	45	-	-	0

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	0.0	10.0	15.0	45.0	95.0	100.0	100.0	100.0	100.0	20

For a description of how UMS marks are calculated see:

<http://www.ocr.org.uk/learners/ums/index.html>

Statistics are correct at the time of publication.

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