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GCSE

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Mark Scheme for the Units

January 2010

J643/MS/R/10J

Oxford Cambridge and RSA Examinations

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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

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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**	

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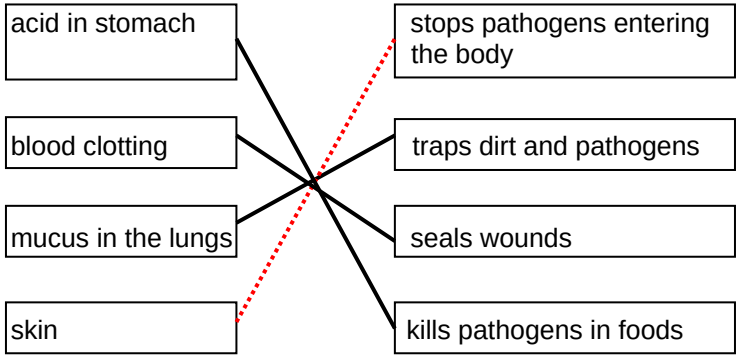
Question			Expected Answers	Marks	Additional Guidance
2	(a)		virus	1	**allow** ringed, underlined more than 1 answer = 0
	(b)			2	All three correct = (2) marks One or two correct = (1) mark
	(c)		(passive immunity) the immunity lasts for a short time / antibodies from someone else / have not made own 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 long**er** / makes own antibodies
			Total	**4**	

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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)	aspirin (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**	

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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**	

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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**	

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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** photosynthesise better **allow** easier to photosynthesise **ignore** more sun
			Total	**5**	

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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**	

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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**	

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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**	

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Question			Expected Answers	Marks	Additional Guidance
10	(a)		**any two from:** choose the strongest dogs from the offspring (1) breed offspring (1) repeat breeding process (1)	2	 **allow** stronger **but not** just strong ignore best / desired characteristics e.g. choose best offspring = 0 choose best offspring and breed = 1 **allow** mate / reproduce. Must be clear that it is the best dogs are being bred cannot score repeat mark without reference to selection . e.g. they are bred again and again (1) **but** the best offspring are chosen and bred, this is done again and again (2)
	(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**	

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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**	

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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**	

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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**	

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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**	

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Question			Gd	Expected Answers	Marks	Additional Guidance
2	(a)		D	damage (body) cells / produce toxins (1)	1	**allow** destroy / kill cells (1) **allow** replicate inside cells (1) **allow** stops the cells working correctly (1) **ignore** attack cells **ignore** reference to tissue / organs
	(b)	(i)	AA	tick in box 1 (1) (non-living pathogen injected which makes the body produce antibodies) tick in box 3 (1) (weakened, living pathogen injected which carries antigens on its surface)	2	if more than two boxes ticked, each additional tick loses one mark
		(ii)	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 (1) **allow** antibodies pass from mother to baby (in breast milk) (1) **but not** from parents / parent unqualified **ignore** immunity from another person **for active immunity allow** lasts long**er** / makes own antibodies
				Total	**4**	

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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**	

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Question			Expected Answers	Marks	Additional Guidance
4	(a)	(i)	ovulation	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**	

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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**	

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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**	

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Question			Expected Answers	Marks	Additional Guidance
7	(a)		**any two from:** buried / covered in sediment / sand (1) soft tissues decay (1) hard tissue / bone replaced by <u>minerals</u> (1)	2	 **ignore** soil / rock / dirt buried must be qualified e.g. they are buried = 0 **but** buried under sand = 1 **allow** flesh decays (1) **ignore** body / animal decays **but** body decays leaving bone = 1 **ignore** space replaced by minerals **ignore** reference to imprints.
	(b)		environmental change (1)	1	**allow** volcanic eruptions / SO_2 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)
	(c)		2, 4, (1), 3	1	
	(d)		went against religious / accepted ideas (1)	1	**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
			Total	**5**	

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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 lumen 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**	

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

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Question			Expected Answers	Marks	Additional Guidance
10	(a)	(i)	mitosis (1)	1	
		(ii)	**any one from:** (chromosomes) are copied (1) divide to (opposite poles) (1)	1	**allow** duplicate / replicate (1) **not** multiply **allow** DNA replicated / copied (1) **ignore** they double up **not** form double chromosomes **allow** split apart **but ignore** just 'split' **allow** they shorten / line up on equator / move towards poles
	(b)		acrosome (1)	1	
	(c)		cell that has not specialised / not differentiated (1)	1	**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
			Total	**4**	

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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 for100) 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**	

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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**	

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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**	

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

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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**	

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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**	

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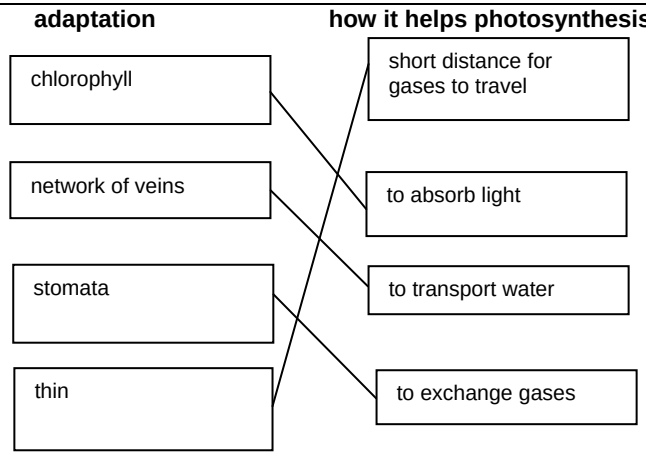
Question			Expected Answers	Marks	Additional Guidance
5	(a)			2	All three correct = (2) marks One or two correct = (1) mark
	(b)	(i)	3980 kJ	1	**must** give units **allow** 3980 KJ/kj
		(ii)	energy transferred to less useful forms / heat / (energy from) respiration / egestion / excretion / movement (1)	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**	

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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**	

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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)	mitosis (1)	1	**allow** phonetic spelling
			Total	**5**	

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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**	

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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**	

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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** no 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** biofuel is (more) renewable / sustainable / carbon-neutral **allow** alcohol is renewable / sustainable / carbon-neutral
				Total	**6**	

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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**	

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Question			Gd	Expected Answers	Marks	Additional Guidance
12	(a)		G	phytoplankton (1)	1	more than one answer = 0
	(b)		CC	**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)		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
				Total	**4**	

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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** sucrase / 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**	

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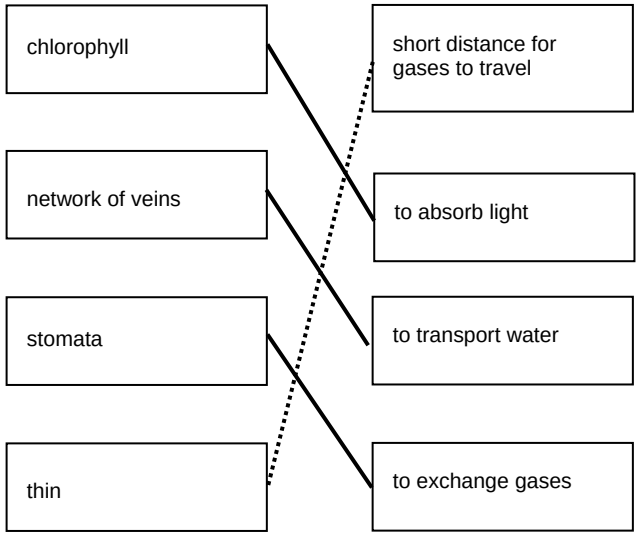
B632/02 Unit 2: Modules B4, B5 and B6 Foundation Tier

Question			Expected Answers	Marks	Additional Guidance
1	(a)		adaptation / how it helps photosynthesis  	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**	

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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**	

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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**	

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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**	

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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**	

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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**	

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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**	

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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**	

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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** no 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** biofuel is (more) renewable / sustainable / carbon-neutral **allow** alcohol is renewable / sustainable / carbon-neutral
			Total	**6**	

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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 / *damage to* drains / *damage to sewage pipes*
			Total	**4**	

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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**	

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Question			Expected Answers	Marks	Additional Guidance
12	(a)	(i)	glucose and 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**	

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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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