

Biology B J643

Gateway Science Suite

General Certificate of Secondary Education

Mark Scheme for the Units

January 2008

J643/MS/R/08J

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All Examiners are instructed that alternative correct answers and unexpected approaches in candidates' scripts must be given marks that fairly reflect the relevant knowledge and skills demonstrated.

Mark schemes should be read in conjunction with the published question papers and the Report on the Examination.

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Any enquiries about publications should be addressed to:

OCR Publications
PO Box 5050
Annersley
NOTTINGHAM
NG15 0DL

Telephone: 0870 770 6622
Facsimile: 01223 552610
E-mail: publications@ocr.org.uk

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GCSE Gateway Biology B J643

MARK SCHEMES FOR THE UNITS

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General advice to Assistant Examiners

- 1 Correct answers to calculations always gain full credit even if no working is shown. (The 'Show your working' is to help candidates, who may then gain partial credit even if their final answer is not correct.)
- 2 Some questions may have a 'Level of Response' mark scheme. Any details about these will be in the rationale.
- 3 If an answer has been crossed out and no alternative answer has been written then mark the answer crossed out.
- 4 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	Rationale	
1		genes (1) DNA (1) chromosomes (1)	3	allow arrows to correct word	
		Total	3		
2	a	(viruses/germs) trapped by mucus (membrane) / removed by cilia (1) OR (viruses/germs) destroyed by white blood cells / immune system / antibodies (1) OR already immune (1)	1	allow stopped by mucus (1) not stopped by cilia ignore hairs allow WBC stop them / WBC were able to defend her allow her immune system is better / may be stronger (1) not has had the flu jab	
	b	infectious (no mark) idea of passing from one person to another (1)	1	if non-infectious = no mark allow you can catch it / can be spread (1)	
	c	i	flu (1)	1	allow any other correct indication e.g underline
		ii	cystic fibrosis (1)	1	allow any other correct indication e.g underline
		Total	4		

Question			Expected Answers	Marks	Rationale
3	a		ear (1)	1	allow any other correct indication e.g underline
	b	i	yes (no mark) response is fast / protective / did without thinking (1)	1	if no = no mark allow she jumped back quickly without thinking / she moved quickly (1) allow automatic / brain not involved (1) not brain automatically reacts
		ii	slow(er) (1)	1	allow less coordinated (1) allow slowing the brain (1)
	c		can not judge distance (as well) / reduced field of vision / AW (1)	1	allow loss of vision on one side (1) allow poor / no 3D vision / lack of depth perception (1) allow difficult to judge position / where things are (1) ignore monocular vision / no binocular vision ignore blurred vision / vision not as good
			Total	4	

4	a	i	overweight (1)	1	more than one answer ringed scores (0) allow any other correct indication eg underline
		ii	answer between 7 and 27 (kg) (1)	1	figures are inclusive allow either figure or range within acceptable range eg 7 – 10 scores (1) but 6 – 10 scores (0) allow correct answer with correct units eg 7000 grams
	b		37.5 g / grams (1)	1	mark answer line first. if blank allow if final answer clearly indicated above unit and correct figure required for mark allow correct answer with correct units eg 0.0375 kg
	c		energy / respiration (1)	1	
			Total	4	

Question		Expected Answers	Marks	Rationale	
5	a	get oxygen / glucose (1) BUT get more oxygen / glucose OR get oxygen / glucose more quickly (2) to muscles (1) for (aerobic) respiration / energy release (1)	3	allow remove carbon dioxide (1) BUT remove more carbon dioxide OR remove carbon dioxide more quickly (2) from the muscles (if mentioning carbon dioxide) allow reduces anaerobic respiration / lactic acid build up / oxygen debt '...breathing quickly because <u>not</u> getting <u>enough oxygen</u> '(2), implies needs more oxygen	
	b	i	evaporation (requires heat / energy) (1)	1	allow vaporisation (1) allow changes from a liquid to a gas (1) allow higher level answers with correct reference to latent heat eg water has a high latent heat
		ii	homeostasis (1)	1	more than one answer ringed scores (0) allow any other correct indication eg underline
Total			5		

6	a	ability to make own food / photosynthesise / contain chloroplasts / chlorophyll / more spreading growth / cells have cell walls / cellulose (1)	1	allow cells have large vacuoles (1) allow food stored as starch (1) allow leaves / roots / stems / flowers allow do not move allow grow continuously / do not have a finite size / cell division mainly at tips of roots and shoots / cells retain ability to differentiate / mainly grow by cell enlargement (1)
	b	binomial (1)	1	more than one answer ticked scores (0) allow any other correct indication eg underline
	c	photosynthesis (1) adapted (1)	2	allow arrows to correct word
Total			4	

Question			Expected Answers	Marks	Rationale
7	a	i	food / shelter / nesting sites / territory (1)	1	not mates allow prey (1) allow space (1) ignore habitat / water
		ii	habitat (1) community (1)	2	allow arrows to correct word
	b	i	claws (1)	1	allow pincers / pinchers (1) not mouthparts / hands / feet / limbs
		ii	predator (1)	1	allow any other correct indication e.g underline
	c	i	in danger of becoming extinct (1)	1	allow may die out (1) allow hardly any left / numbers dropping too much or too low (1) not just numbers dropping
		ii	osprey (1)	1	allow any other correct indication e.g underline
Total			7		

8	a	i	sulfur dioxide (1)	1	allow any other correct indication e.g underline
		ii	increasing population / allow to generate more energy / more cars / travel (1)	1	allow any idea that clearly implies increased energy consumption eg more things being built so the machines burn more fossil fuels (1) allow more factories (1) ignore standard of living up / more products being made etc, if no link to energy consumption
	b		air / atmosphere / gases (1)	3	ignore ozone layer ignore named gases unless air implied eg N ₂ O ₂ and CO ₂ allow idea that radiation is prevented from escaping allow blocks / stops / re-radiates not destroys
			traps / reflects / absorbs (1)		
			global warming / greenhouse effect (1)		both words correct for one mark not greenhouse gases
Total			5		

Question	Expected Answers	Marks	Rationale	
9	a	man-made / not natural / dug (1)	1	
	b	a net (1)	1	allow any other correct indication e.g underline
	c	800 (2) but $200/0.5 = 400$ or $200 \times 2 = 400$ (1)	2	mark answer line first, if blank look in space above correct answer on its own scores (2) 400 on its own scores (1)
		Total	4	

10	a	(cell) membrane (1) and nucleus (1) correctly labelled	2	allow arrows to correct word
	b	(sperm cell) fertilises/joins with egg cell (1) (white blood cells) defend / fight / protect against disease / pathogens / illness / infections / micro-organisms / germs (1) (red blood cells) transport / carry oxygen / oxyhaemoglobin (1)	3	ignore 'swims' allow 'carries male genes to the egg' allow higher level answer: make antibodies / antitoxins / engulf (or eat) bacteria (1) not contains haemoglobin
	c	cells divide / carry out mitosis (1) cell differentiation / turn into specialised cells (1)	2	allow cells multiply (1) allow higher level answer: eg DNA replication
		Total	7	

11	a	asexual (1) identical (1)	2	allow arrows to correct word
	b	(B) D A C (2) D anywhere before A (1) A anywhere before C (1)	2	ie CDA / DCA ie ADC / ACD
	c	(encourage) root (growth) / cell differentiation (1)	1	allow cell specialisation (1) not just growth ignore shoot / leaf / stem growth
		Total	5	

Question		Expected Answers	Marks	Rationale
12	a	alveoli (1)	1	allow alveolus (1) allow air sac (1) not bronchioles / air bag sacs
	b	i	1	allow O ₂ but not O
		ii	2	allow diffusion ignore descriptions of alveoli eg permeable allow down a concentration gradient (1)
		Total	4	

13	a	change in the genes / DNA / chromosomes (1)	1	must have the idea of change in genetic material eg number of chromosomes change / mistakes occur in copying DNA
	b	radioactivity / radiation / named type of radiation eg UV X-rays alpha beta gamma (1) chemicals / named chemical mutagen eg (cigarette) tar (1)	2	ignore occur spontaneously allow sunlight allow microwaves ignore (visible) light / radio / infra red allow carcinogens not just smoking / cigarettes
	c	640 (1)	1	Mark answer line first; if blank credit unambiguous answer above
		Total	4	

		Section Total	60	
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B631/02 Unit 1: Modules B1, B2 and B3 HigherTier

Question			Expected Answers	Marks	Rationale
1	a	i	overweight (1)	1	more than one answer ringed scores [0] allow any other correct indication eg underline
		ii	answer between 7 and 27 (kg) (1)	1	figures are inclusive allow either figure or range within acceptable range eg 7 – 10 scores (1) but 6 – 10 scores [0] allow correct answer with correct units eg 7000 grams
	b		37.5 g / grams (1)	1	mark answer line first. if blank allow if final answer clearly indicated above unit and correct figure required for mark allow correct answer with correct units eg 0.0375 kg
	c		if he is vegetarian / ethical issues / religious or moral issues / medical issues / allergies / fat content (1)	1	allow taste / cost / convenience / availability (1) allow media influences (1) ignore his choice / lifestyle / work hours / his diet / method of cooking
			Total	4	

2	a		<p>lens becomes thinner / less rounded (1)</p> <p>ciliary muscle relaxes (1)</p> <p>suspensory ligaments tighten (1)</p>	3	<p>allow lens is stretched / flatter (1)</p> <p>ignore lens is longer</p> <p>not just lens changes shape</p> <p>not lens contracts</p> <p>allow ciliary muscles get longer (1)</p> <p>allow suspensory ligaments are pulled / pull (1)</p> <p>ignore suspensory ligaments contract / stretch</p>
	b		can not judge distance (as well) / reduced field of vision / AW (1)	1	<p>allow loss of vision on one side (1)</p> <p>allow poor / no 3D vision / lack of depth perception (1)</p> <p>allow difficult to judge position / where things are (1)</p> <p>ignore monocular vision / no binocular vision</p> <p>ignore blurred vision / vision not as good</p>
			Total	4	

Question			Expected Answers	Marks	Rationale
3	a	i	evaporation (requires heat / energy) (1)	1	allow vaporisation (1) allow changes from a liquid to a gas (1) allow higher level answers with correct reference to latent heat eg water has a high latent heat
		ii	homeostasis (1)	1	more than one answer ringed scores (0) allow any other correct indication eg underline
	b		needs to remove / breakdown lactic acid / lactic acid is present (1) any one from: has been respiring anaerobically (1) needs extra oxygen (1) to pay back oxygen debt (1)	2	allow move lactic acid from muscles / to liver (1) not just needs oxygen, must be idea of more oxygen
Total				4	

4	a		probability: 0.25 / 25% / 1 in 4 / 1/4 / 1:3 / 1 to 3 (3) but correct offspring: FF, Ff, Ff, ff (2) but correct gametes: f and F (1)	3	correct answer, no working sores (3) not 1:4 correct offspring, gametes not clearly identified scores (2) allow as headings in Punnett square only allow in a line diagram if gametes shown clearly separated, circled or labelled
		b	red-green colour blindness (1)	1	more than one answer ringed scores (0) allow any other correct indication eg underline
Total				4	

Question		Expected Answers	Marks	Rationale
5	a	few(er) cilia / cilia do not work / cilia damaged (1)	1	allow cilia clogged (1) allow more mucus (1) not just covered in mucus allow reference to cancer eg DNA damaged (1) not just cell damage / cells depleted not covered in tar / dirt / dust not hairs
	b	satisfy craving / addicted to nicotine (1)	1	allow same sensation (1) allow gives you the nicotine you need (1) allow it allows you to come off nicotine slowly / reduce withdrawal symptoms / no cold turkey (1) allow do not contain all the other harmful things cigarettes do (1)
	c	(fit means) idea that good at physical activity (1) (healthy means) free from infection (1)	2	allow specific example such as good stamina / short recovery time / strong / agile / fast / flexible (1) ignore just being active / efficient allow not ill allow can fight illness/ infection / strong immune system (1) ignore references to diet / drugs / exercise / stress / smoking
Total			4	
6	a	ability to make own food / photosynthesise / contain chloroplasts / chlorophyll / more spreading growth / cells have cell walls / cellulose (1)	1	allow cells have large vacuoles (1) allow food stored as starch (1) allow leaves / roots / stems / flowers (1) allow do not move (1) allow grow continuously / do not have a finite size / cell division mainly at tips of roots and shoots / cells retain ability to differentiate / mainly grow by cell enlargement (1)
	b	binomial (1)	1	more than one answer ticked scores (0) allow any other correct indication eg underline

Question		Expected Answers	Marks	Rationale																
6	c	<p>any two from:</p> <table border="0"> <tr> <td>adaptation stem swollen</td> <td>reason stores water (1)</td> </tr> <tr> <td>stem green</td> <td>so takes over the role of photosynthesis (1)</td> </tr> <tr> <td>rounded shape</td> <td>to reduce surface area / so less water loss (1)</td> </tr> <tr> <td>small leaves / spines</td> <td>to reduce surface area / so less water loss / stops animals eating them (1)</td> </tr> <tr> <td>thick cuticle</td> <td>so less water loss / stops animals eating them (1)</td> </tr> <tr> <td>long / deep / spreading roots</td> <td>more water uptake (1)</td> </tr> <tr> <td>less stomata / not open so wide</td> <td>less water loss (1)</td> </tr> <tr> <td>reduced surface area</td> <td>less water loss (1)</td> </tr> </table>	adaptation stem swollen	reason stores water (1)	stem green	so takes over the role of photosynthesis (1)	rounded shape	to reduce surface area / so less water loss (1)	small leaves / spines	to reduce surface area / so less water loss / stops animals eating them (1)	thick cuticle	so less water loss / stops animals eating them (1)	long / deep / spreading roots	more water uptake (1)	less stomata / not open so wide	less water loss (1)	reduced surface area	less water loss (1)	2	<p>correct adaptation must be linked to correct reason for each mark. Read whole answer to look for links</p> <p>allow large / thick stem</p> <p>ignore hollow to store water</p> <p>allow spikes / needles</p> <p>not just cuticle</p> <p>allow to reach water deeper in the ground / over a large area allow to get enough water / water they need not just to get water</p>
adaptation stem swollen	reason stores water (1)																			
stem green	so takes over the role of photosynthesis (1)																			
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less stomata / not open so wide	less water loss (1)																			
reduced surface area	less water loss (1)																			
	d	natural selection (1)	1	<p>ignore evolution ignore survival of the fittest</p>																
		Total	5																	

Question		Expected Answers	Marks	Rationale
7	a	they cannot mate and produce fertile crayfish (1)	1	more than one answer ticked scores (0) allow any other correct indication eg underline
	b	i	2	<p>candidates may answer in the context of the crayfish or in more general terms</p> <p>allow stop (British crayfish) numbers falling / prevent extinction / maintain biodiversity (1) ignore endangered (as in stem of question)</p> <p>not people catching them</p> <p>allow reduces the disruption to the food web / ecosystem (1)</p>
		ii	2	<p>any two from:</p> <p>cultural arguments / difficult to get international agreement / AW (1)</p> <p>difficult to police / illegal whaling occurs / AW (1)</p> <p>difficult to control where they go / difficult to know where they are / cannot put in a reserve / AW (1)</p> <p>allow whales provide useful products eg food (1) allow some countries still want to hunt whales (1)</p> <p>allow difficult to know if people are hunting whales / difficult to stop people hunting (1)</p> <p>allow correct reference to large size eg difficult to control / move / protect / provide safe surroundings / large enough space (1)</p>
Total			5	

Question		Expected Answers	Marks	Rationale
8	a	<p>air / atmosphere / gases (1)</p> <p>traps / reflects / absorbs (1)</p> <p>global warming / greenhouse effect (1)</p>	3	<p>ignore ozone layer / ionosphere</p> <p>ignore named gases unless air implied eg N₂ O₂ and CO₂</p> <p>allow idea that radiation is prevented from escaping</p> <p>allow blocks / stops / re-radiates</p> <p>not destroys</p> <p>both words correct for one mark</p> <p>not greenhouse gases</p>
	b	<p>any two from</p> <p>carbon dioxide level is a limiting factor for photosynthesis (1)</p> <p>plants will take up more carbon dioxide (1)</p> <p>reducing the carbon dioxide in the atmosphere / more carbon locked up in biomass (1)</p> <p>(reducing the carbon dioxide levels) reduces the amount of heat trapped / greenhouse effect (1)</p>	2	<p>not just plants take away carbon dioxide / take up carbon dioxide / more photosynthesis. Must be idea of more carbon dioxide taken up</p> <p>ignore global warming</p>
		Total	5	

Question			Expected Answers	Marks	Rationale
9	a	i	800 (2) but $200/0.5 = 400$ or $200 \times 2 = 400$ (1)	2	mark answer line first, if blank look in space above correct answer on its own scores (2) 400 on its own scores (1)
		ii	small sample size / sample may not have been representative (1)	1	allow there is only one sample (1) allow there may be more in other areas of the pond (1) ignore not all of pond is sampled
	b		any two from: look for the idea of biological indicator species (1) idea that presence or absence indicates level of pollution (1) fewer animals in cows' field / ORA (1) less biodiversity in cows' field / ORA (1)	2	assume reference to polluted pond / cows' field if unqualified allow named example of an indicator species eg bloodworm, waterlouse, sludgeworm, rat-tailed maggot (1) not just look for dead animals but large numbers of eg bloodworm, which are adapted to pollution, indicates a polluted pond / small numbers of eg gammarus, which are not adapted to pollution, indicates a polluted pond (2) allow correct figures to describe eg 16 in cow's field and 20 in natural pond (1) allow correct figures to describe eg 4 in cow's field and 7 in natural pond (1) allow less different types of animals overall (1) allow one or more species is missing (1)
Total				5	

Question		Expected Answers	Marks	Rationale
10	a	<p>any two from:</p> <p>(carry out) respiration (1)</p> <p>(provide / release) energy (1)</p> <p>for movement (1)</p>	2	<p>allow make / produce / for energy (1)</p> <p>allow correct reference to ATP (1)</p> <p>ignore store energy</p> <p>but energy to move scores (2)</p> <p>allow for work</p>
	b	<p>any two from:</p> <p>(cell) wall (1)</p> <p>(large) vacuole (1)</p> <p>chloroplast (1)</p>	2	<p>ignore cellulose</p> <p>ignore chlorophyll</p>
	c	i	1	<p>allow a cell that is not yet specific</p> <p>not simple / basic cells</p> <p>not part of a plant</p>
		ii	1	<p>allow 'playing God' / unethical / not natural (1)</p>
		Total	6	

Question		Expected Answers	Marks	Rationale
11	a	(encourage) root (growth) / cell differentiation (1)	1	allow cell specialisation (1) not just growth ignore shoot / leaf / stem growth
11	b	use (large numbers of) small pieces of tissue (1) aseptic technique / sterile scalpel / sterile apparatus (1) max one from: use of suitable growth medium / nutrients / hormones / minerals / amino acids (1) example of suitable conditions: warm temperature / oxygen / light / carbon dioxide / water (1)	3	ignore cells / cuttings allow scrapings (of cells) not just clean allow microbe free (1) allow named example eg agar, auxin
	c	any one from: chromosomes are copied / replicated (1) move to opposite poles (1) diploid number is maintained (1)	1	ignore any description of division eg splitting ignore any description of meiosis allow DNA / genetic material is copied (1) allow chromosomes condense / become thicker / become shorter / appear as two chromatids (1) ignore chromosomes double allow move to opposite sides / ends of the cell (1) allow same number of chromosomes in newly formed cell(s) as original cell (1)
		Total	5	

Question		Expected Answers	Marks	Rationale
12	a	alveoli (1)	1	allow alveolus (1) allow air sac (1) not bronchioles / air bag sacs
	b	(oxygen) / (gases) <u>diffuse</u> (1) from high to low concentration / high conc in alveoli and low conc in blood (1)	2	allow diffusion (1) ignore descriptions of alveoli eg permeable allow down a concentration gradient (1)
	c	short diffusion distance (1)	1	allow steeper / greater concentration / diffusion gradient (1) not just quicker / easier ignore references to surface area
Total			4	

13	a	answer in range 8500 - 10000 (1)	1	figures are inclusive count number of noughts
	b	radioactivity / radiation / named type of radiation eg UV X-rays alpha beta gamma (1) chemicals / named chemical mutagen eg (cigarette) tar (1)	2	ignore occur spontaneously allow sunlight / nuclear accident (1) allow microwaves (1) ignore (visible) light / radio / infra red allow carcinogens (1) not just smoking / cigarettes
	c	i	1	allow specific examples eg AAT changes to ATG (1) ignore genes change / coding changes / DNA change not eg letter of DNA alphabet missing
		ii	1	allow different amino acid(s) (1)
Total			5	

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

Question		Expected Answers	Marks	Rationale
1	a	vacuole (1)	1	more than one answer ringed = 0
	b	Any two from: contains chlorophyll (1) absorb (sun) light (1) for photosynthesis / make food / make sugar (1)	2	allow uses light to make food (2) allow absorb / transfer energy (1)
	c	support / stop over expansion of cells(1)	1	allow keep its shape (1) ignore maintains structure ignore protection unless qualified eg stop cell bursting (1)
Total			4	

2	a	A (1) any two from: loses most / more water (1) most / more transpiration / evaporation (1) A has a much larger surface area / leaf surface (1) has most / more leaves (1)	3	ignore needs more water / uses more water ignore plant / bigger roots
	b	minerals / nutrients / nitrates / magnesium / other named example (1)	1	not food / soil allow fertiliser / eg of fertiliser
Total			4	

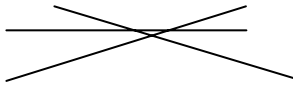
Question			Expected Answers	Marks	Rationale
3	a	i	caterpillars (1)	1	not pests
		ii	idea that more crop produced (1) OR less / no cabbage being eaten (1)	1	allow improve yield / bigger cabbages (1) allow improve quality / less damage (1) allow cabbage has more chance of surviving (1)
	b	i	dandelions (1)	1	ignore hawthorn hedge
		ii	idea that more crop produced (1) OR less / no competition for light / water / space / other valid example (1)	1	not stops them suffocating
			Total	4	

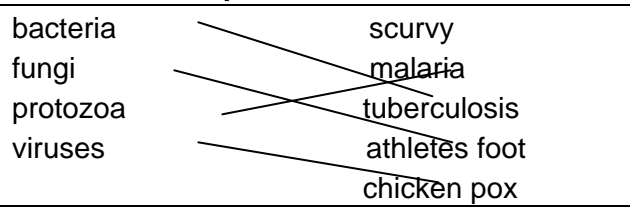
4	a		bacteria / fungi (1)	1	allow valid example allow microbes / microorganisms (1) not insects	
		b		warm(er) / ORA (1)	1	allow hotter / hot (1) ignore lighter / brighter / sunnier / sun / sunshine allow more decomposers (1)
			c	combustion (1) respiration (1)	2	more than two answer ringed = 0
			Total	4		

5	a	i	1140 (kJ) (1)	1	
		ii	respiration (1)	1	not moving allow muscle contraction / correct reference to metabolism (1)
	b		2 (%) (1)	1	
		c	30kJ (1)	1	
			Total	4	

Question		Expected Answers	Marks	Rationale
6	a	amoeba (1)	1	
	b	shark (1)	1	
	c	shark and human (1)	1	
		Total	3	

7	a	i	to show that they want their organs used for transplants (when they die) (1)	1	eg so they can donate organs (1) not donate blood ignore parts of body
		ii	any two from: blood / cornea / heart / lungs / kidney / bone marrow / skin / liver (1)	1	allow face / valves (1) not artificial organs not hip / leg / knee
	b	i	any two from: the number of people who need transplants is increasing (1) not enough donors (1) the gap is widening (1)	2	ignore the number of donors are going down BUT allow relative number of donors are going down eg more people need transplants than there are donors (1) eg there are not enough donors and the number of people needing transplants is going up (2)
		ii	some people donate several organs / some donors are live donors (1)	1	ignore reference to preserving organs allow animal transplants / dead person has more than one organ (1) ignore mechanical replacements not live donation of invalid organ eg heart
		Total		5	

Question			Expected Answers	Marks	Rationale
8	a	i	ovary (1) vagina (1)	2	more than one answer on a line = 0
		ii	ovary (1)	1	
	b			2	one or two correct = 1 mark more than two lines from any box loses a mark
Total				5	
9	a	i	ulna (1)	1	
		ii	simple (1)	1	more than one answer ringed = 0
	b	i	hinge joint (1)	1	allow synovial (1)
		ii	tendons (1)	1	
Total				4	
10	a		tick on middle row (1)	1	more than one answer ticked = 0
		b	releases (more) sweat (1) evaporates taking heat from skin (1)	2	ignore water / liquid / moisture ignore references to brain and negative feedback
Total				3	
11	a		flagellum (1) and cell wall (1) correctly labelled	2	
		b	yoghurt / vinegar / silage / compost (1)	1	allow any correct suggestion eg insulin not wine
	c		spherical (1) spiral (1)	2	allow coccus (1) allow spirillum (1)
Total				5	

Question		Expected Answers	Marks	Rationale	
12	a	bacteria fungi protozoa viruses 	3	more than one line to any box, lose 1 mark	
	b	i	8 (1)	1	
		ii	(produce) toxins / pyrogens (1)	1	allow body response to raise temperature not body fighting bacteria
	c	antibiotics (1)	1	more than one answer ringed = 0	
		Total	6		

13	a	methane (1)	1	allow CH ₄ (1)
	b	generate electricity / fuels (for buses) (1)	1	allow cooking / lighting / any correct use (1) ignore fire unless qualified
	c	any two from: anchorage (1) minerals / named mineral (1) water (1)	2	allow oxygen (1) ignore nutrients not food / fertilisers
		Total	4	

Question		Expected Answers	Marks	Rationale
14	a	clinistix / reagent strip (1) turns green / brown (1) OR any two from: Benedict (1) heat urine (1) turns green / yellow / red orange (1)	2	results must match test allow biosensor (1) correct observation eg current change (1)
	b	genetic engineering (1)	1	allow GM / genetically modified (1)
	c	any two from: sucrase breaks down sucrose (1) into fructose (and glucose) (1) into sweeter product (1) so less needs to be added to food (1)	2	not breaks down sugar into sucrose not sucrase can be broken down sucrase breaks down sucrose into glucose and galactose = max 1
		Total	5	
		Overall Total	60	

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

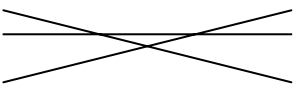
Question		Expected Answers	Marks	Rationale
1	a	combustion (1) respiration (1)	2	more than two answer ringed = 0
	b	feed on dead material / AW (1)	1	allow correct description of extracellular digestion (1) not living material
	c	denitrifying bacteria (1)	1	more than one answer ringed = 0
	d	make / produce / for / protein / amino acid(s) (1)	1	allow bases of DNA not contains / provides protein / amino acid(s)
Total			5	

2	a	i	1140 (kJ) (1)	1	
		ii	respiration (1)	1	not moving allow muscle contraction / correct reference to metabolism (1)
	b		2 (%) (1)	1	
	c		30 kJ (1)	1	
Total			4		

3	a	i	any two from: could harm other organisms (1) get into food chains / bioaccumulation (1) some are / could be persistent / can't be broken down / excreted (1)	2	ignore may get washed into rivers / damage to food chain not eutrofication allow may build up resistance (1) kills organisms higher up the food chain = 2
		ii	may not attract right birds / birds not insect eaters / bird boxes may not be used (1)	1	allow birds eat other food / don't eat the caterpillars (1) ignore may not eat all the caterpillars
	b	i	(needed to make) chlorophyll (1)	1	ignore chloroplasts
		ii	absorb (more) light / (more) photosynthesis (1)	1	allow increase rate of photosynthesis (1) there is more chlorophyll is not enough for mark
Total			5		

Question		Expected Answers	Marks	Rationale
4	a	more transpiration / more evaporation / more water lost (1) (light) opens stomata (1)	2	must be comparison not just the plant is transpiring ignore more light / more photosynthesis ignore using more water allow more humid in cupboard (1) allow less air movement in cupboard (1)
	b	control / see if water lost without plant (1)	1	not simply 'fair test'
	c	any one from: more / quicker diffusion (1) more evaporation (1)	1	allow more transpiration (1) ignore more water / mass lost
	d	i	1	ignore flaccid
		ii	<u>air</u> (1)	1
Total			6	

5	a	any two from: the number of people who need transplants is increasing (1) not enough donors (1) the gap is widening (1)	2	ignore the number of donors are going down BUT allow relative number of donors are going down eg more people need transplants than there are donors (1) eg there are not enough donors and the number of people needing transplants is going up (2)
	b	some people donate several organs / some donors are live donors (1)	1	ignore reference to preserving organs allow animal transplants / dead person has more than one organ (1) ignore mechanical replacements not live donation of invalid organ eg heart
	c	rejection / side effects from immuno-suppressive drugs (1)	1	not fights the organ allow production of antibodies if correctly qualified allow possible infection / inflammation (1)
Total			4	

Question		Expected Answers	Marks	Rationale
6	a		2	one or two correct = 1 mark more than two lines from any box loses a mark
	b	any two from: difficulty making mother baby bond (1) baby is not genetically linked to one or both of them (1) difficult to find surrogate mother (1) (surrogate) mother may not wish to give up the baby (1) health issues / genetic disorders (1)	2	not ethical allow cost if qualified (1) eg may have to go private which is expensive allow idea of sperm / egg donation (1)
		Total	4	
7	a	any two from: how much cartilage is present (1) cartilage is converted to bone / degree of ossification (1) reference to calcium / phosphate being added to the bone (1)	2	Ignore presence / absence of cartilage
	b	(human) growth hormone (1)	1	
	c	genetic link (1)	1	allow inherited condition (1)
		Total	4	
8	a	releases (more) sweat (1) evaporates taking heat from skin (1)	2	ignore water / liquid / moisture ignore references to brain and negative feedback
	b	A	1	allow ascending loop of Henle (1)
	c i	pacemaker (1)	1	allow SA node (1)
	ii	adrenaline (1)	1	allow noradrenalin (1)
		Total	5	

Question		Expected Answers	Marks	Rationale
9	a	3.5 million (2)	2	2 million children / 1.5 million adults = 1 mark allow 3500000 / 3.5×10^6
	b	medicines to prevent allergic reactions / (inhalers to) relax muscles in the airways /(1)	1	allow removal of allergens / expand bronchioles / appropriate reference to mucus (1) allow correct named medication (1)
Total			3	

10	a	spherical (1) spiral (1)	2	allow coccus (1) allow spirillum (1)
	b	i any one from: convert ammonium compounds (1) into nitrates / nitrites / NO_2^- / NO_3^- (1)	1	not convert nitrogen to product
		ii <i>Azotobacter</i> / <i>Clostridium</i> / <i>Rhizobium</i> (1)	1	
Total			4	

11	a	i 4 (1)	1	
		ii (produce) toxins / pyrogens (1)	1	allow body response to raise temperature (1) not body fighting bacteria
	b	(Alexander) Fleming (1)	1	
Total			3	

Question		Expected Answers	Marks	Rationale
12	a	generate electricity / fuels (for buses) (1)	1	allow cooking / lighting / any correct use (1) ignore fire unless qualified
	b	any one from: less CO ₂ produced than in fossil fuels (1) no particulates (1) sustainable / renewable (1) no net addition of CO ₂ to air (1) methane more effective greenhouse gas if released (1)	1	allow qualified cost eg free so does not have to pay for fuel (1) ignore less pollution / less CO ₂ allow less contribution to greenhouse effect (than fossil fuels) (1) allow does not contain sulfur / no increase in acid rain (1)
	c	any two from: bacteria rely on enzymes / there are enzymes (1) enzymes / proteins <u>denatured</u> at higher temperatures (1) bacteria killed by higher temperatures (1)	2	eg enzymes in bacteria are denatured (1) not kill enzymes not denature bacteria allow enzymes not at optimum temperature (1) not reference to explosion
Total			4	

13	a	(insulin) gene inserted into plasmid / bacterial DNA (1) bacteria cloned / reproduced / divide / grown cultured / (1)	2	allow splicing (1) ignore gene is put into the bacteria
	b	restriction enzyme / restriction endonuclease (1)	1	
	c	any two from: sucrase breaks down sucrose (1) into fructose (and glucose) (1) into sweeter product (1) so less needs to be added to food (1)	2	not breaks down sugar into sucrose not sucrase can be broken down sucrase breaks down sucrose into glucose and galactose = max 1
Total			5	

Question		Expected Answers	Marks	Rationale
14	a	less 21 and greater 9 (1)	1	
	b	2CH ₃ CH ₂ OH / 2C ₂ H ₅ OH (1) 2CO ₂ (1)	2	allow correct formula not balanced = 1
	c	to kill bacteria / microbes / AW (1)	1	allow improve keeping quality / stop further fermentation / stop bottles bursting (1) kills yeast needs to be qualified eg kills yeast to stop fermentation =1 BUT kills yeast =0 ignore removes bacteria
		Total	4	
		Overall Total	60	

Grade Thresholds

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

Unit Threshold Marks

Unit		Maximum Mark	A*	A	B	C	D	E	F	G	U
B631/01	Raw	60	-	-	-	35	28	21	15	9	0
	UMS	69	-	-	-	60	50	40	30	20	0
B631/02	Raw	60	47	38	29	20	12	8	-	-	0
	UMS	100	90	80	70	60	50	40	-	-	0
B632/01	Raw	60	-	-	-	32	26	20	14	8	0
	UMS	69	-	-	-	60	50	40	30	20	0
B632/02	Raw	60	42	34	26	19	11	7	-	-	0
	UMS	100	90	80	70	60	50	40	-	-	0

For a description of how UMS marks are calculated see:
http://www.ocr.org.uk/learners/ums_results.html

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OCR (Oxford Cambridge and RSA Examinations)
1 Hills Road
Cambridge
CB1 2EU

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Telephone: 01223 553998

Facsimile: 01223 552627

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