OCR
RECOGNISING ACHIEVEMENT

GCSE

Biology B

General Certificate of Secondary Education

Unit **B732/01**: Modules B4, B5, B6 (Foundation Tier)

Mark Scheme for June 2013

Oxford Cambridge and RSA Examinations

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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.

OCR will not enter into any discussion or correspondence in connection with this mark scheme.

Annotations

Annotation	Meaning
	correct response
	incorrect response
	benefit of the doubt
	benefit of the doubt **not** given
	error carried forward
	information omitted
	ignore
	reject
	contradiction
	Level 1
	Level 2
	Level 3

Subject-specific Marking Instructions

Abbreviations, annotations and conventions used in the detailed Mark Scheme.

/	=	alternative and acceptable answers for the same marking point
(1)	=	separates marking points
allow	=	answers that can be accepted
not	=	answers which are not worthy of credit
reject	=	answers which are not worthy of credit
ignore	=	statements which are irrelevant
( )	=	words which are not essential to gain credit
__	=	underlined words must be present in answer to score a mark (although not correctly spelt unless otherwise stated)
ecf	=	error carried forward
AW	=	alternative wording
ora	=	or reverse argument

Question			Answer	Marks	Guidance
1	(a)	(i)	vinegar (1)	1	**not** garlic / bay leaves
		(ii)	bummalo (1)	1	
	(b)		bacteria / fungi (1)	1	**allow** mould
	(c)		used to breakdown / decompose / digest (sewage) (1)	1	**allow** decay / rot **ignore** feeds on
			Total	**4**	

Question			Answer	Marks	Guidance
2	(a)		by osmosis (1) through **cell** membrane (1)	2	**ignore** diffusion **allow** through semi permeable membrane (1) **allow** ideas about concentration differences (1) e.g. moves from **high** water concentration to low **water** concentration (1)
	(b)		**any two from:** **cells** are full of water / **cells** are rigid / **cells** swollen / AW (1) cells are **turgid** / **turgor** pressure (1) clear description of turgor: contents of cells pushing against cell wall (1)	2	 **ignore** cells take in water (in question) **ignore** chip is rigid **ignore** cells are stronger / hard **allow** chip is turgid (1) **ignore** not flaccid
			Total	**4**	

Question			Answer	Marks	Guidance
3	(a)	(i)	biological (control) (1)	1	**not** biological pesticides
		(ii)	he is an organic farmer (1)	1	**allow** not allowed to use chemicals **allow** pesticides harm / damage the environment **not** damages crops / swedes
	(b)		**(Level 3)** Answer includes details of collecting method that include ideas about random sampling or repeats. The calculation is correct and there is sensible interpretation of the result. Quality of written communication does not impede communication of the science at this level.**(5-6 marks)** (**Level 2)** Answer includes a description of the correct collecting method **OR** Names a correct collecting method **AND** makes a simple interpretation of the data **OR** Names a correct collecting method or makes a simple interpretation of the data **AND** correctly calculates the estimate of the population. Quality of written communication partly impedes communication of the science at this level.**(3-4 marks)** **(Level 1)** Answer includes some reference to a collecting method **OR** makes a simple interpretation of the data **OR** shows the correct method of calculation but answer may be incorrect. Quality of written communication impedes communication of the science at this level. **(1-2 marks)** **(Level 0)** Insufficient or irrelevant science. Answer not worthy of credit. **(0 marks)**	6	**This question is targeted at grades up to C** **Indicative scientific points may include at level 3: points from level 2 and** • some reference is given to sampling being at random • idea that repeats are needed • idea that a number of traps are set or quadrats used • an appreciation that 450 is only estimates. **Indicative scientific points may include at level 2:** • description of how to place pitfall traps in the ground • describes how to use quadrat without reference to random sampling • estimate of population is 450 • quite successful as the population has halved / numbers have decreased / gone down **Indicative scientific points may include at level 1:** • use pitfall traps or counting using quadrats • calculation is $\frac{50 \times 45}{5}$ • method is working as population has gone down Use L1, L2, L3 annotations in scoris. Do not use ticks.
			Total	**8**	

Question			Answer	Marks	Guidance
4	(a)		glucose **and** oxygen (1)	1	**any order** **allow** sugar
	(b)	(i)	idea that not enough mass/materials/substances/nutrients lost from soil to supply the mass/material/substances/nutrients gained by the tree (1) correct **calculation**: soil lost 1kg but tree gained 78kg (1)	2	**allow** the tree gained (much) more mass than the soil lost **allow** total mass changed from 102kg → 179kg (1) **allow** soil would have been 22kg (if scientists were correct) (1) **allow** the tree gained 77kg from somewhere else (not soil) = 2 marks **allow** tree gained 78kg but soil **only** lost 1kg = (2) (BOD)
		(ii)	**any three from:** enters through root (hairs) (1) by osmosis (1) transported up the stem (1) passes through xylem (1) lost from the leaves by evaporation (1) by the process of transpiration (1)	3	 **allow** correct description of osmosis (1) **ignore** diffusion / active transport **for extra marking point allow** **allow** a (small amount) used in photosynthesis (1)
	(c)	(i)	hydroponics (1)	1	**allow** soil-less culture
		(ii)	soil contains minerals (1) minerals needed for plant growth / without minerals plants do not grow so well (1)	2	**allow** nutrients (1) **allow** reference to a specific mineral in soil (1) **ignore** natural fertilisers **allow** function of a specific mineral (1)
			Total	**9**	

Question			Answer	Marks	Guidance
5	(a)		<table><tr><td>ball and socket joint</td><td></td><td>B</td><td></td></tr><tr><td>fixed joint</td><td></td><td>A</td><td></td></tr><tr><td>hinge joint</td><td></td><td>C</td><td>(2)</td></tr></table>	2	all correct 2 marks 1 or 2 correct 1 mark
	(b)		**right** leg is simple (fracture) (1) **left** leg is compound (fracture) (1) if legs are not specified max 1 mark eg one is an open fracture the other is a simple fracture	2	**allow right** is closed fracture (1) **ignore** hairline/greenstick **allow left** is open / complex / spiral fracture (1) look for other ways of stating left or right e.g. annotation on diagram
	(c)		anti-coagulants (1)	1	**allow** ringed answer
			Total	**5**	

Question			Answer	Marks	Guidance
6	(a)		**any three from:** menstruation / period / lining shed from 1st Feb (to 5th) or when she is bleeding uterus lining thickens / repaired / builds up from any date starting on the 6th to the 28th ovulation / egg released Feb 13 or 14 or 15th or egg released when she is most fertile (1) uterus thickness maintained from the 15th to 28th next menstruation / period / lining shed starts on 1st March or when she is bleeding again	3	**ignore** bleeding / blood lost **allow** any dates within range

Question	Answer	Marks	Guidance
(b)	**(Level 3)** Gives a detailed explanation of male **AND** female reason why fertilisation will not take place. Quality of written communication does not impede communication of the science at this level. **(5–6 marks)** **(Level 2)** Makes simple comment on chances of having children **AND** refers to either male or female reason why fertilisation will not take place. **OR** Makes a simple male **AND** female reason why fertilisation will not take place. Quality of written communication partly impedes communication of the science at this level. **(3–4 marks)** **(Level 1)** Makes simple comment on chances of having children **OR** Makes a simple male **or** female reason why fertilisation will not take place. Quality of written communication impedes communication of the science at this level. **(1–2 marks)** **(Level 0)** Insufficient or irrelevant science. Answer not worthy of credit. **(0 marks)**	6	**This question is targeted at grades up to E** **Indicative scientific points at level 3 may include:** **both one reason why male AND one reason why female might contribute to infertility** • damaged sperm means no tails so less chance of reaching the egg • sperm many have no heads so cannot fertilise egg • missing enzymes so can't break egg wall down • difficulty in predicting fertile period for synchronising sperm and egg meeting • idea that irregular periods mean Janet will not know when she is fertile and therefore when to try for a baby **allow** higher level responses eg use of FSH and IVF **Indicative scientific points at level 1 and 2 may include:** • Gavin or Janet might be infertile / less likely to have children • sperm cannot swim / get to egg • eggs might not be released / irregular egg production • Janet may not know when she is most fertile • they don't know when is the best time to try for a baby • egg and sperm may not meet (on its own level 1) **allow** will probably need fertility treatment Use the L1, L2, L3 annotations in scoris. Do not use ticks.
	Total	**9**	

Question			Answer	Marks	Guidance
7	(a)	(i)	90 (%) (1)	1	**allow** 90.32258 or correct rounding
		(ii)	vessel at A = capillary (1) vessel at B = vein (1)	2	**allow** capillary bed / arteriole (1) **ignore** small artery **allow** venule / named vein e.g. vena cava (1)
	(b)	(i)	reduces effective blood circulation / blood could fall back into heart / backflow would happen (1) pressure is not maintained / reduces pressure (1)	2	**ignore** references to oxygenated/deoxygenated **ignore** less blood but **allow** less blood pumped around body **ignore** job of valves e.g. valves stop backflow **allow** not enough pressure to push blood around **allow** oedema / idea of fluid building up in tissues / lungs **ignore** references to higher pressure e.g. inside heart
		(ii)	biological . ✓ chemical ethical mechanical ✓ physical (1)	1	**both boxes ticked for 1 mark more than two ticked scores zero**
			Total	**6**	

Question			Answer	Marks	Guidance
8	(a)		**any three from:** (digestive enzymes) break down food (1) turns (large molecules) into smaller molecules (1) to make food soluble (1) so that it can be absorbed into blood (1)	2	**ignore** to break up food **not** to break down food so it can be digested **allow** so they can be transported (1) **allow any** correct example e.g. protease breaks down protein into amino acids (2)
	(b)	(i)	supports claim (that found in stomach) because it works best/optimum around pH 2 (1) does not support claim that it is a protease since there is no evidence (1)	2	**allow** optimum pH matches stomach pH **allow** idea it could be another type of enzyme
		(ii)	small intestine (1)	1	
			Total	**5**	

Question			Answer	Marks	Guidance
9	(a)		rots (1) methane (1) digester (1)	3	
	(b)		**any two from:** yeast uses sugar (1) to makes alcohol / ethanol (1) by fermentation / anaerobic respiration / without oxygen (1) alcohol is mixed with petrol (1)	2	**allow** yeast is fermented **allow** higher level answer turned into gasohol (1)
			Total	**5**	

Question			Answer	Marks	Guidance
10	(a)		no maggots when covered because **flies** could not get in / lay eggs (1) this shows the flies are needed **or** maggots develop from eggs not meat (1)	2	**allow** reverse argument: only get maggots when uncovered as **flies** can get in / lay eggs (1) **ignore** just 'maggots don't come from meat'
	(b)		idea of not enough evidence (1)	1	**allow** only explain why maggots form does not disprove other examples of (spontaneous generation') **allow** fungal spores too small to see / few microscopes available **allow** lack of scientific method to test ideas / **other** scientist have not tested it **allow** poor communication meant work not published World wide **allow** ideas about religious beliefs / superstition hindering acceptance of new ideas **ignore** idea that he only did it once
	(c)		(bacterial) DNA (1) flagellum (1)	2	**allow** genetic material **/** genes / chromosomes but **not** nucleus
	(d)		no bacteria in B because they were **killed** / bacteria **killed** in both flasks in stage 2 (1) bacteria cannot get into B / can get into A (1) BUT shape of the neck in B stops the bacteria getting in / the shape of the neck allows bacteria into flask A (2) bacteria multiply in A / in B gravy stays sterile (1)	3	 **ignore** B has no bacteria / A has bacteria **ignore** bacteria grow/develop in A (in question) **ignore** bacteria do not grow/develop in B (in question) **allow** ideas about how they reproduce as extra marking points e.g. bacteria in A feed and multiply by asexual reproduction or binary fission (1) **ignore** references to oxygen / lack of oxygen
			Total	**8**	

Question			Answer	Marks	Guidance
11	(a)		8 (km) (1)	1	
	(b)		**(Level 3)** Describes at least two **linked** patterns **AND** explains the described patterns in terms of eutrophication. Quality of written communication does not impede communication of the science at this level. **(5–6 marks)** **(Level 2)** Describes at least two **linked** patterns **OR** Describes one pattern **and** attempts to explain the described pattern. Quality of written communication partly impedes communication of the science at this level. **(3–4 marks)** **(Level 1)** Describes at least one pattern **OR** attempts an explanation. Quality of written communication impedes communication of the science at this level. (**1–2 marks)** **(Level 0)** Insufficient or irrelevant science. Answer not worthy of credit. **(0 marks)**	6	**This question is targeted at grades up to C** **Indicative scientific points at Level 3 may include:** some of the points from level 1 and 2 plus • fertiliser used by algae • algae numbers increase • too much algae / not enough light • algae die and are decomposed by bacteria • bacteria use up oxygen during decomposition process • fish cannot respire so die. NOT algae use oxygen – limits to L2 **Indicative scientific points at Level 2 may include:** some of the points from level 1 plus • oxygen levels decrease as bacteria numbers increase / oxygen levels increase as bacteria numbers decrease • fish numbers decrease as bacteria numbers increase / fish numbers increase as bacteria numbers decrease • fish numbers decrease as oxygen levels decrease / fish numbers increase as oxygen levels increase **explanation** • fish numbers fall because bacteria use up all the oxygen • bacteria increase as more food • fish need oxygen to stay alive **Indicative scientific points at Level 1 may include:** • oxygen levels decrease past the factory (then rise again) • fish numbers decrease past the factory (then rise again) • bacteria numbers increase past the factory (then fall again) • fish die because there is no oxygen • bacteria use up the oxygen. Use the L1, L2, L3 annotations in scoris; do not use ticks.
			Total	**7**	

Question			Answer	Marks	Guidance
12	(a)		(she has type 1 diabetes) because her level is less than 9.0 (1) but not less than 8.5 (1)	2	**if state she is type 2 then no marks** **allow** value between 9 and 8.5 (2)
	(b)		in (glass) beads (1) or on reagent sticks (1)	2	**ignore** but in gel **allow** high level answers as extra marking points mixed with alginate (1) drop the mixture into calcium chloride (1)
	(c)		genetic engineering (1)	1	**more than one tick score zero**
			Total	**5**	

Question			Answer	Marks	Guidance
13	(a)	(i)	Ethiopia (1)	1	
		(ii)	Uruguay (1)	1	
	(b)		no for cholesterol but yes for BMI (1) cholesterol: (only) 1 country / India has higher cholesterol for females / ora (1) BMI: 4 countries have higher BMI for males / ora / only Cyprus has higher BMI for females (1)	3	**allow** most countries higher cholesterol in men (1) **ignore** idea that in more / most countries males have higher BMI
	(c)		the higher the (blood) cholesterol the higher the BMI ora / positive correlation (1)	1	
	(d)	(i)	all points correctly plotted to within 0.5 square (2) **but** three / four points correctly plotted to within 0.5 square (1)	2	points are: (3.2, 24.5) (3.6, 22.6) (4.7, 28.0) (4.7, 25.2) (5.0, 27.0) **ignore** labels
		(ii)	there is (now) no link / pattern / correlation (1) (because) points are scattered / random / AW (1)	2	 **allow** examples e.g. Greece and Netherlands have same cholesterol but different BMI (1)
			Total	**10**	

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