RECOGNISING ACHIEVEMENT

GCSE

Environmental and Land Based Science

General Certificate of Secondary Education

Unit **B682/02** Plant Cultivation and Small Animal Care (Higher Tier)

Mark Scheme for January 2013

OCR (Oxford Cambridge and RSA) is a leading UK awarding body, providing a wide range of qualifications to meet the needs of candidates of all ages and abilities. OCR qualifications include AS/A Levels, Diplomas, GCSEs, Cambridge Nationals, Cambridge Technicals, Functional Skills, Key Skills, Entry Level qualifications, NVQs and vocational qualifications in areas such as IT, business, languages, teaching/training, administration and secretarial skills.

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This mark scheme is published as an aid to teachers and students, to indicate the requirements of the examination. It shows the basis on which marks were awarded by examiners. It does not indicate the details of the discussions which took place at an examiners' meeting before marking commenced.

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

Used in the detailed Mark Scheme:

Annotation	Meaning
/	alternative and acceptable answers for the same marking point
(1)	separates marking points
not/reject	answers which are not worthy of credit
ignore	statements which are irrelevant - applies to neutral answers
allow/accept	answers that can be accepted
(words)	words which are not essential to gain credit
words	underlined words must be present in answer to score a mark
ecf	error carried forward
AW/owtte	credit alternative wording / or words to that effect
ORA	or reverse argument

Available in scoris to annotate scripts:

	indicate uncertainty or ambiguity
BOD	benefit of doubt
CON	contradiction
	incorrect response
ECF	error carried forward
	draw attention to particular part of candidate's response
NBOD	no benefit of doubt
R	reject
	correct response

L1 , L2 , L3	indicate level awarded for a question marked by level of response
^	information omitted

Subject-specific Marking Instructions

a. Accept any clear, unambiguous response (including mis-spellings of scientific terms if they are *phonetically* correct, but always check the guidance column for exclusions).

b. Crossed out answers should be considered only if no other response has been made. When marking crossed out responses, accept correct answers which are clear and unambiguous.

e.g. for a one-mark question where ticks in the third <u>and</u> fourth boxes are required for the mark:

This would be worth 1 mark.

This would be worth 0 marks.

This would be worth 1 mark.

c. The list principle:
If a list of responses greater than the number requested is given, work through the list from the beginning. Award one mark for each correct response, ignore any neutral response, and deduct one mark for any incorrect response, e.g. one which has an error of science. If the number of incorrect responses is equal to or greater than the number of correct responses, no marks are awarded. A neutral response is correct but irrelevant to the question.

d. Marking method for tick-box questions:

If there is a set of boxes, some of which should be ticked and others left empty, then judge the entire set of boxes.
If there is at least one tick, ignore crosses and other markings. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses. Credit should be given according to the instructions given in the guidance column for the question. If more boxes are ticked than there are correct answers, then deduct one mark for each additional tick. Candidates cannot score less than zero marks.

e.g. if a question requires candidates to identify cities in England:

Edinburgh	
Manchester	
Paris	
Southampton	

the second and fourth boxes should have ticks (or other clear indication of choice) and the first and third should be blank (or have indication of choice crossed out).

Edinburgh			✓			✓	✓	✓	✓	
Manchester	✓	×	✓	✓	✓				✓	
Paris				✓	✓		✓	✓	✓	
Southampton	✓	×		✓		✓	✓		✓	
Score:	**2**	**2**	**1**	**1**	**1**	**1**	**0**	**0**	**0**	**NR**

e. For answers marked by levels of response:

i. **Read through the whole answer from start to finish**
ii. **Decide the level** that **best fits** the answer – match the quality of the answer to the closest level descriptor
iii. **To determine the mark within the level**, consider the following:

Descriptor	Award mark
A good match to the level descriptor	The higher mark in the level
Just matches the level descriptor	The lower mark in the level

iv. Use the **L1**, **L2**, **L3** annotations in Scoris to show your decision; do not use ticks.

Quality of Written Communication skills assessed in 6-mark extended writing questions include:

- appropriate use of correct scientific terms
- spelling, punctuation and grammar
- developing a structured, persuasive argument
- selecting and using evidence to support an argument
- considering different sides of a debate in a balanced way
- logical sequencing.

Question			CBT Q No	Answer	Marks	Guidance
1			**1**	D water loss	1	
2			**2**	(Glucose) for respiration / to provide energy; (Amino acids) to make proteins/ for growth; (Hormones) for shoot / root growth/ cell differentiation; (Antibiotics) to prevent the growth of bacteria / fungi	2	**I** disease unless qualified
3			**3**	mutation	1	
4			**4**	Parental genotypes completed correctly / resistant rr and non resistant Rr; Punnett Square completed correctly; F1 generation phenotypes and genotypes completed correctly resistant rr and non resistant Rr.	3	Allow ecf
5	**(a)**		**5**	a crop which contains a gene from a different species / genes changed/ altering the genetic make-up of a species by artificial means / artificial introduction (or removal) of a mutation into a specific gene.	1	**R** genetics changed
	(b)		**5**	Maize(no mark) Relevant statement: increase in weeds/insects compared with a decrease for beet and rape; Relevant data: insects increase from 11.57-15.58/ weeds increase from 8-14	2	some figures from the table required for marking point 2
	(c)		**6**	two from: to eliminate other variables / to ensure same conditions; same weather/climate; same soil type/crumb structure/pH/nutrient level;	2	**I** reference to fair test

Question			CBT Q No	Answer	Marks	Guidance
	(d)		**6**	two from: no way of ever showing total safety; no mention of cross breeding with wild plants; no mention of human health/safety, allergies etc;	2	
6	**(a)**		**7**	**Level 3 (5–6 marks)** Correctly named biological control agent and target organism; Provides a very detailed description of how the biological control agent works. Provides a detailed comparison (of the advantages and disadvantages) of the two types of control. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Correctly named biological control; Provides a detailed description of how the agent works. Provides an comparison of the two types of control. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** An example that shows an understanding of what a biological control agent is. A description of how the biological control agent works A relevant statement comparing biological and chemical control. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**Relevant detail about biological control agents include:** • for example: *Encarsia Formosa* / whitefly • for example: parasite which lays its eggs in the scales, the eggs hatch out and feed off the scales **Relevant points for comparison include:** Biological control: • does not leave a residue on the crop which would be eaten by consumers • does not affect other organisms which may be predators / pollinators / may be important in the food chain • does not leach into rivers / soils and affect wildlife • does not kill all the pests • needs to be introduced at the start of the season • takes time to work • could escape from the glasshouse • Less harmful to consumers / other organisms / environment **accept** reverse arguments **ignore** reference to cost **ignore** wasps stinging humans

Question			CBT Q No	Answer	Marks	Guidance
	(b)		**8**	bees are needed for pollination of flowers to produce fruit / many vegetables do not have to be pollinated (to get a crop)	1	
7	**(a)**		**9**	6.5; the nutrients need to be dissolved in water / soluble; for plants / roots to absorb them;	3	
	(b)		**9**	Any one from: DNA; Cell membranes / phospholipids; ATP;	1	
8	**(a)**		**10**	4.8g	1	

Question			CBT Q No	Answer	Marks	Guidance
	(b)		**11**	**Level 3 (5–6 marks)** Provides a very detailed comparison of the two foods to include most of the constituents and relevant values; Correct detailed identification of the target animals; Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Provides a detailed comparison of the two foods to include some of the constituents and some reference to a piece of data from the label; Correct identification of the target animals; Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Provides a limited comparison of the two foods to include a constituent of the feedstuffs; Correct identification of one of the target animals; Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**Relevant comparative points include:** • Feedstuff B contains more protein than A, 16% compared to 12% • Feedstuff B contains twice as much oil as A. • Feedstuff B contains more calcium / iron than A • Feedstuff A and B contain the same quantities of fibre and vitamins **Identification of target animals:** Young rabbit / lactating female requires • High protein for growth / repair • High oil for energy / insulation • High calcium for bones • High iron for efficient oxygen carriage in the blood Maintenance ration for mature rabbit requires • smaller quantities of protein, oil, calcium and iron • similar quantities of fibre to aid movement of food through the digestive tract • similar trace quantities of vitamins for general health
9			**12**	any three from: allows all the nutrients to be absorbed; microorganisms / bacteria in caecum; digest cellulose; nutrients absorbed in small intestines; idea that caecum is after the small intestine; so must pass through digestive system again	3	

Question			CBT Q No	Answer	Marks	Guidance
10	**(a)**		**13**	any two from: **Advantages** do not have to wait for a hen to go broody / hens keep laying eggs; no risk of hens abandoning eggs / animals eating eggs; hatch more eggs; **Disadvantages** cost of incubator; less % success rate / possibility of a power cut; time consuming/turning eggs;	2	
	(b)	**(i)**	**14**	larger eggs require a lower temperature than smaller eggs / larger eggs have a lower hatching percentage at each temperature;	1	
		(ii)	**14**	increased metabolic activity / respiration releases more heat / larger eggs have thicker shells that are harder to break or any relevant point; test related to hypothesis.	2	
11			**15**	£125	1	**A** £145

Question			CBT Q No	Answer	Marks	Guidance
12			16	**Level 3 (5–6 marks)** Provides a detailed explanation of how vaccines work. Produces a very detailed summary of the evidence which weighs up both sides of the argument and makes full use of the information provided. Quality of written communication does not impede communication of the science at this level. **Level 2 (3–4 marks)** Provides some explanation of how vaccines work. Produces a detailed summary of the evidence which mentions both sides of the argument and makes use of the information provided. Quality of written communication partly impedes communication of the science at this level. **Level 1 (1–2 marks)** Provides a limited explanation of how vaccines work. Provides some evidence for and / or against the argument. Quality of written communication impedes communication of the science at this level. **Level 0 (0 marks)** Insufficient or irrelevant science. Answer not worthy of credit.	6	**Relevant detail on vaccines** • Use of killed or altered strains of the pathogen • Produces an immune response / antibodies • Remain in blood to protect against future infections **Relevant arguments on vaccination** • Vaccinations are expensive, however it is cheaper than vet bills if the animal becomes ill • Only a small number of animals are adversely affected by vaccination and the risk of death due to contracting a disease is higher • Many articles are from focus groups who may be biased and do not necessarily have scientific backgrounds • Some unscrupulous vets may persuade pet owners to have unnecessary vaccinations to make money

Question			CBT Q No	Answer	Marks	Guidance
13	(a)		17	salmonella / tetanus / bird flu / *E.coli* / ringworm/ rabies	1	**R:** fleas, swine flu **A:** other suitable examples
	(b)		17	any two from: scratching; loss of fur; observation of fleas / nits; flee dirt when combed; skin irritation/ red marks on skin	2	
				Total	**50**	

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