OCR
Oxford Cambridge and RSA

GCSE

Environmental and Land Based Science

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

General Certificate of Secondary Education

Mark Scheme for June 2018

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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.

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	alternative wording
ORA	or reverse argument

Available in RM Assessor to annotate scripts

	indicate uncertainty or ambiguity
	benefit of doubt
	contradiction
	incorrect response
	error carried forward
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	draw attention to particular part of candidate's response
	no benefit of doubt
	reject
	correct response
	draw attention to particular part of candidate's response
	information omitted

Subject-specific Marking Instructions

a. If a candidate alters his/her response, examiners should accept the alteration.

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 boxes 3 and 4 are required for the mark:

Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.	Put ticks (✓) in the two correct boxes.
☐	☐	☒
☐	☐	☒
☒	✓	✓
☒	☒	✓
☐	☐	☐
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 boxes:

Always check the additional guidance.

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. If there are no ticks, accept clear, unambiguous indications, e.g. shading or crosses.
Credit should be given for each box correctly ticked. 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 a city in England, then in the boxes

Edinburgh	
Manchester	
Paris	
Southampton	

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

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

Question			Answer	Marks	Guidance
1	a		Box 1: $6CO_2$ Box 2: $6O_2$	1	
	b		**A**	1	
	c		as temperature increases the number of bubbles per minutes increases/rate of photosynthesis increases/positive correlation; any **one** from: enzymes are more efficient/ molecules have more kinetic energy at higher temperatures/ temperature is the limiting factor	2	
	d		other factors limit the rate of photosynthesis; such as light/CO_2 **OR** Too much water is lost; plant will wilt/ lots of money spent on watering	2	Accept - kill beneficial insects Accept – too hot for workers

Question			Answer	Marks	Guidance
2	a		200%	1	
	b		**[Level 3]** A detailed description of the roles of water, oxygen and temperature in germination, with scientific explanation. Quality of written communication does not impeded communication of the science at this level. (5-6 marks) **[Level 2]** A description of the role of water, oxygen and temperature in germination. Quality of written communication partly impedes communication of the science at this level. (3-4 marks) **[Level 1]** A description of the role of water, oxygen or temperature in germination. 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:** **Water:** • Water enters the seed (causing the cotyledons) to swell (and the testa) to burst • The plumule and radicle/ root and shoot are able to grow • Water is needed to make the food store soluble (so that it can be used in respiration/cell metabolism) **Oxygen:** • Oxygen is used to respire • Energy released (by respiration is used for growth of the plumule and radicle) **Temperature:** • Enzymes • Catalyse reactions/ respiration • Break dormancy **Use the L1, L2, L3 annotations in RM Assessor; do not use ticks**

Question			Answer	Marks	Guidance
3	a		50 (tonnes)	2	1 mark - 20 times
	b		wood ash because it is high in K/needed for fruit and flowers; dried blood/bonemeal high in N/ needed for growth	2	1 mark – woodash **and** dried blood/bonemeal with no reason
	c		any **two** from: improves crumb structure; improves water retention; slow nutrient release; encourages soil fauna/adds microbes; contains micronutrients/names micronutrient; recycles waste; eat organic produce	2	

Question			Answer	Marks	Guidance
4			**[Level 3]** An explanation of the techniques used in genetic engineering specifically referring to vitamin C. A detailed description of the possible environmental and ethical issues arising with some evaluation. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** A detailed description of the techniques used in genetic engineering together with some of the environmental **and** ethical issues arising. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** A basic description of the techniques used in genetic engineering together with some of the arguments for and against its use. 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 A* Indicative scientific points may include: **Technique:** • Genetic engineering is the transfer of genes/characteristics from one species to another. • Selection of species/characteristic/gene high vitamin C content • Use of enzymes/named enzyme. **Issues:** • Problems of cross pollination of GMOs with normal varieties. • Small gene pool/ all crops susceptible to the same diseases • Invasion of natural habitat by GMOs. • Unknown long term health risks associated with eating GMOs. • GMOs could be toxic to insects and lead to biomagnification. • Alteration of food web and consequent knock on effect. • Farmers unable to save the seed from sterile GMOs. • Control of GMOs by multinational corporations. • Use of land to produce food for guinea pigs • Cost of development of GM crops for pets instead of humans • Unethical to develop GM crops/GM crops are unnatural • Long process so takes time Credit should be given to any suitable examples that candidates have studied. **Use the L1, L2, L3 annotations in RM Assessor; do not use ticks.**

Question			Answer	Marks	Guidance
5	a	i	Tick in box next to “external parasite”	1	
		ii	168	1	
	b		vaccinations cause antibodies/description of immune response (to be produced to provide immunity against infection); maggots damage the external tissue (and this does not stimulate antibody production); OWTTE	2	
6			**[Level 3]** A detailed description and explanation of digestion in poultry with reference to the relevant specific nutrients in the feed. Quality of written communication does not impede communication of the science at this level. (5 – 6 marks) **[Level 2]** A description and some explanation of digestion in poultry with reference to some of the specific nutrients in the feed. Quality of written communication partly impedes communication of the science at this level. (3 – 4 marks) **[Level 1]** A simple description of digestion in poultry. 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 A** **Indicative scientific points may include:** • Hens swallow feed without chewing • store it in the crop • proventriculus / stomach where enzymes/acid are added • Acid helps to kill any bacteria • Gizzard has very muscular walls. • Gizzard contains grit is used to grind up the food • Enzymes break up large insoluble nutrients into smaller soluble ones/ named examples • Digested food can be absorbed through the walls of the small intestine (into the blood) • The caecum absorbs some water and salts. • Caecum contains microbes which help to digest some of the fibre. • Water absorbed in large intestine • Waste passes out of the vent/cloaca/anus • Vitamins and minerals are absorbed in the small intestine (without being digested) **Use the L1, L2, L3 annotations in RM Assessor; do not use ticks.**

Question			Answer	Marks	Guidance
7	a		**ALL** three points correctly plotted correct prediction	2	
	b		any **two** from: repeat; calculate the mean value; measure the mass of the eggs more often during incubation; use more precise equipment; check the accuracy e.g. calibrate	2	
	c		any **four** from: allantoic sac gets larger/surrounds the embryo allantoic sac stores nitrogenous waste; allantoic sac provides a large surface area for absorption of oxygen; oxygen needed for respiration; yolk sac gets smaller; yolk sac provides protein/lipid/nutrients; for growth and respiration; AVP release of CO_2 causes mass loss;	4	

Question			Answer	Marks	Guidance
8	a		45 days	1	**ALLOW** 46 or 47 days
	b	i	any **two** from: to mimic the wild; so the dragon gains extra nutrients from their gut contents; to fill Mushu up so he require fewer crickets;	2	**ALLOW** to keep the crickets alive
		ii	calcium for healthy bones; vitamin D to aid absorption of calcium	2	1 mark – for bones/teeth
	c		Mushu picks up a pathogen from friend OWTTE; Friend should have washed hands/ put on gloves beforehand; **OR** Mushu became stressed by being handled by a stranger; Don't allow strangers to handle Mushu; **OR** Friend mishandles Mushu; Correct handling of Mushu should be demonstrated in advance;	2	cause of illness must be linked to prevention

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