

GENERAL CERTIFICATE OF SECONDARY EDUCATION

ENVIRONMENTAL AND LAND-BASED SCIENCE

B682/01

Unit B682: Plant Cultivation and Small Animal Care (Foundation Tier)

Candidates answer on the question paper
 A calculator may be used for this paper

OCR Supplied Materials:

None

Duration: 1 hour

Other Materials Required:

- Calculator
- Ruler (cm/mm)

Candidate Forename		Candidate Surname	
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Centre Number						Candidate Number				
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INSTRUCTIONS TO CANDIDATES

- Write your name, clearly in capital letters, your Centre Number and Candidate Number in the boxes above.
- Use black ink. Pencil may be used for graphs and diagrams only.
- Read each question carefully and make sure that you know what you have to do before starting your answer.
- Answer all the questions.
- Write your answer to each question in the space provided, however additional paper may be used if necessary.

INFORMATION FOR CANDIDATES

- Your quality of written communication is assessed in questions marked with a pencil (✎).
- The number of marks for each question is given in brackets [] at the end of each question or part question.
- The total number of marks for this paper is **50**.
- This document consists of **20** pages. Any blank pages are indicated.

For Examiner's Use		
	Max	Mark
1	2	
2	3	
3	2	
4	4	
5	2	
6	6	
7	2	
8	4	
9	2	
10	5	
11	2	
12	4	
13	6	
14	6	
TOTAL	50	

Answer **all** the questions.

- 1 The picture shows a bowl of food suitable for a small animal.



© iStockphoto.com

Describe the characteristics of a concentrate feed.

.....

.....

.....

..... [2]

2 The photograph shows a rabbit hutch.



L Higginbottom / © OCR

Housing for small animals must meet their needs.

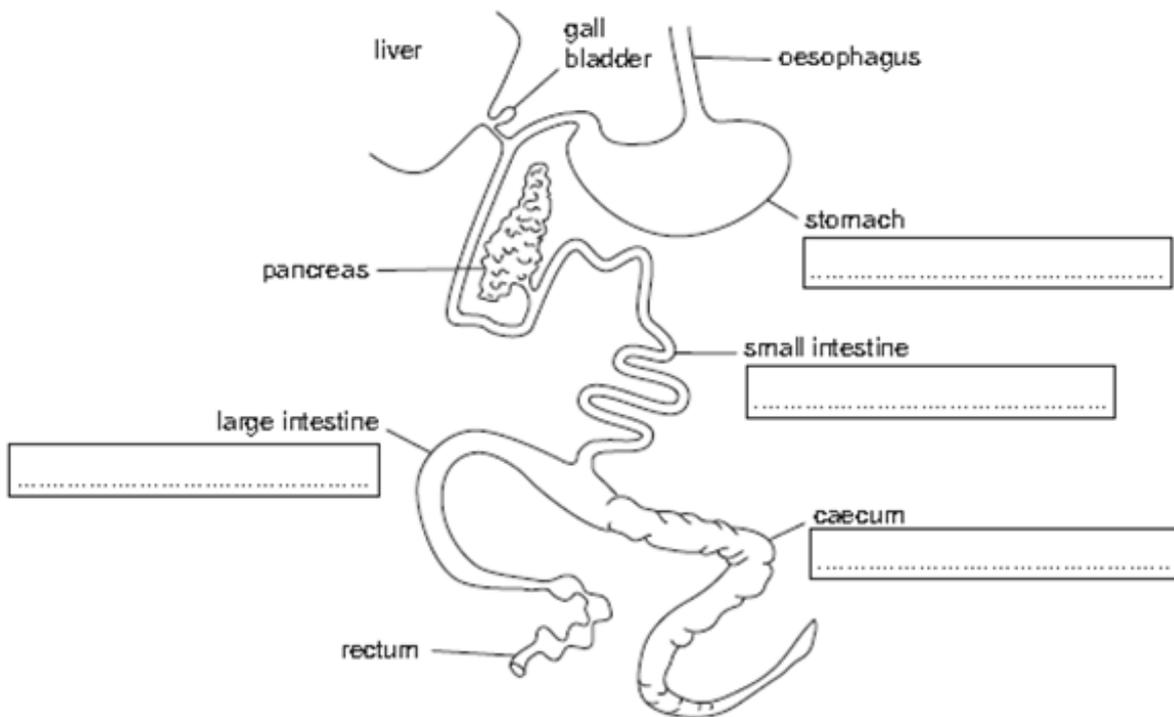
Complete the table to show the ways in which the rabbit hutch shown above is able to provide for the needs of a rabbit.

The first one has been done for you.

rabbit needs	provided by the rabbit hutch
food and water	water bottle fixed to mesh of door and feeding bowl with concentrate food

[3]

4 The diagram shows the digestive system of a rabbit.



Write the function of the organs in the correct boxes on the diagram.

Choose from the list below.

absorbs water

churns food

digestion of cellulose

digestion of fats

stores waste

[4]

5 The photograph shows a guinea pig being washed in preparation for a show.



It is important that the guinea pig is handled correctly.

Give **two** reasons why.

1

2 [2]

7 A scientist carried out a genetic cross between a tall and a short pea plant.

The seeds produced by the genetic cross were sown and all the plants which grew were found to be tall.

Complete the following sentences using words from the list below.

- dominant F1 generation F2 generation genotype**
phenotype recessive

The pea plants which grew from the seeds produced by the genetic cross are called the

.....

All the pea plants which grew were tall because the gene for tallness is

[2]

8 The diagram shows a wind-pollinated flower.



Explain how this flower is adapted for wind pollination.

.....

.....

.....

.....

..... [4]

9 The photograph shows an organ of vegetative propagation (asexual reproduction).



© OCR

(a) Name the organ of vegetative propagation shown.

..... [1]

(b) Name a plant that uses this organ of vegetative reproduction.

..... [1]

10 Some stored seed loses quality over time.

The table shows the effect of storage temperature and seed moisture content on the length of time seed can be stored.

Each column in the table is for a different seed moisture content, shown as a percentage (%.)

storage temperature in °C	time (months) seeds can be stored at different seed moisture contents					
	13%	14%	15%	16%	17%	18%
5	150.0	61.0	29.0	15.0	9.4	6.1
10	84.0	35.0	16.0	8.9	5.3	3.4
15	47.0	19.0	9.2	5.0	3.0	1.9
20	26.0	11.0	5.0	2.8	1.7	1.1
25	15.0	6.0	2.9	1.6	0.9	0.9

- (a) What is the relationship between seed moisture content, storage temperature and the length of time the seed can be stored?

.....

.....

.....

..... [2]

(b) Some seed is harvested at 15% moisture content and at a temperature of 20 °C.

It is then dried to 14% moisture content and cooled to 10 °C.

This increases the storage time.

Use the data in the table to calculate by how many times the storage time increases.

Choose the correct answer from the list below.

A 35 times

B 30 times

C 7 times

D 5 times

Answer **A, B, C** or **D**.....[1]

(c) EU regulations require the seed to be capable of being stored for at least 36 months.

Under what environmental conditions can this regulation be met?

.....

..... [2]

11 The shaded areas in the table show the pH values when important plant nutrients are most available in soil.

plant nutrient	soil pH value									
	acidic			neutral			alkaline			
	5.0	5.5	6.0	6.5	7.0	7.5	8.0	8.5	9.0	9.5
nitrogen										
phosphorus										
potassium										
calcium										
magnesium										
sulfur										
iron										

(a) What range of pH values is most suitable for plant growth?

Explain your answer.

.....

..... [1]

(b) What would be the effect on plant growth and development of growing plants in soil of pH 7.5 - 8.0?

.....

..... [1]

12 A student investigated the conditions which affect the germination of broad bean seeds.

He planted a single broad bean seed in each of twelve plant pots.

The seeds in pots 1-6 were planted 5 cm deep and those in pots 7-12 were planted 10 cm deep.

Six of the twelve pots had the holes at the bottom sealed.

The pots were kept in a glasshouse and watered daily.

After three weeks the dry mass of each bean plant was measured.

plant pot number	dry mass (kg)
1	0.00
2	0.15
3	0.13
4	0.00
5	0.19
6	0.00
7	0.10
8	0.00
9	0.00
10	0.12
11	0.08
12	0.00

(a) Which **six** seeds did not germinate?

Plant pot numbers: [1]

(b) Use the information in the table to suggest why six of the seeds did not germinate.

.....

.....

..... [1]

(c) The student concluded that planting depth has no effect on germination.

Does the evidence he collected support this conclusion?

Explain your answer.

.....

.....

.....

..... [2]

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ENVIRONMENTAL AND LAND-BASED SCIENCE

B682/01

Unit B682: Plant Cultivation and Small Animal Care (Foundation Tier)

MARK SCHEME

Duration: 1 hour

MAXIMUM MARK 50

Guidance for Examiners

Additional guidance within any mark scheme takes precedence over the following guidance.

1. Mark strictly to the mark scheme.
2. Make no deductions for wrong work after an acceptable answer unless the mark scheme says otherwise.
3. Accept any clear, unambiguous response which is correct, eg mis-spellings if phonetically correct (but check additional guidance).
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/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

Eg mark scheme shows 'work done in lifting/(change in) gravitational potential energy' (1)

work done = 0 marks
 work done lifting = 1 mark
 change in potential energy = 0 marks
 gravitational potential energy = 1 mark

5. If a candidate alters his/her response, examiners should accept the alteration.
6. 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.

Eg

For a one mark question, where ticks in boxes 3 and 4 are required for the mark:

Put ticks (✓) in
the two correct
boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth 0 marks.

Put ticks (✓) in
the two correct
boxes.

<input type="checkbox"/>
<input type="checkbox"/>
<input checked="" type="checkbox"/>
<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth one mark.

Put ticks (✓) in
the two correct
boxes.

<input checked="" type="checkbox"/>
<input type="checkbox"/>

This would be
worth one mark.

7. 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, eg 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.

8. 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, eg 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.

eg 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 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

Question	Expected answer	Marks	Additional guidance
1	low volume high nutrient content	[2]	
2	three from: security strong construction / waterproof roof / bolt or lock on door exercise exercise area in cage / separate run a place to sleep separate nest area with dry bedding ventilation wire netting front of cage interest toys / things to gnaw	[3]	one mark for each correct line
3	make good pets because: one from: make good companions small docile are a good food source because: one from: rapid breeding large litters healthy meat	[2]	answers must be linked in order to gain full credit; they must link the purpose for keeping rabbits (pets and food source) with the correct reasons accept references to using fur
4	clockwise from oesophagus: churns food digestion of fats digestion of cellulose absorbs water	[4]	

Question	Expected answer	Marks	Additional guidance
5	so animal does not get hurt / dropped / escape so person does not get bitten / hurt / get disease or parasites	[2]	
6 	<p>[level 3] Well balanced with detailed advantages and disadvantages of the two systems. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. (5 – 6 marks)</p> <p>[level 2] Some advantages and disadvantages given of both systems. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. (3 – 4 marks)</p> <p>[level 1] One sided approach or very few advantages or disadvantages given. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the information. (1 – 2 marks)</p> <p>[level 0] Insufficient or irrelevant information. Answer not worthy of credit. (0 marks)</p>	[6]	<p>relevant points include:</p> <p>advantages of using hens:</p> <ul style="list-style-type: none"> • no fear of power cuts / equipment failure • no need for artificial heating when rearing • ‘chicks are more robust when reared by ‘broodies’ <p>disadvantages of hens:</p> <ul style="list-style-type: none"> • difficulty finding broody hens – modern breeds don’t get broody • parasite problems with broody hens • husbandry more involved / greater care required for broody hens • broody hens not viable for large scale production systems <p>advantages of incubators</p> <ul style="list-style-type: none"> • incubators suitable for large scale production systems • able to maintain constant controlled conditions • less cost for labour, feed, bedding etc. <p>disadvantages of incubators</p> <ul style="list-style-type: none"> • cost of electricity, initial purchase • problems with power cuts / equipment failure

Question		Expected answer	Marks	Additional guidance
7		F1 generation dominant	[2]	
8		long filaments so anthers hang outside the flower so pollen is blown off long style / feathery stigma / large surface area so stigma hangs outside flower to catch pollen	[4]	answers must be linked in order to gain full credit; they must link features of the structure of the flower to their functions and should be in the order specified
9	(a)	rhizome	[1]	
9	(b)	ginger / asparagus / iris	[1]	
10	(a)	the lower the moisture content the lower the temperature the longer the seeds can be stored	[2]	must link condition with storage time to gain each mark
	(b)	C – 7 times	[1]	
	(c)	below 15% moisture content (or 13-14%) and 5°C and below 15°C (or 5-10°C) and 13% moisture	[2]	must have all correct for 2 marks
11	(a)	6.5-7.0 because all nutrients (except iron) available	[1]	both needed for 1 mark
	(b)	(lack of potassium) – discoloured leaves (lack of phosphorus) – stunted growth / poor flowers / fruits	[1]	both needed for 1 mark

Question		Expected answer	Marks	Additional guidance
12	(a)	1, 4, 6, 8, 9, 12	[1]	all needed for 1 mark
	(b)	soil was waterlogged so no air / oxygen for roots	[1]	
	(c)	conclusion supported because same number of seeds grew at each planting depth but not enough evidence because has only used two planting depths / only 3 seeds grew at each depth	[2]	allow idea of no significant difference between dry masses in pots 1-6 and 7-12 answers can be given in any order

Question	Expected answer	Marks	Additional guidance
13 	<p>[level 3] Answer describes the process in detail with all stages correctly sequenced and none omitted; additional points included. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. (5 – 6 marks)</p> <p>[level 2] Some details given about all the stages but additional points not included. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. (3 – 4 marks)</p> <p>[level 1] Not all stages included, or not correctly sequenced, and few details given. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the information. (1 – 2 marks)</p> <p>[level 0] Insufficient or irrelevant information. Answer not worthy of credit. (0 marks)</p>	<p>[6]</p>	<p>relevant points include:</p> <ul style="list-style-type: none"> • identification of desired features of animal – ear length, face shape, length of coat, body size and shape, colouring etc. • animals with desired characteristics bred together • offspring selected for these characteristics • continued for many generations <p>also credit for</p> <ul style="list-style-type: none"> • idea of line breeding to ‘fix’ characteristics • avoidance of in-breeding to prevent health problems (examples for this breed could be included)

Question	Expected answer	Marks	Additional guidance
14 	<p>[level 3] A detailed explanation is given of the signs that the plant is healthy, giving in each case the interpretation of these signs. All information in answer is relevant, clear, organised and presented in a structured and coherent format. Specialist terms are used appropriately. Few, if any, errors in grammar, punctuation and spelling. (5 – 6 marks)</p> <p>[level 2] Most of the signs that the plant is healthy are given but they are not fully explained. For the most part the information is relevant and presented in a structured and coherent format. Specialist terms are used for the most part appropriately. There are occasional errors in grammar, punctuation and spelling. (3 – 4 marks)</p> <p>[level 1] Descriptions of the signs that the plant is healthy are limited. Answer may be simplistic. There may be limited use of specialist terms. Errors of grammar, punctuation and spelling prevent communication of the information. (1 – 2 marks)</p> <p>[level 0] Insufficient or irrelevant information. Answer not worthy of credit. (0 marks)</p>	[6]	<p>relevant points include:</p> <ul style="list-style-type: none"> • green leaves / not yellow leaves and flowers • vigorous growth – no signs of mineral deficiency • turgid leaves / leaves not wilted – so plant is not short of water • leaves undamaged - no sign of pests / disease / necrosis <p>Note: colour photo will be provided</p>
Total		[50]	

Assessment Objectives (AO) Grid

(includes quality of written communication )

Question	AO1	AO2	AO3	Total
1	2			2
2	2	1		3
3		2		2
4		4		4
5	2			2
6 	6			6
7	2			2
8		4		4
9(a)		1		1
9(b)	1			1
10(a)		2		2
10(b)		1		1
10(c)		2		2
11(a)		1		1
11(b)		1		1
12(a)		1		1
12(b)		1		1
12(c)			2	2
13 	3	3		6
14 	4	2		6
Totals	22	26	2	50

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