

External assessment 2021

Multiple choice question book

Agricultural Science

Paper 1

General instruction

- Work in this book will not be marked.



Queensland
Government



Queensland Curriculum
& Assessment Authority

Section 1

QUESTION 1

The table contains feed consumption and live weight data for four different agricultural animals.

Identify the animal that has the best feed conversion ratio.

Animal	Mass of food eaten (kg)	Mass gained by the animal (kg)
(A)	5.4	0.5
(B)	5.2	4.0
(C)	3.6	3.0
(D)	0.9	0.6

QUESTION 2

An appropriate risk management strategy for a honey bee enterprise is to

- (A) sell honey bee-related products to one market.
- (B) develop new product types from extracted honey.
- (C) provide enough water to meet environmental conditions.
- (D) identify one supplier to provide replacement queen bees.

QUESTION 3

A dairy farmer is planning to introduce new genetics into the herd to improve milk protein yield. The table shows Australian Breeding Values (ABVs) for four bulls.

Identify the bull the farmer should use to improve the milk protein content of the herd.

Bull	Milk protein yield (kg dry/lactation)	Milk yield (L/lactation)	Fat yield (kg/lactation)
(A)	18	-120	39
(B)	30	190	23
(C)	32	195	36
(D)	36	-20	27

QUESTION 4

The table shows grain yield from a field trial for two varieties of oats at different rates of nitrogen application.

Rate of nitrogen applied (kg/ha)	Variety 1 (kg/ha)	Variety 2 (kg/ha)
0	2.4	2.4
10	3.4	3.4
30	5.1	4.6
50	5.6	3.8
80	5.1	3.4

Which conclusion can be supported by the data?

- (A) Variety 2 demonstrates the largest positive response to nitrogen application.
- (B) Both varieties show a decline in yield at the same rate of nitrogen application.
- (C) Variety 1 requires less nitrogen fertiliser than Variety 2 to achieve optimal production.
- (D) Other major nutrients are limiting grain yield for Variety 2 at an application rate of 80 kg/ha.

QUESTION 5

The table shows the population data collected in a study of four edible insect species in a 10-ha area.

Species	Year			
	1980	1990	2000	2020
<i>C. redtembacheri</i> H.	480	363	387	495
<i>A. hesperiaris</i> W.	139	112	85	79
<i>M. melliger</i> W.	280	178	87	30
<i>Th. gigas</i> B.	700	572	620	541

Identify the species that could be a commercial option if harvested for human consumption in the local region.

- (A) *C. redtembacheri* H.
- (B) *A. hesperiaris* W.
- (C) *M. melliger* W.
- (D) *Th. gigas* B.

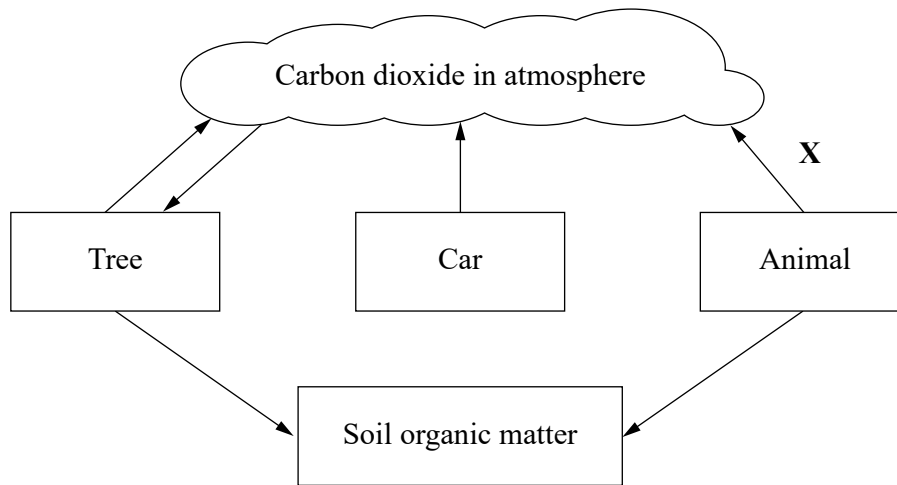
QUESTION 6

In a monogastric animal, carbohydrates are absorbed in the

- (A) rumen.
- (B) true stomach.
- (C) large intestine.
- (D) small intestine.

QUESTION 7

The diagram shows a simplified nutrient cycle.



Identify the process marked X on the diagram.

- (A) respiration
- (B) combustion
- (C) decomposition
- (D) photosynthesis

QUESTION 8

Crossbreeding involves developing new plant varieties by crossing offspring from

- (A) related plants with themselves.
- (B) unrelated plants of different varieties.
- (C) related plants until the offspring are purebred.
- (D) plants of different varieties by using pollen in sterile cultures.

QUESTION 9

Identify which type of animal uses volatile fatty acids as its major source of energy.

- (A) fish
- (B) goats
- (C) horses
- (D) poultry

QUESTION 10

The table shows the percentage of nutrients found in four different poultry feeds.

Identify the most appropriate feed for laying hens.

Feed	Minimum crude protein (%)	Minimum crude fat (%)	Maximum crude fibre (%)	Maximum added salt (%)	Minimum calcium (%)	Minimum available phosphorus (%)
(A)	19.5	2.5	6.0	0.3	1.0	0.5
(B)	15.5	2.5	8.0	0.0	1.0	0.5
(C)	15.0	2.5	10.0	0.3	3.8	0.4
(D)	12.5	2.5	6.0	0.0	2.0	0.3

QUESTION 11

The table shows the bone, muscle and fat percentages of carcasses for a type of agricultural animal at different stages of the production cycle. The stages are not in any order.

Stage of production	Bone (%)	Muscle (%)	Fat (%)
I	11	49	36
II	9	43	46
III	8	40	48
IV	24	64	9

A conclusion supported by the data in the table is that the animal at

- (A) Stage I is a leaner carcass than the animal at Stage IV.
- (B) Stage IV is a younger animal than the animal at Stage II.
- (C) Stage II has a lower meat yield than the animal at Stage III.
- (D) Stage III is at an earlier stage of its production cycle than the animal at Stage I.

QUESTION 12

Dairy goat production could be positively influenced by

- (A) breeding with an F1 generation male.
- (B) vaccinating annually for clostridial diseases.
- (C) grazing on a lucerne pasture for an extended time.
- (D) moving stock into a paddock that is currently being grazed by sheep.

QUESTION 13

The table shows an excerpt of income and variable costs from a merino enterprise.

	Budget (\$)
Income	
Wool	
Shear	86 996
Crutch	3 411
Sheep sales	17 219
Variable costs	
Replacements	
Breeders and rams	14 875
Cartage	350
Wool harvesting and selling	
Shearing	7 150
Crutching	1 566
Sheep health	
Fly control	1 800
Vaccination (6-in-1)	300
Pasture maintenance	3 922

Calculate the gross margin for the enterprise.

- (A) -\$77 663
- (B) \$60 444
- (C) \$77 663
- (D) \$137 589

QUESTION 14

Chlorothalonil is a fungicide that controls downy mildew in zucchinis. The recommended application schedule is 7 to 14 days. When disease pressure is high, the manufacturer recommends spraying at 2.5 L/ha at 7-day intervals.

Identify the total volume of fungicide required for a 3.5-ha zucchini crop over a 2-week period in which 10 mL of rain has fallen.

- (A) 7.00 L
- (B) 8.75 L
- (C) 17.50 L
- (D) 26.25 L

QUESTION 15

The most effective alternative method to mulesing in sheep is

- (A) breeding sheep without wool in the breech area.
- (B) moving sheep to a new paddock.
- (C) vaccinating for diseases.
- (D) providing pain relief.

QUESTION 16

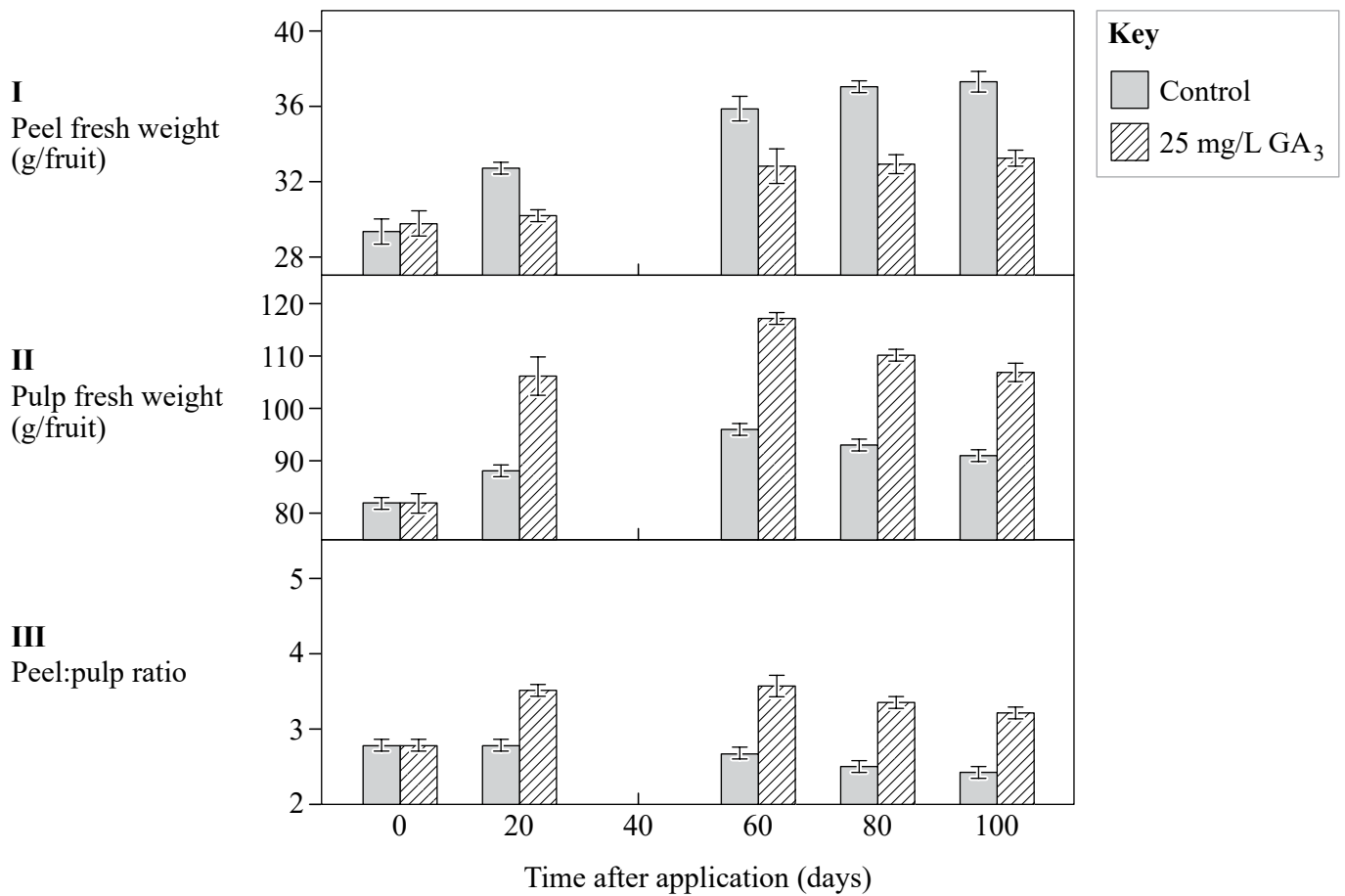
A demand factor that could increase the price of coffee beans grown in northern Queensland is the

- (A) arrival of coffee berry disease in Australia.
- (B) implementation of a foreign trade agreement.
- (C) implementation of water quotas in irrigation areas.
- (D) destruction of plantations due to extreme weather events.

QUESTION 17

The graphs show the effect of 25 mg/L GA₃ spray applied to mandarin trees on peel fresh weight (I), pulp fresh weight including juice content (II) and peel:pulp ratio (III).

Error bars indicate standard error.



A conclusion that could be drawn from this experiment is that GA₃ treatment

- (A) slowed the increase in peel weight during maturation.
- (B) significantly decreased the pulp weight during maturation.
- (C) significantly delayed the naturally occurring decrease in peel:pulp ratio.
- (D) significantly increased the peel weight compared to the control treatment.

QUESTION 18

A market specification criterion used only by Meat Standards Australia (MSA) is

- (A) fat depth.
- (B) meat colour.
- (C) carcass weight.
- (D) tropical content.

QUESTION 19

A source of extreme risk for farm workers that can occur in a plant production system is

- (A) applying a pesticide to a greenhouse hydroponic system.
- (B) formulating a ration using a hammer mill.
- (C) mixing a herbicide with a surfactant.
- (D) moving stock between paddocks.

QUESTION 20

In a ruminant animal, fats are broken down into

- (A) amino acids.
- (B) hydrochloric acid.
- (C) volatile fatty acids.
- (D) essential fatty acids.

References

Question 3

Data sourced from DataGene 2019a, 'Cow ABVs — August 2019', www.datagene.com.au/cowABVsMenu.
——2019b, 'Good bulls guide — August 2019', www.datagene.com.au/GoodBulls.

Question 5

Data sourced from Ramos-Elorduy, J 2006, table 2, in 'Threatened edible insects in Hidalgo, Mexico and some measures to preserve them', *Journal of Ethnobiology and Ethnomedicine*, issue 2, <https://doi.org/10.1186/1746-4269-2-51>. Licensed under CC BY 2.0.

Question 10

Data sourced from Barastoc 2019, 'Our products', <https://barastocpoultry.com.au/our-products/essentials-range/chick-starter>.

Question 17

Data extracted from Pozo, L et al. 2000, Figure 3, View of Effects of gibberellic acid on ripening and rind puffing in 'Sunburst' mandarin, *Proceedings of the Florida State Horticultural Society 2022*, Flvc.org, available at: <https://journals.flvc.org/fshs/article/view/86362/83278>



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