

External assessment

Multiple choice question book

Agricultural Science

Paper 1

General instruction

- Work in this book will not be marked.



Queensland
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Section 1

QUESTION 1

Identify the hormone that causes cell elongation in plants.

- (A) auxin
- (B) ethylene
- (C) gibberellin
- (D) abscisic acid

QUESTION 2

The most important function of microscopic organisms in a ruminant digestive system is the

- (A) digestion of fat.
- (B) digestion of cellulose.
- (C) synthesis of vitamin A.
- (D) absorption of amino acids.

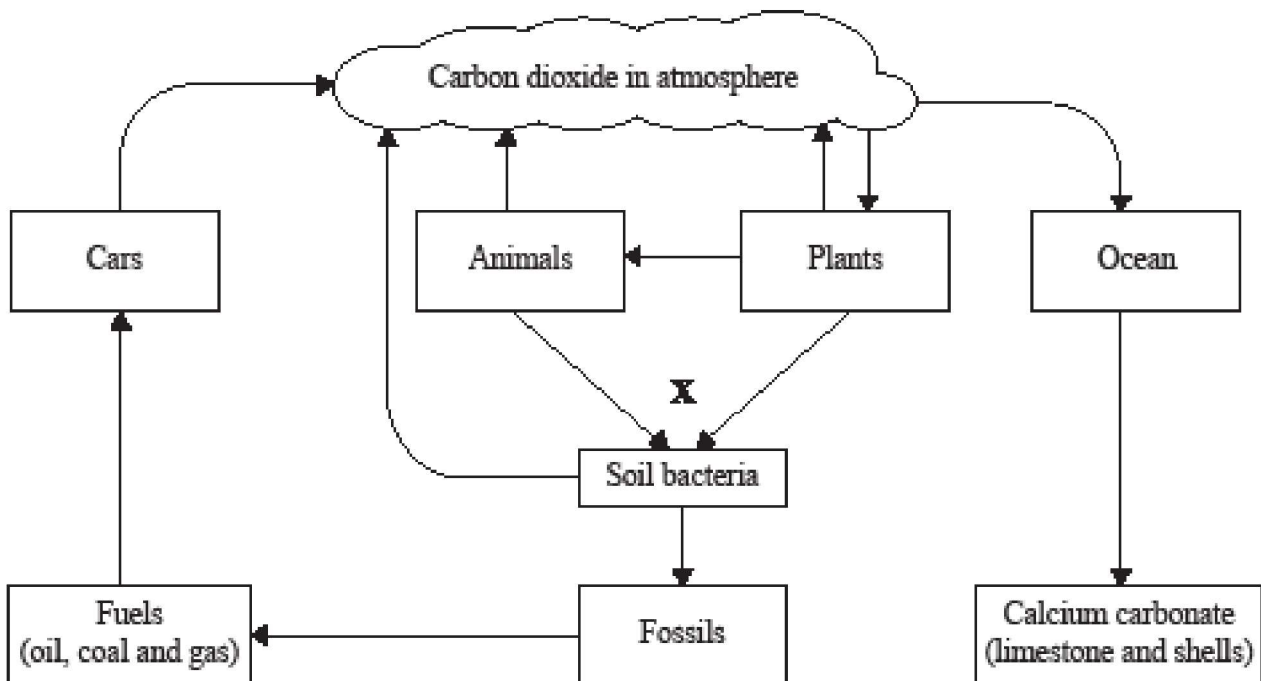
QUESTION 3

Legume pasture species can support sustainable plant production by

- (A) increasing groundwater recharge.
- (B) improving soil structure/porosity.
- (C) removing excessive sodium from the topsoil.
- (D) improving potassium availability in soil for plant use.

QUESTION 4

The diagram shows the different processes that take place in the carbon cycle.



Identify the process taking place at point X.

- (A) decomposition
- (B) fossilisation
- (C) respiration
- (D) feeding

QUESTION 5

The table shows part of the nutritional analysis for four different pig rations.

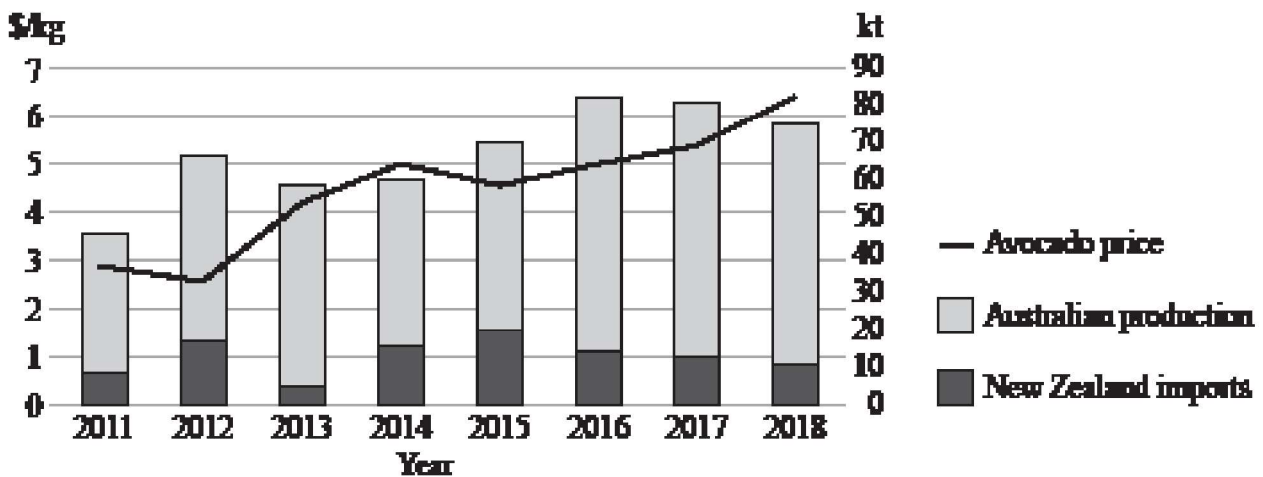
Component	Ration A	Ration B	Ration C	Ration D
Protein (%)	20	16	22	16
Calcium (%)	0.9–1.2	0.8–1.4	1.0–1.3	1.0–1.4
Digestible energy (DE) (MJ/kg)	14.5	12.8	16.0	13.2

Use the table to identify the most appropriate ration for non-lactating sows.

- (A) Ration A
- (B) Ration B
- (C) Ration C
- (D) Ration D

QUESTION 6

The graph shows the price and domestic supply of avocados between 2011 and 2018.

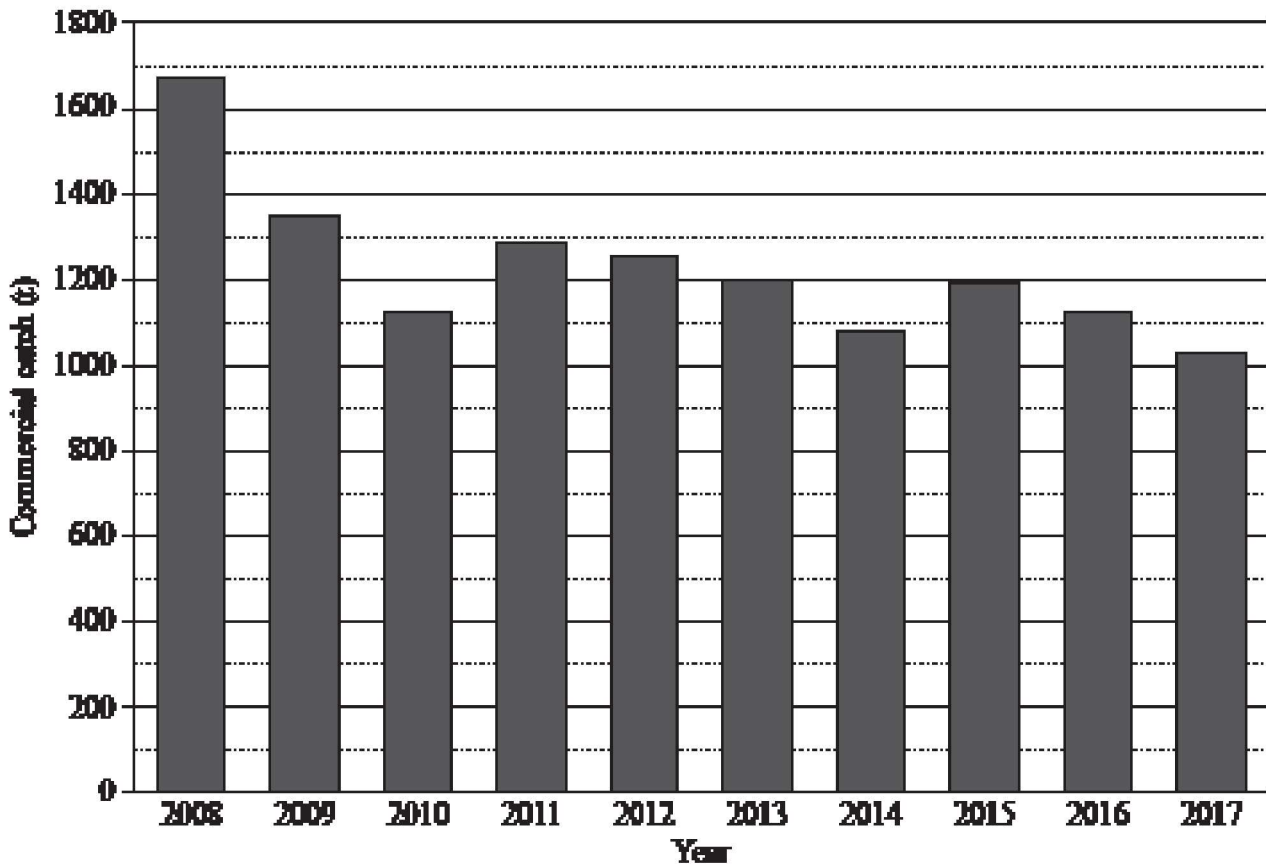


The change in the price of avocados between 2013 and 2014 is most likely due to

- (A) a decrease in the demand for avocados.
- (B) an increase in the demand for avocados.
- (C) a slight increase in the overall supply of avocados.
- (D) an increase in the supply of cheap avocados from New Zealand.

QUESTION 7

Commercial fishing from native fisheries must be sustainable to continue. The graph shows the commercial catch of a marine species from a native fishery, measured in tonnes (t), from 2008 to the end of 2017.



Which of the following options represents the approximate average annual decrease in commercial catch between the start of 2008 and end of 2017?

- (A) 41 tonnes
- (B) 55 tonnes
- (C) 65 tonnes
- (D) 72 tonnes

QUESTION 8

The table shows the annual sources of income from the sale of animals for a fat lamb enterprise.

Source	Sales	Price per head	Cartage (%)
Ewes	50	\$165	1.5
Wethers	235	\$105	1.5
Lambs	365	\$144	1.0

Determine the gross annual income of the enterprise.

- (A) \$52 560
- (B) \$77 235
- (C) \$84 465
- (D) \$85 485

QUESTION 9

Which part of the PPRR model of risk management best demonstrates a producer's decision to sell non-breeders during a drought?

- (A) prevention
- (B) preparedness
- (C) response
- (D) recovery

QUESTION 10

The table shows catalogue EBV information for two rams of the same breed at a sale.

	Litter size	8-week weight	Maternal	Scan weight	Muscle depth	Fat depth	Index
Ram 1 EBV	0.30	4.39 kg	0.02 kg	10.36 kg	5.11 mm	0.51 mm	361
Accuracy %	51	94	46	94	90	94	75
Ram 2 EBV	0.17	5.79 kg	-0.90 kg	12.34 kg	2.24 mm	0.17 mm	310
Accuracy %	45	89	31	94	91	91	92

Ram 1 would be the preferred sire for a producer to use if they wanted to breed better ewes and finish lambs over a longer period because

- (A) Ram 1 has a higher maternal EBV than Ram 2.
- (B) Ram 1 has higher muscle and fat depth EBVs than Ram 2.
- (C) lambs will still have a respectable growth rate compared to lambs produced from Ram 2.
- (D) ewe lambs retained for breeding would produce more lambs and grade better at slaughter.

QUESTION 11

The supply of an agricultural product is most directly affected by the

- (A) amount of household disposable income.
- (B) number of people wanting the product.
- (C) market price offered for a product.
- (D) price of alternative products.

QUESTION 12

A disease control program for an agricultural animal follows the timeline shown in the graph.

This stimulus has not been published for copyright reasons.

View diagram 'Two doses of vaccine plus boosters are essential' in Zoetis 2018, 'Best practice vaccination for lambs', www.zoetis.com.au/livestock-solutions/sheep/maximise-lamb-productivity/best-practice-vaccination-for-lambs.aspx.

Which of the following options best describes the point labelled X on the graph?

- (A) the highest level of protective antibodies for the animal
- (B) the animal is susceptible to infection by identified microbial disease
- (C) immunity levels are rising in the young animal 12 months after birth
- (D) maternal antibodies are providing the animal with sufficient immunity

QUESTION 13

The table identifies the minimum requirements for different lamb export markets.

Market segment	Liveweight range (kg)	Carcass weight range (kg)	Preferred fat score
Heavy export	38–64	20–30	2 to 4
Light export	25–35	10–16	2
‘Hajj’ market	35–41	18–22	No preference

Identify the lamb that is best suited to the heavy export market.

Lamb	Liveweight (kg)	Carcass weight (kg)	Fat score
(A)	50	27	1
(B)	40	23	5
(C)	40	22	3
(D)	35	19	2

QUESTION 14

Vitamins are important for a six-week-old calf because they

- (A) stimulate the functioning of the rumen.
- (B) ensure normal fat digestion.
- (C) improve feed efficiency.
- (D) support fertility.

QUESTION 15

The table shows livestock's approximate tolerances to dissolved salts in drinking water.

Livestock	No adverse effects (g/L)	Reluctance to drink (g/L)	Decline in condition and health (g/L)
pigs	0–1.0	1.0–5.0	5.0–7.0
horses	0–4.0	4.0–6.0	6.0–7.0
beef cattle	0–4.0	4.0–5.0	5.0–10.0
dairy cattle	0–2.4	2.4–4.0	4.0–7.0

Identify the livestock that would suffer a loss in production with a total dissolved salt measurement of 4820 mg/L.

- (A) pigs
- (B) horses
- (C) beef cattle
- (D) dairy cattle

QUESTION 16

Identify the organisms that can cause a metazoal disease.

- (A) barber's pole worm, buffalo flies and cattle ticks
- (B) tapeworms, liver flukes and clostridial bacteria
- (C) clostridial bacteria, roundworms and lice
- (D) stickfast fleas, cattle ticks and ringworm

QUESTION 17

An experiment was conducted to compare the effects of different fertiliser treatments on the fruit yield of apple trees. Each fertiliser treatment was made up of a base of nitrogen, phosphorus and potassium (NPK) and a combination of mineral or organic material.

The table shows the mean values \pm confidence interval (CI) at 95% level.

Fertiliser treatment	Yield per tree (kg)
NPK + zeolite	22.6 ± 0.6
NPK + cattle manure	23.7 ± 0.4
NPK + chicken manure	23.5 ± 0.3
NPK + zeolite + cattle manure	21.0 ± 1.0

The conclusion supported by the data is

- (A) NPK + cattle manure significantly increased yield per tree compared with NPK + zeolite.
- (B) NPK + chicken manure significantly increased yield per tree compared with NPK + cattle manure.
- (C) NPK + zeolite + cattle manure significantly increased yield per tree compared with NPK + chicken manure.
- (D) NPK + cattle manure significantly increased yield per tree compared with the other fertiliser treatments.

QUESTION 18

Identify the genetic technique used to naturally combine desirable genes found in two or more different plant varieties to produce superior pure-breeding offspring.

- (A) grafting
- (B) hybridisation
- (C) tissue culture
- (D) genetic modification

Use these tables for Questions 19 and 20.

The tables contain a nutrient analysis for different animal feeds and the minimum recommended crude protein for sheep at different stages of development.

Animal feed	Metabolisable energy (MJ/kg dry matter)	Crude protein (%)	Dry matter (%)
Wheat grain	13	12	90
Sorghum grain	13	11	90
Chickpeas	12	21	90
Grassy lucerne	9	13	90
Immature grass pasture	11	8	20
Cottonseed meal	10	33	90
Molasses	13	1	76

50-kg sheep	Minimum crude protein requirement (%)
Dry sheep	6–8
Ewe — mid-pregnancy	8–10
Ewe — early lactation	12–14

QUESTION 19

Feed sources that could be used to meet the crude protein requirement for a ewe that has lambed are

- (A) molasses, grassy lucerne and wheat grain.
- (B) wheat grain, grassy lucerne and chickpeas.
- (C) sorghum grain, chickpeas and immature grass pasture.
- (D) sorghum grain, cottonseed meal and immature grass pasture.

QUESTION 20

To supply approximately 47 MJ metabolisable energy and 0.51 kg crude protein, on a dry matter basis, to animals that will be introduced to a feedlot for a short period of time and are expected to eat 5 kg a day, an appropriate ration is

- (A) 4 kg wheat grain + 1 kg chickpeas.
- (B) 3 kg wheat grain + 2 kg chickpeas.
- (C) 3 kg grassy lucerne + 2 kg wheat grain.
- (D) 4 kg immature grass pasture + 1 kg wheat grain.

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References

Question 4

Adapted from MC Biology 2008, 'Carbon cycle', *Environmental Biology — Ecosystems*, <http://w3.marietta.edu/~biol/biomes/ecosystems.htm>.

Question 5

Riverina 2015, *Pig Breeder Pellets/Meal*, www.riverina.com.au/products/pig-breeder-pellets-meal.

Question 6

Xia, C 2019, 'Commodity outlook and issues: Wide Bay agriculture' (PowerPoint presentation), Australian Bureau of Agricultural and Resource Economics and Sciences (ABARES), 6 August, www.agriculture.gov.au/sites/default/files/abares/documents/conference-events/regional-outlook/bundabergregional-xia.pdf Used under a Creative Commons Attribution 4.0 International licence (CC BY 4.0).

Question 7

Adapted from Fisheries Research and Development Corporation 2018, *Spanner Crab*, www.fish.gov.au/report/178-Spanner-Crab-2018. Licensed under a Creative Commons Attribution 3.0 licence (CC BY 3.0).

Question 12

Adapted from Zoetis 2018, 'Best practice vaccination for lambs', www.zoetis.com.au/livestock-solutions/sheep/maximise-lamb-productivity/best-practice-vaccination-for-lambs.aspx.

Question 13

Top table sourced from 'Module 3: Market focused lamb and sheepmeat production', *Making More From Sheep*, http://www.makingmorefromsheep.com.au/market-focussed-lamb-and-sheepmeat-production/tool_3.2.html (c) Australian Wool Innovation and Meat and Livestock Australia 2008. Used with permission.

Question 15

Department of Primary Industries and Regional Development (WA) 2020, 'Water quality for livestock', *Agriculture and Food*, www.agric.wa.gov.au/livestock-biosecurity/water-quality-livestock.

Question 17

Milosevic, T & Milosevic, N 2015, 'Apple fruit quality, yield and leaf macronutrients content as affected by fertilizer treatment', *Journal of Soil Science and Plant Nutrition*, vol. 15, no. 1, pp. 76–83.

Questions 19 and 20

Australian Wool Innovation and Meat and Livestock Australia 2008, *Making More From Sheep*, 'Module 11: Healthy and contented sheep', http://makingmorefromsheep.com.au/healthy-contented-sheep/tool_11.1.htm.



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