— Public use —

Multiple choice question book

Agricultural Science

Paper 1

— Public use —

THIS PAGE IS INTENTIONALLY BLANK

Section 1

Instructions

- Answer all questions in the question and response book.
- This book will not be marked.

QUESTION 1

The table below gives pairs of descriptions for intensive and extensive industries.

Feature	Intensive	Extensive
I	high levels of input/ha	low levels of input/ha
II	low levels of production/ha	high levels of production/ha
III	high initial capital costs per unit area	low initial capital costs per unit area
IV	smaller areas of production	larger areas of production

Which of the following describes the characteristics for intensive and extensive industries?

- (A) I, II, III
- (B) I, II, IV
- (C) I, III, IV
- (D) II, III, IV

QUESTION 2

Which of the following is a major function of rumen bacteria in animal nutrition?

- (A) secreting enzymes to assist in the breakdown of carbohydrates into volatile fatty acids
- (B) secreting enzymes to assist in the breakdown of fats into fatty acids and glycerol
- (C) synthesising carbohydrates to simple sugars
- (D) synthesising vitamin D

QUESTION 3

Which pathway represents the metabolism of energy in animals?

- (A) gross energy → digestible energy → net energy → metabolisable energy → maintenance and production energy

- (B) gross energy → digestible energy → metabolisable energy → net energy → maintenance and production energy

- (C) gross energy → digestible energy → maintenance and production energy → metabolisable energy → net energy

- (D) gross energy → metabolisable energy → digestible energy → ammonia → maintenance and production energy → net energy

QUESTION 4

Four steers were weighed to calculate their feed conversion ratios (FCR), as shown in the table below.

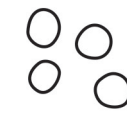| Animal	FCR
I	4.8: 1
II	5.2: 1
III	4.9: 1
IV	5.6: 1

From the data in the table, which two animals would be the costliest to finish for optimum condition if all four animals were introduced to a feedlot finishing ration?

- (A) Animal I and Animal III
- (B) Animal I and Animal IV
- (C) Animal II and Animal III
- (D) Animal II and Animal IV

QUESTION 5

The figure below shows the differently sized seeds of various agricultural crops, pastures and weeds. The diagrams are drawn to scale.

Soybeans	Velvetleaf	Corn	Giant foxtail	Wheat

From the information in the figure, which of the following seeds is most likely to successfully establish if planted deeper in the soil?

(A) giant foxtail

(B) soybeans

(C) wheat

(D) corn

QUESTION 6

The nutrient that legumes least require at planting compared to other agricultural crops is

(A) phosphorus.

(B) potassium.

(C) nitrogen.

(D) calcium.

QUESTION 7

The figure below shows the results of a trial conducted on cotton seedlings to investigate the effect on internodal length of applying an unknown hormone to the seedlings.
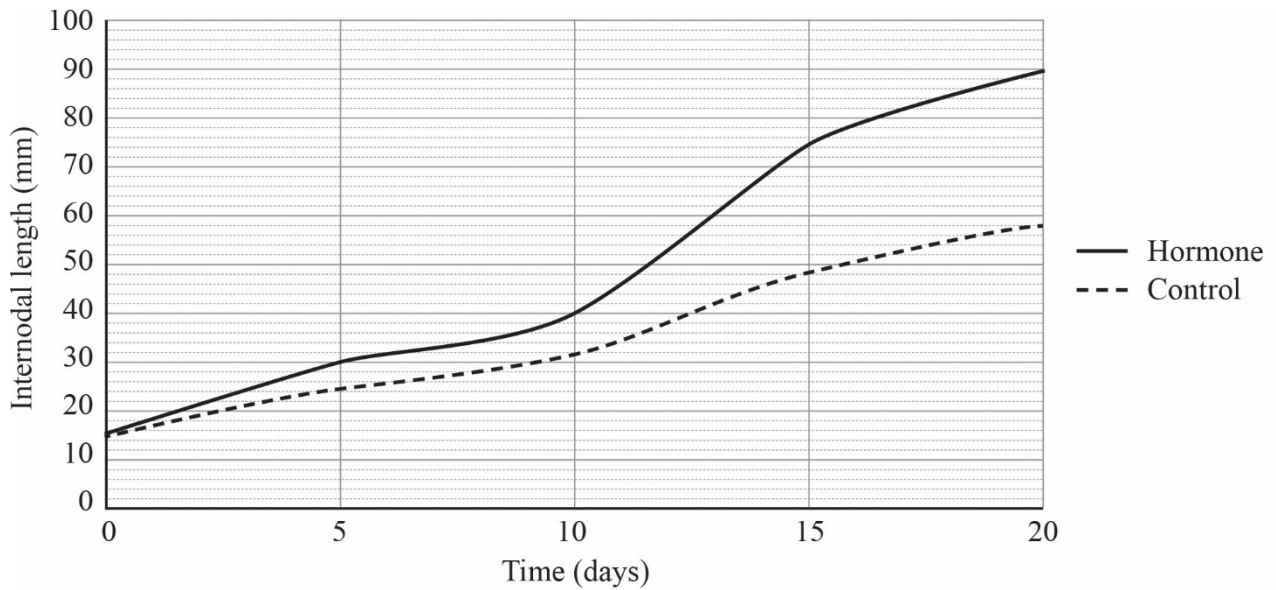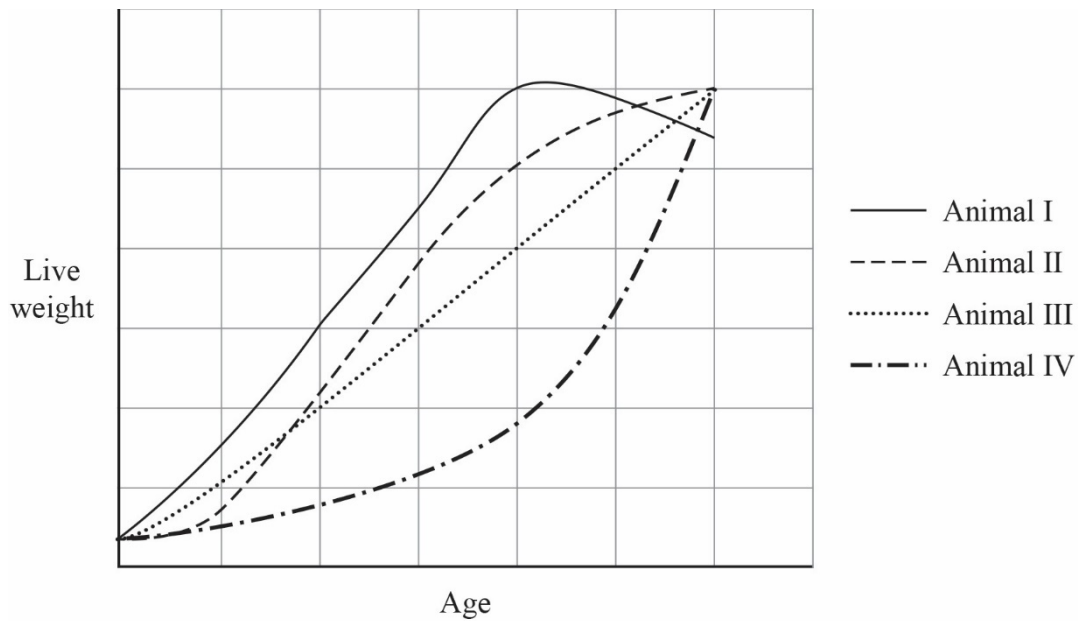

Analyse the results in the figure to determine the phase of the trial where the seedlings showed the greatest percentage response to the hormone application.

    (A)   days 0 to 5

    (B)   days 5 to 10

    (C)   days 10 to 15

    (D)   days 15 to 20

QUESTION 8

The graph below shows the relationship between live weight and age for four different animals.

Which animal illustrates the typical growth curve of an animal over its life up to slaughter?

(A) Animal I

(B) Animal II

(C) Animal III

(D) Animal IV

QUESTION 9

Some of the market specifications for an animal carcass set by industry bodies (e.g. Meat Standards Australia) include

(A) rib fat, external parasite count, sex, carcass weight, pH, meat colour, tropical breed content, hormone growth promotants.

(B) carcass weight, pH, meat colour, marbling, sex, rib fat, tropical breed content, hormone growth promotants.

(C) pH, meat colour, marbling, sex, tropical breed content, rib fat, carcass weight, marbling, hide colour.

(D) meat colour, marbling, rib fat, carcass weight, pH, sex, polledness, hormone growth promotants.

QUESTION 10

The figure below shows the target market specifications for cattle carcasses.
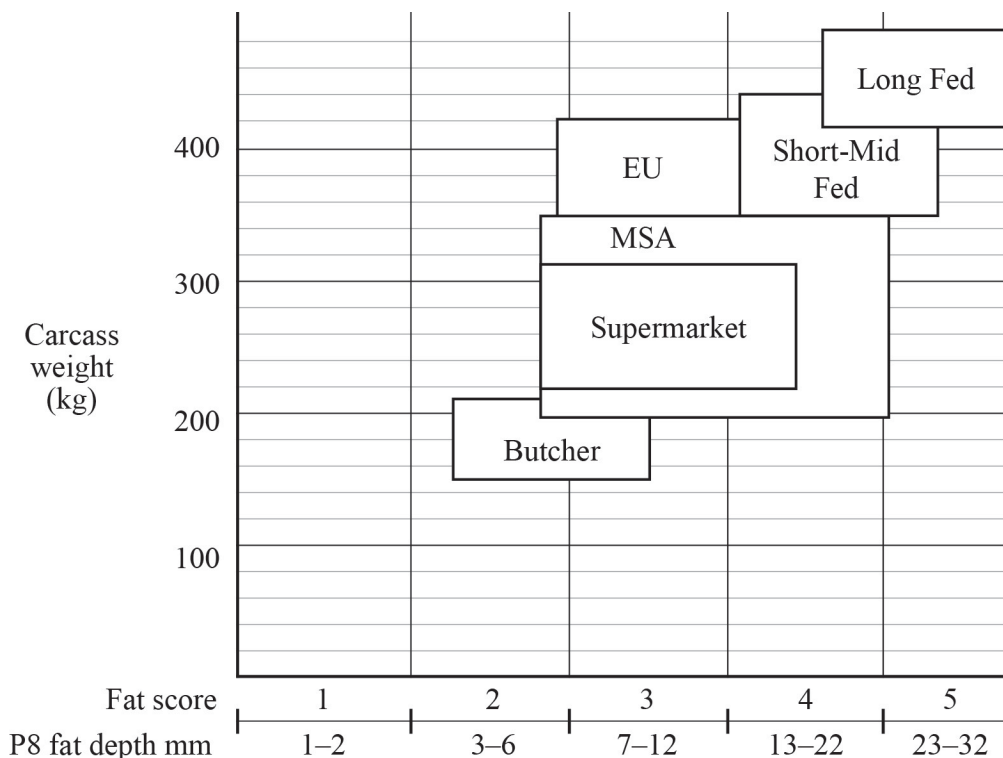
The table below shows the carcass weight, fat score and fat depth for four different animals.

Animal	Carcass weight (kg)	Fat score	P8 fat depth (mm)
I	210	3	10
II	240	3	8
III	320	4	17
IV	290	4	14

From the information in the figure and table, which animal/s would most likely meet MSA market requirements?

(A) Animal I

(B) Animal I and Animal III

(C) Animal II and Animal III

(D) Animal IV

QUESTION 11

Which of the following is an example of a marketing technique for an agricultural product?

(A)   quality assurance

(B)   value-adding

(C)   auctioning

(D)   bartering

QUESTION 12

The most effective method of comparing the profitability of an alternative enterprise to an existing one is a

(A)   partial budget.

(B)   cash flow budget.

(C)   whole-farm budget.

(D)   gross margin budget.

QUESTION 13

A producer is most likely to change from a regular production system to a certified organic system because of their need to

(A)   respond to a change in consumer demands.

(B)   maximise output while minimising input.

(C)   increase crop yields.

(D)   reduce labour costs.

QUESTION 14

Paddock rotation is a system of

(A)   planting agricultural crops in alternating strips to minimise water erosion on steeper slopes.

(B)   growing different crops on the same paddock from one year to the next.

(C)   alternating the use of paddocks to allow for a rest period.

(D)   breaking up paddocks to maximise feed utilisation.

QUESTION 15

In terms of plant production, 'biological control' means pest and disease control methods

    (A)   that use chemicals.

    (B)   that introduce a natural enemy or predator.

    (C)   where the pest is attacked and/or destroyed.

    (D)   that use a combination of synthetic techniques.

QUESTION 16

The labels below provide information about Products A and B.

Product A	Product B
For active immunisation against pulpy kidney, black disease, tetanus, blackleg, vibriosis and malignant oedema in sheep, goats and cattle. For active immunisation against tetanus and haemorrhagic enterotoxaemia in horses.	For active immunisation against pulpy kidney, lamb dysentery, tetanus and vibriosis in pigs. For active immunisation against pulpy kidney, haemorrhagic enterotoxaemia, malignant oedema, blackleg, black disease, redwater and tetanus in ruminant animals.

Compare the information about diseases controlled by Product A and Product B.

A disease that is covered by both products for ruminants is

    (A)   haemorrhagic enterotoxaemia.

    (B)   malignant oedema.

    (C)   dysentery.

    (D)   vibriosis.

QUESTION 17

An exotic disease is

- (A) an organism that injures, irritates or damages livestock, livestock products or plant products, and that can adversely affect production.
- (B) a disorder of structure or function in an animal or plant that is not simply a direct result of physical injury.
- (C) an animal disorder that by law must be reported to government authorities.
- (D) an infectious disease that normally does not occur in the region.
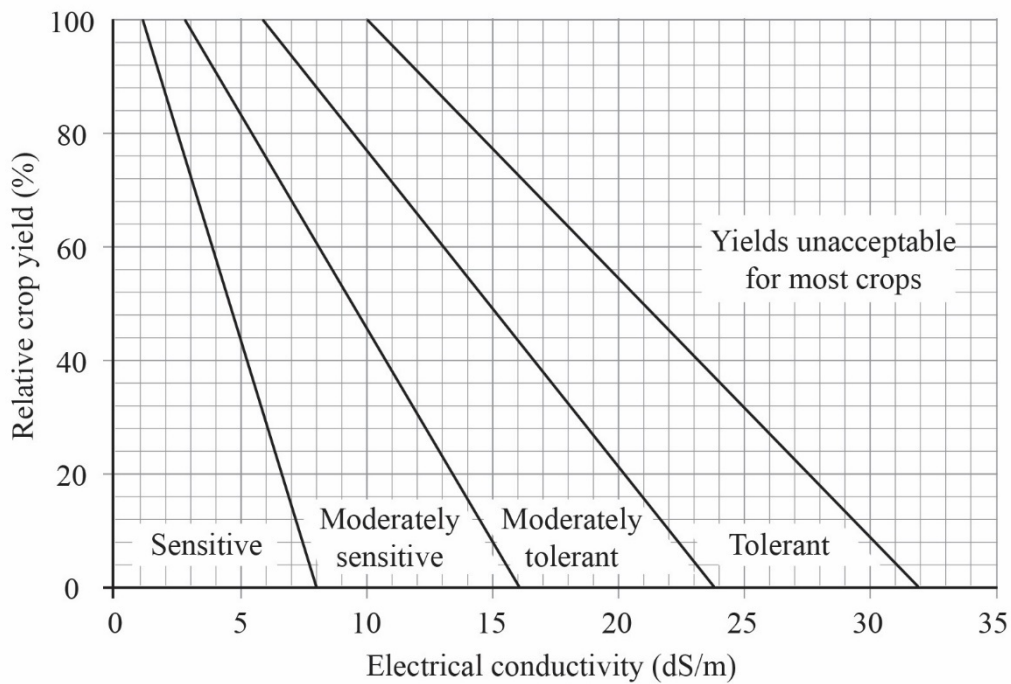
QUESTION 18

The term *animal welfare* considers the

- (A) physical and psychological wellbeing of animals.
- (B) husbandry practices that maximise animal production.
- (C) study of non-human relations, including animal rights and animal psychological welfare.
- (D) process of an animal increasing in size and weight with the assistance of management decisions.

QUESTION 19

The figure below shows crop tolerance to soil salinity.

For which of the following ranges of soil salinity would an agricultural crop classified as tolerant record a relative crop yield of 80%?

(A)   24.0–32.0 dS/m

(B)   2.5–14.5 dS/m

(C)   9.5–14.5 dS/m

(D)   5.5–9.5 dS/m

QUESTION 20

Which of the following is an example of a risk avoidance strategy for an agricultural producer?

(A)   establishing a monoculture farming system

(B)   increasing the stocking rate on their property

(C)   maintaining a constant stocking rate throughout the year

(D)   growing more than one type of agricultural crop at the same time

References

Question 5

Derived from Cornell University 2018, 'How does soil fertility influence the competitive balance between crops and weeds?', *Organic Agriculture at Cornell*, www.hort.cornell.edu/extension/organic/ocs/tutorial/weeds/fertility.html.

Question 10

Andrews, T 2015, *Market specifications for cattle*, NSW Government Department of Primary Industries, www.dpi.nsw.gov.au/__data/assets/pdf_file/0005/148415/Market-specifications-for-cattle.pdf. © State of New South Wales through the Department of Trade and Investment, Regional Infrastructure and Services 2015. Used under a bare licence — worldwide.

Question 16

Derived from Coopers 2019, 'Tasvax 5 in 1', www.coopersanimalhealth.com.au/products/Tasvax5In1.

Question 19

Food and Agriculture Organization of the United Nations, 'Annex 1. Crop salt tolerance data', www.fao.org/docrep/005/y4263e/y4263e0e.htm. Reproduced with permission.

— Public use —

THIS PAGE IS INTENTIONALLY BLANK

— Public use —

THIS PAGE IS INTENTIONALLY BLANK

— Public use —

LUI ☐☐☐☐☐☐☐☐☐☐ Venue code ☐☐☐☐

School name ☐

Given name/s ☐

Family name ☐

Attach your
barcode ID label here

Sample assessment 2020

Agricultural Science

Paper 1

Time allowed

- Perusal time — 10 minutes
- Working time — 90 minutes

General instructions

- Answer all questions in this question and response book.
- QCAA-approved calculator permitted.
- Planning paper will not be marked.

Section 1 (20 marks)

- 20 multiple choice questions

Section 2 (40 marks)

- 11 short response questions

Clear zone — margin trimmed off after completion of assessment

Section 1

Instructions

- Choose the best answer for Questions 1–20.

- This section has 20 questions and is worth 20 marks.

- Use a 2B pencil to fill in the A, B, C or D answer bubble completely.

- If you change your mind or make a mistake, use an eraser to remove your response and fill in the new answer bubble completely.

	A	B	C	D
Example:	●	○	○	○

	A	B	C	D
1.	○	○	○	○
2.	○	○	○	○
3.	○	○	○	○
4.	○	○	○	○
5.	○	○	○	○
6.	○	○	○	○
7.	○	○	○	○
8.	○	○	○	○
9.	○	○	○	○
10.	○	○	○	○
11.	○	○	○	○
12.	○	○	○	○
13.	○	○	○	○
14.	○	○	○	○
15.	○	○	○	○
16.	○	○	○	○
17.	○	○	○	○
18.	○	○	○	○
19.	○	○	○	○
20.	○	○	○	○

Section 2

Instructions

- Write using black or blue pen.
- Respond in paragraphs consisting of full sentences unless instructed otherwise.
- If you need more space for a response, use the additional pages at the back of this book.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page …
  - If you do not do this, your original response will be marked.
- This section has 11 questions and is worth 40 marks.

QUESTION 21 (4 marks)

The market share of free-range and barn-laid egg production systems has increased from 2009 to 2018.

a) Explain a reason for the increase in the market share of free-range and barn-laid eggs.

[2 marks]

b) Explain a risk management strategy that a producer of caged eggs could adopt to avoid declining market share.

[2 marks]

QUESTION 22 (4 marks)

A producer undertook a comparison of gross margins to help them decide between planting dryland sorghum or dryland sunflowers.

a) Complete the table below. *[2 marks]*

	Dryland sorghum	**Dryland sunflowers**
Income		
Yield t/ha	2.00	1.00
Income $/t	215.00	510.00
Total income $/ha	430.00	510.00
Variable costs $/ha		
Sowing	35.15	48.71
Fertiliser and application	0.00	54.00
Herbicide and application	117.63	90.82
Insecticide and application	0.00	23.96
Harvesting	66.24	66.24
Levies and insurance	18.20	18.82
Total variable cost $/ha	237.22	302.56
Gross margin $/ha		

Note: If you make a mistake in the table, cancel it by ruling a single diagonal line through your work and use the additional table on page 13 of this question and response book.

b) Which crop should the producer plant? Give a reason for your decision. *[2 marks]*

QUESTION 23 (4 marks)

Explain two strategies that a producer could implement to increase the level of agricultural production on soil with an elevated level of salinity.

1. _____

_____

2. _____

_____

QUESTION 24 (3 marks)

Identify three components of nutrition that are important to agricultural animals.

1. _____

2. _____

3. _____

QUESTION 25 (3 marks)

Define the following plant terms.

    a)   herbicide   *[1 mark]*

_____

_____

    b)   nematicide   *[1 mark]*

_____

_____

    c)   grafting   *[1 mark]*

_____

_____

QUESTION 26 (2 marks)

Explain why tissue culture is used in breeding new plant varieties.

_____

_____

_____

_____

QUESTION 27 (2 marks)

An animal study fed four groups of birds of the same age the same ration for a period of seven days. The table below shows the birds' average mass gain and the amount of food consumed for each group.

	Group A	Group B	Group C	Group D
Mass gained / animal (g)	253	302	295	340
Mass of food eaten (g) / animal	1825	1840	1953	2095

Interpret the results to decide which group of birds is genetically superior in terms of production. Explain your decision.

_____

_____

_____

_____

QUESTION 28 (2 marks)

Identify where carbohydrates are absorbed into the blood in

    a)   ruminant animals   _[1 mark]_

_____

    b)   monogastric animals.   _[1 mark]_

_____

QUESTION 29 (3 marks)

A beef producer in tropical Queensland wishes to implement an integrated management program to control buffalo flies in their herd.

Dung beetles reduce buffalo fly populations by removing or spreading dung so flies cannot breed in it. Dung beetles are most active in hot, humid weather (i.e. wet season, October–March), which coincides with the period when flies are most active. To help increase the dung beetle population, farmers must consider using chemicals that are known to have little or no effect on the beetles and avoid using chemicals at peak dung beetle breeding times.

Three chemical products available for buffalo fly control are Product A, Product B and Product C.

	Product A	**Product B**	**Product C**
Potential activity period of the chemical after a single treatment	21 days	14–18 days	up to 21 days
Likelihood of resistance in flies to the chemical	medium	low	medium
Likely activity period of the chemical where there is resistance in flies	around 10 days	around 7 days	7–10 days
Likelihood of chemical activity in dung	yes	none	none

Use data from the table to decide which product a producer should use at the beginning of the wet season. Give reasons for your decision.

_____

_____

_____

_____

_____

_____

QUESTION 30 (7 marks)

The figure below shows the projected human population growth in billions from 2012 to 2050.
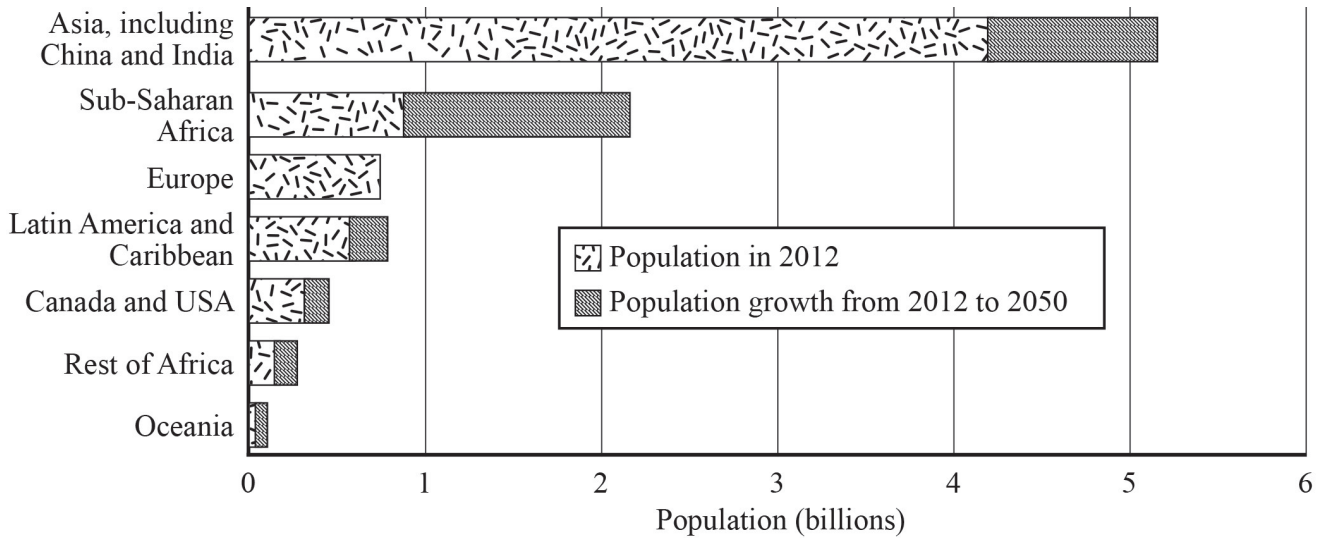

Table 1 below shows the expected changes in global consumption of meat products from 2006 to 2050.

Table 1

Region	Livestock (kcal/person/day)			Beef and mutton (kcal/person/day)		
	2006	**2050**	**%Change**	**2006**	**2050**	**%Change**
Asia, including China and India	745	1177	58%	49	108	120%
Sub-Saharan Africa	144	185	29%	41	51	26%
Europe	864	925	7%	80	75	–6%
Canada and USA	907	887	–2%	117	95	–19%

Table 2 below shows the volume of water in litres required for each crop and animal product to produce a kilogram of product, kilocalorie of energy, and gram of protein.

Table 2

Crop or animal product	L/kg	L/kcal	L/g of protein
Vegetables	322	1.34	26
Fruits	962	2.09	180
Cereals	1644	0.51	21
Pulses (legumes)	4055	1.19	19
Chicken meat	4325	3.00	34
Sheep/goat meat	8763	4.25	63
Bovine (cattle) meat	15 415	10.19	112

Use the data to answer the following questions.

a) Assess the opportunity for sustainable social practices in beef production systems in Australia using the following criteria.

- population distribution
- food quality
- food security

[3 marks]

_____

_____

_____

_____

_____

_____

_____

b) Draw a conclusion about the opportunity for sustainable social practices in beef production, providing reasons to support your conclusion.

[4 marks]

_____

_____

_____

_____

_____

_____

_____

QUESTION 31 (6 marks)

Table 1 below shows the carcass results for three animals shown at the Royal National Association Led Steer competition. Table 2 below shows the pricing schedule at the abattoir that the animals were sent to after the competition (grid price $5.90/ kg).

Table 1

Characteristics	Animal A	Animal B	Animal C
Hot score carcass weight (HSCW) (kg)	250	220	220
Dentition	4	0	2
P8 fat (mm)	4	8	14
Butt shape	D	B	B
Sex	M	M	F
Eye muscle area (cm²)	98	94	87

Table 2

Sex		P8 fat mm		Butt shape		Dentition		HSCW kg	
M	0	0–2	–40c	A	+20c	0	0c	130.1–150	–60c
F	–5c	3	–20c	B	+10c	2	–5c	150.1–160	–45c
		4	–10c	C	0	4	–30c	160.1–180	–30c
		5–9	0	D	–20c	6	–50c	180.1–200	–15c
		10–12	0	E	–50c	8	–65c	200.1–280	0
		13–17	–5c					280.1–300	–5c
		18–22	–15c					300.1–320	–15c
		23–32	–40c					320.1–400	–40c
		33+	–60c					>400.1	–60c

a) Determine which animal returned the highest income. Show your working.

[3 marks]

Animal returning the highest income = Animal _____

b) For each animal, discuss the possible characteristics, if any, that prevented them from achieving the agreed grid price.

[3 marks]

END OF PAPER

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

ADDITIONAL PAGE FOR STUDENT RESPONSES

ADDITIONAL RESPONSE SPACE FOR QUESTION 22

If you want this table to be marked, rule a diagonal line through the table on page 3.

	Dryland sorghum	**Dryland sunflowers**
Income		
Yield t/ha	2.00	1.00
Income $/t	215.00	510.00
Total income $/ha	430.00	510.00
Variable costs $/ha		
Sowing	35.15	48.71
Fertiliser and application	0.00	54.00
Herbicide and application	117.63	90.82
Insecticide and application	0.00	23.96
Harvesting	66.24	66.24
Levies and insurance	18.20	18.82
Total variable cost $/ha	237.22	302.56
Gross margin $/ha		

References

Question 22

Derived from NSW Government Department of Primary Industries 2013, *Dryland north-west NSW summer crop budgets*, www.dpi.nsw.gov.au/__data/assets/pdf_file/0013/410440/North-West-all-12-13.pdf. © State of New South Wales through NSW Department of Industry.

Question 30

Derived from Ranganathan, J 2013, 'The global food challenge explained in 18 graphics', *World Resources Institute*, 3 December, www.wri.org/blog/2013/12/global-food-challenge-explained-18-graphics. Licensed under CC BY 4.0, https://creativecommons.org/licenses/by/4.0.

Derived from Water Footprint Network 2010, 'Water footprint of crop and animal products: A comparison', http://waterfootprint.org/en/water-footprint/product-water-footprint/water-footprint-crop-and-animal-products.

— Public use —

Agricultural Science

Paper 2

— Public use —

THIS PAGE IS INTENTIONALLY BLANK

Stimulus 1

A family-owned business runs a breeding operation and fattens cattle destined for feedlots in Central Queensland. They own 8500 ha and lease a further 12 750 ha across three properties. They run a herd of tropical crossbred cattle that they join to Angus and Wagyu sires, i.e. early-maturing breeds of cattle.

- Property A consists of heavy-cracking clays with 20% blackbutt and bean tree scrub soils and an expected annual rainfall of 660 mm. This property has also had considerable work performed on improving pastures, with improved legume and grass pasture species (e.g. buffel grass, butterfly pea, stylo species and Bambatsi panic) now dominating.

- Properties B and C consist of bluegum forest soils to lighter forest country. These properties are in a highly variable rainfall area, with annual averages between 760 and 1010 mm. Pastures on these properties are developed and range from native forest grasses to naturalised and improved legume and grass species, e.g. Rhodes grass, Wynn cassia, stylo species, para grass and pangola grasses.

All properties have been fully fenced and divided into appropriately sized paddocks, with animals accessing natural watercourses, dams or, in limited cases, water troughs. In the past year, the manager has noticed an increasing problem with invasive weed species, including parthenium. They have also noticed significant dung beetle activity on all properties.

Stimulus 2

A north-west Queensland grazing operation consists of 20 000 ha. An aquifer is located under the southern half of the property. Annual rainfall in this region is 400 mm, and this operation usually runs 2000 head of cattle for breeding purposes. As the region has received below-average rainfall for the past four years, breeder numbers have been decreased to 1400.

Despite the ongoing drought conditions, productivity remains high, with excellent calving and weaning rates of 93% and 87% respectively.

The owners of the grazing operation are currently reaching their goal of keeping calf survival between 80% and 90% for their herd. They predict that they could lose an extra $104 000 'in the pocket' each year if weaning rates fall below 80%.

— Public use —

THIS PAGE IS INTENTIONALLY BLANK

— Public use —

THIS PAGE IS INTENTIONALLY BLANK

— Public use —

Sample assessment 2020

Agricultural Science

Paper 2

Time allowed

- Perusal time — 10 minutes
- Working time — 90 minutes

General instructions

- Answer all questions in this question and response book.
- Write using black or blue pen.
- Respond in paragraphs consisting of full sentences unless instructed otherwise.
- QCAA-approved calculator permitted.
- Planning paper will not be marked.

Section 1 (35 marks)

- 11 short response questions

Section 2 (20 marks)

- 1 extended response question

Section 1

Instructions

- If you need more space for a response, use the additional pages at the back of this book.
  - On the additional pages, write the question number you are responding to.
  - Cancel any incorrect response by ruling a single diagonal line through your work.
  - Write the page number of your alternative/additional response, i.e. See page …
  - If you do not do this, your original response will be marked.
- This section has 11 questions and is worth 35 marks.

QUESTION 1 (3 marks)

Nutritional constituents of three commercially prepared poultry rations are shown in the table below.

Nutritional constituents	Feed A	Feed B	Feed C
Crude protein (%)	19.5	15.0	15.5
Crude fat (%)	2.5	2.5	1.0
Crude fibre (%)	6.0	10.0	8.0
Calcium (%)	1.0	3.5	1.0
Available phosphorus (%)	0.5	0.5	0.5

Contrast the information in the table to justify which ration should be used for 16-week-old egg-laying chickens.

_____

_____

_____

_____

_____

QUESTION 2 (3 marks)

Table 1 lists the nutritional requirements for cattle, based on their stage of production.

Table 1

Category (life stage)	Life stage	Dry matter intake (% LW)[1]	Metabolisable energy (MJ/kg DM)[2]	Crude protein (%)	Non-digestible fibre (%)
1	Bull calf >12 months old	2.8	10.8	12	30–42
2	Cow: mating	2.0	10.0	10	30–60
3	Cow: late pregnancy	2.0	9.0	10	30–48
4	Cow: lactating	2.5	10.5	15	30–48

Table 2 shows some nutritional analysis of a generic cattle pellet.

Table 2

Analysis	As fed
Crude protein (minimum) (%)	11.7
Metabolisable energy (MJ/kg DM)	10.5

Justify which life-stage categories could be fed the generic pellet.

_____

_____

_____

_____

_____

_____

---

[1] LW: live weight

[2] MJ/kg DM: megajoules per kilogram dry mass

QUESTION 3 (4 marks)

Explain two effects that land clearing has on natural resources.

_____

_____

_____

_____

QUESTION 4 (2 marks)

Describe the impact that a specific government decision or policy has on an Australian agricultural enterprise.

_____

_____

_____

_____

QUESTION 5 (3 marks)

a)   Identify a soil management technique.   *[1 mark]*

_____

b)   Describe one advantage and one disadvantage of this technique in terms of sustainable production.   *[2 marks]*

_____

_____

_____

QUESTION 6 (6 marks)

An investigation was conducted to test the effect of planting density on the growth of sunflowers. A trial was conducted where five treatments, each with three replications, were tested:

one plant (control), two plants, four plants, six plants and eight plants per 300 mm pot.

Each week the average height for each treatment was calculated and recorded. The results are shown in the table below.

Note: The recommended planting rate for sunflowers is equivalent to one plant per pot.

Day	Average height (cm)				
	One plant (control)	Two plants	Four plants	Six plants	Eight plants
7	18.3	19.2	19.5	19.6	20.2
14	45.0	36.3	39.6	35.8	36.5
21	70.3	60.4	60.8	53.3	50.4
28	97.4	85.8	80.6	67.3	66.2
35	116.2	98.6	92.9	74.8	71.3

a) Determine the average growth rates for the control treatment and sunflowers in the eight-plant treatment from Day 7 to Day 35. (Round your answers to 1 decimal place.)   *[2 marks]*

Average growth rate for control treatment = _____ cm/day

Average growth rate for eight-plant treatment = _____ cm/day

b) Contrast the data for all treatment groups at Day 7 with Day 35.

[2 marks]

_____

_____

_____

_____

_____

c) Explain two reasons for why plant density affects plant growth.

[2 marks]

_____

_____

_____

_____

_____

_____

_____

QUESTION 7 (4 marks)

The table below contains live weight and carcass estimated breeding values (EBV) data for a selection of sires from a British breed catalogue.

Bull	400-day weight	600-day weight	Rump fat	EMA[3]	IMF[4]	RBY[5]
A	+59	+93	–0.7	+4.3	+0.1	+0.5
B	+50	+84	–0.2	+2.0	–0.1	+0.1
C	+55	+96	+1.4	+4.2	+0.2	+0.4
D	+56	+88	+0.8	+2.0	–0.2	+0.1

a) Use the data to decide which bull a buyer should purchase if they wish to sell steers to the local domestic market and have been advised to

  - increase size and growth to 14 months

  - reduce fatness

  - maintain or improve muscularity

  - improve marbling.   *[1 mark]*

Bull purchased = _____

b) Justify your decision.   *[3 marks]*
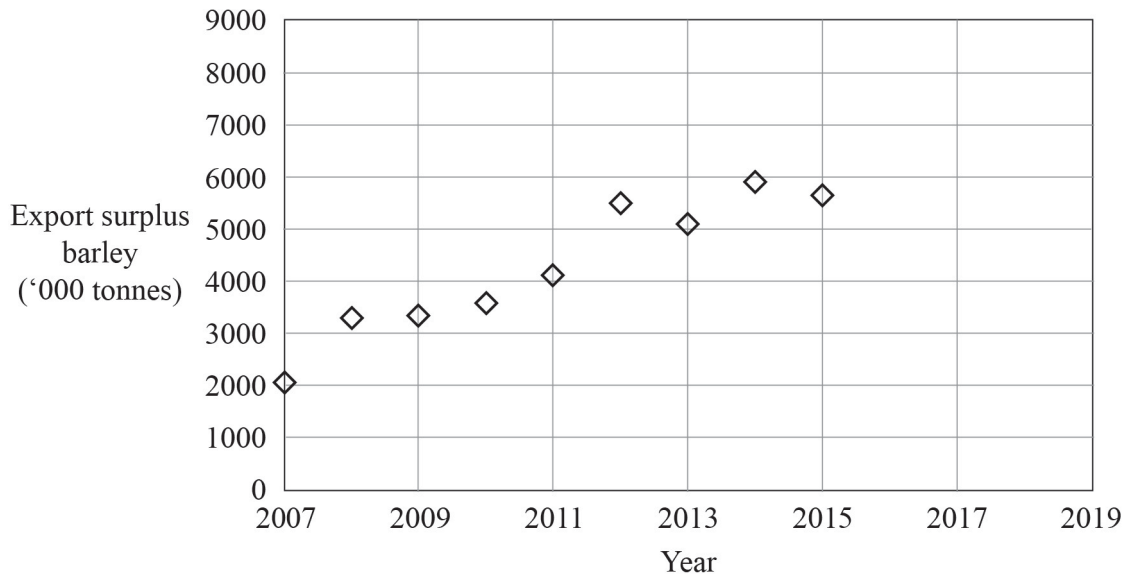
_____

_____

_____

---

[3] EMA: eye muscle area EBV

[4] IMF: intramuscular fat EBV

[5] RBY: retail beef yield EBV (%)

QUESTION 8 (3 marks)

The figure below shows the amount of surplus barley that is exported after being used in domestic feed and malting.

a) Determine, to the nearest 10 000 tonnes/year, the average annual increase in the mass of barley exported from 2007 to 2013. *[1 mark]*

> Average annual increase in barley = _____ tonnes/year

b) Use the data to predict approximately how much barley will be exported in 2018. State your answer to the nearest 100 000 tonnes. Show your working. *[2 marks]*

_____

_____

_____

> Expected barley exported in 2018 = _____ tonnes

QUESTION 9 (3 marks)

Identify three factors that affect animal growth and development.

1. _____

2. _____

3. _____

QUESTION 10 (2 marks)

Select a local or regional pest and describe an impact that the pest has on the associated production animal.

Selected pest: _____

Impact: _____

_____

_____

_____

QUESTION 11 (2 marks)

Select an animal welfare issue associated with production practices and explain why it is classified as a welfare issue.

Animal welfare issue: _____

_____

_____

_____

_____

Section 2

Instructions

- Respond to **one** of the following questions.

- This section has one question and is worth 20 marks.

- Select **one** question. Indicate the question you have selected by filling in the bubble completely.

  If you change your mind or make a mistake, draw a cross through the bubble you wish to change and fill in the new bubble completely.

  Example:

Question 12 ●	Question 13 ✖

- Respond in 300–350 words.

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED

Select **one** question. Indicate the question you have selected by filling in the bubble completely.

| Question 12 ○ | Question 13 ○ |

QUESTION 12

Refer to Stimulus 1 in the stimulus book.

Question 12 has four parts: a), b), c) and d). You must respond to all four parts.

Assess the opportunity that the family has for sustainable practices in their operation.

a) Explain three positive practices in their current management. *[9 marks]*

b) Identify two management actions that the manager could take that would improve sustainability. Address water/soil management and weed management. Give reasons to support each action. *[6 marks]*

c) Identify three future risks that the family should manage for their operation to remain sustainable. *[3 marks]*

d) For one of the identified risks, explain why it would be considered a risk to the future sustainability of the family's operation. *[2 marks]*

OR

QUESTION 13

Refer to Stimulus 2 in the stimulus book.

Question 13 has two parts: a) and b). You must respond to both parts.

Assess the risk associated with this agricultural enterprise for drought using the PPRR model.

a) Make three recommendations for improvements in each of the four areas. *[12 marks]*

b) For each area, choose two recommendations and explain how each of these recommendations will lessen the impact of drought. *[8 marks]*

END OF PAPER

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

ADDITIONAL PAGE FOR STUDENT RESPONSES

Write the question number you are responding to.

References

Question 2

Derived from Meat & Livestock Australia 2013, 'Managing your feedbase: Understand livestock nutritional requirements', *More Beef from Pastures*, https://mbfp-pastoral.mla.com.au/managing-your-feedbase/understand-livestock-nutritional-requirements/#.

Question 7

Derived from University of New England 2015, *A Basic Guide to Breedplan EBVs*, p. 24, http://breedplan.une.edu.au/booklets/A%20Basic%20Guide%20to%20BP%20EBVs%20%28Complete%29.pdf.

Question 8

Derived from Spragg, J 2016, *Australian Feed Grain Supply and Demand Report 2016*, Feed Grain Partnership, www.sfmca.com.au/items/1093/FGP%20Report%20October%202016.pdf.

— Public use —

DO NOT WRITE ON THIS PAGE

THIS PAGE WILL NOT BE MARKED