— Public use —

LUI | | | | | | | | | | |  Venue code | | | | |

School name

Given name/s

Family name

Attach your barcode ID label here

**Sample assessment 2020**

**Question and response book**

# 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

Clear zone — margin trimmed off after completion of assessment

Queensland Government | QCAA Queensland Curriculum & Assessment Authority

**DO NOT WRITE ON THIS PAGE**

**THIS PAGE WILL NOT BE MARKED**

## 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]*

_____

_____

_____

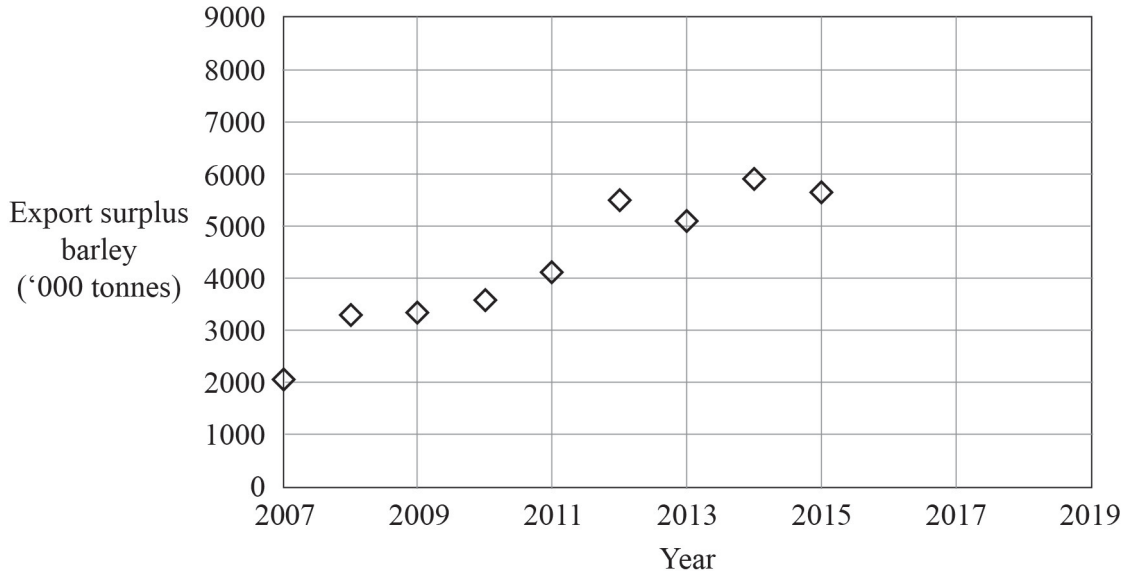
[3] EMA: eye muscle area EBV

[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.

**DO NOT WRITE ON THIS PAGE**

**THIS PAGE WILL NOT BE MARKED**