



Western Australian Certificate of Education Examination, 2015

Question/Answer Booklet

ANIMAL PRODUCTION SYSTEMS

Stage 3

Please place your student identification label in this box

Student Number: In figures

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In words

Time allowed for this paper

Reading time before commencing work: ten minutes

Working time for paper: three hours

Materials required/recommended for this paper

To be provided by the supervisor

This Question/Answer Booklet

Multiple-choice Answer Sheet

Number of additional answer booklets used (if applicable):

To be provided by the candidate

Standard items: pens (blue/black preferred), pencils (including coloured), sharpener, correction fluid/tape, eraser, ruler, highlighters

Special items: non-programmable calculators approved for use in the WACE examinations

Important note to candidates

No other items may be taken into the examination room. It is **your** responsibility to ensure that you do not have any unauthorised notes or other items of a non-personal nature in the examination room. If you have any unauthorised material with you, hand it to the supervisor **before** reading any further.

Structure of this paper

Section	Number of questions available	Number of questions to be answered	Suggested working time (minutes)	Marks available	Percentage of exam
Section One: Multiple-choice	15	15	20	15	15
Section Two: Short answer	6	6	90	98	50
Section Three: Production practices	1	1	30	26	15
Section Four: Extended answer	3	2	40	40	20
Total					100

Instructions to candidates

- The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2015*. Sitting this examination implies that you agree to abide by these rules.
- Answer the questions according to the following instructions.

Section One: Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Sections Two, Three and Four: Write your answers in this Question/Answer Booklet.

- You must be careful to confine your responses to the specific questions asked and to follow any instructions that are specific to a particular question.
- Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.
 - Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
 - Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

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Section One: Multiple-choice

15% (15 Marks)

This section has **15** questions. Answer **all** questions on the separate Multiple-choice Answer Sheet provided. For each question, shade the box to indicate your answer. Use only a blue or black pen to shade the boxes. If you make a mistake, place a cross through that square, then shade your new answer. Do not erase or use correction fluid/tape. Marks will not be deducted for incorrect answers. No marks will be given if more than one answer is completed for any question.

Suggested working time: 20 minutes.

1. Which statement **best** describes 'duty of care' requirements?
 - (a) The sole responsibility for ensuring a safe workplace belongs to the employer.
 - (b) A safety induction is the only requirement.
 - (c) Duty of care does not apply to everyone.
 - (d) All individuals in the workplace have occupational health and safety responsibilities.

2. Ensuring that current practices do **not** affect the wellbeing of future generations is commonly known as
 - (a) generational sustainability.
 - (b) the triple bottom line.
 - (c) intergenerational equity.
 - (d) a positive feedback loop.

3. The end product of the digestive process converts sugars, starches and cellulose into
 - (a) fatty acids.
 - (b) amino acids.
 - (c) ammonia.
 - (d) microbial protein.

4. Which one of the following government measures works toward increasing Australia's global competitiveness in livestock products?
 - (a) import restrictions
 - (b) trade agreements
 - (c) import tariffs
 - (d) market quotas

5. Gross margins should only be used to compare the profitability of similar enterprises, as they do **not** include
 - (a) variable costs.
 - (b) commodity prices.
 - (c) fixed costs.
 - (d) performance data.

See next page

6. An effective short-term conservation strategy is to
- (a) implement a biosecurity plan.
 - (b) focus on improving production profitability.
 - (c) fence according to contours and soil types.
 - (d) diversify the enterprise mix.

Question 7 refers to the table below.

Feed cost table

	On farm cost (\$/t)	Energy (MJ/kg DM)
Barley	300	13
Lupins	400	13
Oats	250	10

7. The order for the **most** cost effective feed type (\$ per MJ/kg DM) to meet livestock energy requirements would be
- (a) lupins, barley, oats.
 - (b) lupins, oats, barley.
 - (c) barley, oats, lupins.
 - (d) oats, lupins, barley.
8. Which of the following **best** explains why a producer should compare his own enterprise financial data with industry benchmarks?
- (a) Ensure practices meet quality assurance requirements.
 - (b) Forecast future changes in market specifications of a product.
 - (c) Plan adequately for long-term environmental and financial sustainability.
 - (d) Identify the main factors that influence the financial performance of an enterprise.
9. A positive feedback loop occurs when
- (a) outputs are fed back as inputs in an unstable system.
 - (b) outputs are fed back as inputs in a stable system.
 - (c) production practices have a negative impact on feedback loops.
 - (d) there is no relationship between inputs and outputs.
10. Which statement **best** describes a natural ecosystem?
- (a) Undisturbed natural ecosystems are only able to maintain a limited sustainable diversity of life.
 - (b) Natural ecosystems have intricate recycling systems that are unable to conserve essential materials and nutrients.
 - (c) Natural ecosystems recycle materials including mineral nutrients and important biological substances.
 - (d) A natural ecosystem is a system in which energy but not matter passes through various cycles.

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11. Which statement about an urban ecosystem is correct?
- (a) The urban ecosystem has significantly lower soil contaminants than the natural environment.
 - (b) Acid rain is not a feature of air pollution in urban ecosystems.
 - (c) The urban ecosystem has significantly more air pollution, due primarily to industry.
 - (d) Recycling in an urban ecosystem is greater because of an increase in material available.
12. The **best** management strategy for avoiding pesticide resistance is to
- (a) use a pesticide that increases the proportion of resistant individuals in the pest population.
 - (b) apply the same class of pesticide repeatedly to control the pest number.
 - (c) use a pesticide at predetermined dates in the calendar year to ensure the pest population is minimised.
 - (d) implement accepted management practices of an integrated pest management program.

13. Calculate the average weight gain **per animal, per day** for the following.

Date	Weight (kg)	
	Animal A	Animal B
08 March 2015	200	210
15 March 2015	211	219

- (a) 1.25 kg
 - (b) 1.43 kg
 - (c) 4.71 kg
 - (d) 10.00 kg
14. A farmer is concerned about a variation in fleece weights at shearing time. After weighing all fleeces, what information should he look at to determine whether his concern is justified?
- (a) mean and range
 - (b) mean and standard deviation
 - (c) median and standard deviation
 - (d) median and range
15. Which of the following is the **most** environmentally-sustainable means of disease control?
- (a) IPM control
 - (b) quarantine
 - (c) chemical control
 - (d) cultural practices

End of Section One

See next page

Section Two: Short answer

50% (98 Marks)

This section has **six (6)** questions. Answer **all** questions. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 90 minutes.

Question 16**(17 marks)**

Budgets (partial and whole farm) and gross margins can be used to compare profitability across animal productions systems.

- (a) List a benefit and a limitation of using partial budgets for financial analysis. (2 marks)

Benefit: _____

Limitation: _____

- (b) A producer is contemplating an enterprise change by replacing 600 merino ewes with 50 beef cows. The following partial budget has been developed.

Purchases required for the change	Purchase 50 cows	\$45 000
	Purchase 1 bull	\$5 000
	Fence upgrade	\$8 000
Sales to help fund the change	Less sale of 600 ewes	\$8 000
Net capital required		(A)
Gross margin cows		\$20 000
Gross margin ewes		\$18 000
Increase or decrease in income		(B)
Percentage return on extra capital		(C)

- (i) Calculate the missing information for **A**, **B** and **C**. (3 marks)

A: _____

B: _____

C: _____

See next page

- (ii) What additional factors would the producer need to consider to ensure that there was a valid comparison between the enterprise gross margins in part (b)(i)? (2 marks)

- (iii) On the basis of the analysis of the partial budget in part (b)(i), explain what recommendation you would give to the producer. (2 marks)

- (c) Name **two** export market conditions that could have an impact on projected enterprise incomes and explain their effects. (4 marks)

One: _____

Explanation: _____

Two: _____

Explanation: _____

Question 16 (continued)

- (d) Describe **two** possible strategies available to the producer to address the risk of fluctuations in product price. (4 marks)

One: _____

Two: _____

Question 17

(15 marks)

The selection and mating of genetically-superior animals is an essential component of successful breeding programs.

- (a) (i) Identify **two** methods of selecting genetically-superior animals. (2 marks)

One: _____

Two: _____

- (ii) Define 'heritability' and, using an example, describe how an understanding of heritability can assist genetic improvement. (4 marks)

(b) A commercial prime lamb producer has identified two suitable rams to purchase. The only information available is the following estimated breeding values (EBVs).

Ram A: Growth (kg) EBV +6

Ram B: Growth (kg) EBV +4

(i) Calculate the estimated gain in the progeny for each ram. (2 marks)

Ram A: _____

Ram B: _____

(ii) Assuming each ram will mate with 50 ewes (100% lambing), calculate the potential difference in income between each ram if the market price for lamb is \$5/kg. Show **all** workings. (3 marks)

(iii) Discuss, using **two** examples, how EBVs can assist in meeting market specifications. (4 marks)

Question 18

(17 marks)

Australia's comparative advantage in livestock production means that it has been successful in establishing and maintaining export markets.

- (a) (i) List **two** factors that contribute to Australia's comparative advantage and identify an international market in which this applies. (3 marks)

One: _____

Two: _____

Market: _____

- (ii) Explain **two** ways in which the Australian Government can assist in developing or maintaining agricultural animal export markets. (4 marks)

One: _____

Two: _____

- (b) Discuss, using an example, how changes in productivity have contributed to Australia's global competitiveness in livestock products. (3 marks)

- (c) (i) Name a significant infectious livestock disease and outline the consequences of an outbreak, both locally and at the international level. (3 marks)

Disease	Consequence of outbreak	
	Local level	International level

- (ii) Outline **two** ways in which Australia’s biosecurity system is designed to reduce the likelihood of an infectious disease outbreak for each of the given levels. (4 marks)

Australian Government (international) biosecurity measures:

One: _____

Two: _____

Individual farm (local) biosecurity measures:

One: _____

Two: _____

Question 19

(20 marks)

All animals have a natural disease control system that varies in complexity and effectiveness.

- (a) Outline the function of the immune system. (2 marks)

- (b) Define 'antigen' and 'antibody'. (2 marks)

- (c) (i) Discuss **one** reason why colostrum is important for a young animal in the first few hours of birth. (2 marks)

- (ii) What may happen if the newborn animal receives no colostrum from its mother? (2 marks)

- (iii) What management strategy could the farmer use to address the possible outcome in part (c)(ii)? (2 marks)

- (d) Why is a booster required when vaccinating young stock? What impacts on production would there be if the producer did not vaccinate his stock in the short and long term? (6 marks)

Reason for booster: _____

Short-term impact: _____

Long-term impact: _____

- (e) Discuss **one** social and **one** economic issue that would affect a producer's decision to use a new animal health medication within an enterprise. (4 marks)

Social issue: _____

Economic issue: _____

Question 20

(17 marks)

The presence of pests in an animal production system can affect the quality of any marketed product and result in a decrease in price.

- (a) Explain, using an example, how the producer can implement measures to control a pest on the basis of the economic injury level (EIL) strategy. (3 marks)

- (b) Describe the difference between contact and systemic modes of action. (4 marks)

Contact: _____

Systemic: _____

- (c) For **one** of the modes of action in part (b), list **one** advantage and **one** disadvantage related to pest control. (2 marks)

Advantage: _____

Disadvantage: _____

(d) Explain what is meant by the term 'pesticide resistance'. (2 marks)

(e) List **two** methods available to the producer to avoid or limit the impact of a pest. (2 marks)

One: _____

Two: _____

(f) Discuss an integrated approach to the control of a selected pest in an animal production system. (4 marks)

Selected pest: _____ (no marks)

IPM strategy: _____

Question 21

(12 marks)

A producer believes she has a worm resistance problem on her farm. She conducts a trial comparing two drenches on 30 animals of various breeds, age, weight and different management groups. The animals are split into two equal groups with one type of drench used in each group.

Note: any egg count greater than 300 affects production.

Faecal egg counts (average per animal) for two drench types over time

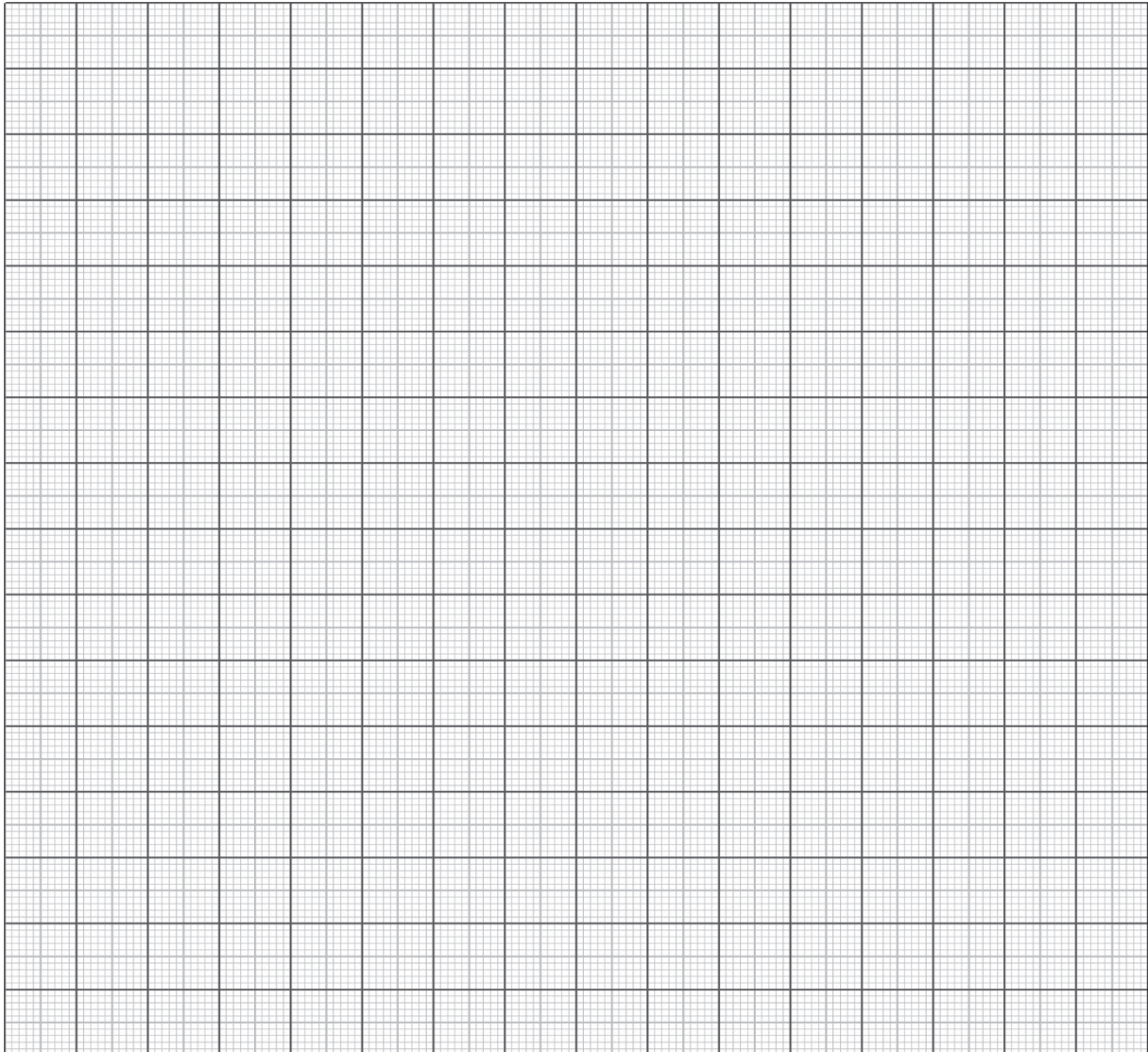
Month	Faecal egg count (eggs per gram)	
	Drench – A Clear	Drench – B Combination
December 2014	1200	1150
February 2015	300	1500
April 2015	200	550
June 2015	200	450
August 2015	600	300

- (a) Write an hypothesis for this trial. (2 marks)

- (b) Identify and explain **one** variable that you could use to decrease the error in this trial. (2 marks)

- (c) Use the information from the drenches trial to draw graphs showing the results of the **two** drenches. (6 marks)

A spare grid is provided at the end of the Question/Answer Booklet. If you need to use it, cross out this attempt.



- (d) Outline the conclusion that can be drawn from these results. (2 marks)

End of Section Two

See next page

Section Three: Production practices**15% (26 Marks)**

This section contains **one (1)** question. You must answer this question. Write your answers in the spaces provided.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 30 minutes.

Question 22**(26 marks)**

The sustainability of a farm enterprise relies on the application of knowledge and skills to optimise production.

Name an animal production enterprise you have studied this year and state its marketed product.

Animal production enterprise: _____ (no marks)

Marketed product: _____ (no marks)

- (a) (i) Identify a relevant quality assurance program for the marketed product and outline **two** of its quality assurance criteria. (5 marks)

Quality assurance program: _____

Criterion one: _____

Criterion two: _____

- (ii) Describe **two** factors that may influence a producer's decision to implement a quality assurance system. (4 marks)

One: _____

Two: _____

- (b) If changes in the market result in consumers demanding leaner carcasses, outline how a livestock manager could address this change through: (9 marks)

breeding _____

nutrition _____

technology. _____

Question 22 (continued)

(c) Balancing short-term needs with long-term sustainability is a dilemma faced by livestock producers.

(i) Describe **two** ways in which a livestock producer could achieve a short-term goal of increased profit while also working toward a long-term goal of social sustainability. (4 marks)

One: _____

Two: _____

(ii) Outline the importance of balancing triple bottom line sustainability to an animal production business. (4 marks)

End of Section Three

See next page

Section Four: Extended answer**20% (40 Marks)**

This section contains **three (3)** questions. You must answer **two (2)** questions. Write your answers on the lined pages provided following Question 25.

Spare pages are included at the end of this booklet. They can be used for planning your responses and/or as additional space if required to continue an answer.

- Planning: If you use the spare pages for planning, indicate this clearly at the top of the page.
- Continuing an answer: If you need to use the space to continue an answer, indicate in the original answer space where the answer is continued, i.e. give the page number. Fill in the number of the question that you are continuing to answer at the top of the page.

Suggested working time: 40 minutes.

Question 23**(20 marks)**

In the last decade, large proportions of Australia's agricultural regions have endured extended dry conditions.

- (a) Livestock producers must address the following challenges when experiencing extended dry conditions:
- economic sustainability
 - maintenance feeding.

Discuss these challenges and how they can be addressed. (8 marks)

- (b) Explain the principles of production feeding. Your response must include
- how feed additives and hormone growth promotants (HGP) could be of assistance. Include **two** specific examples.
 - the legal requirements associated with using HGP. (12 marks)

Question 24**(20 marks)**

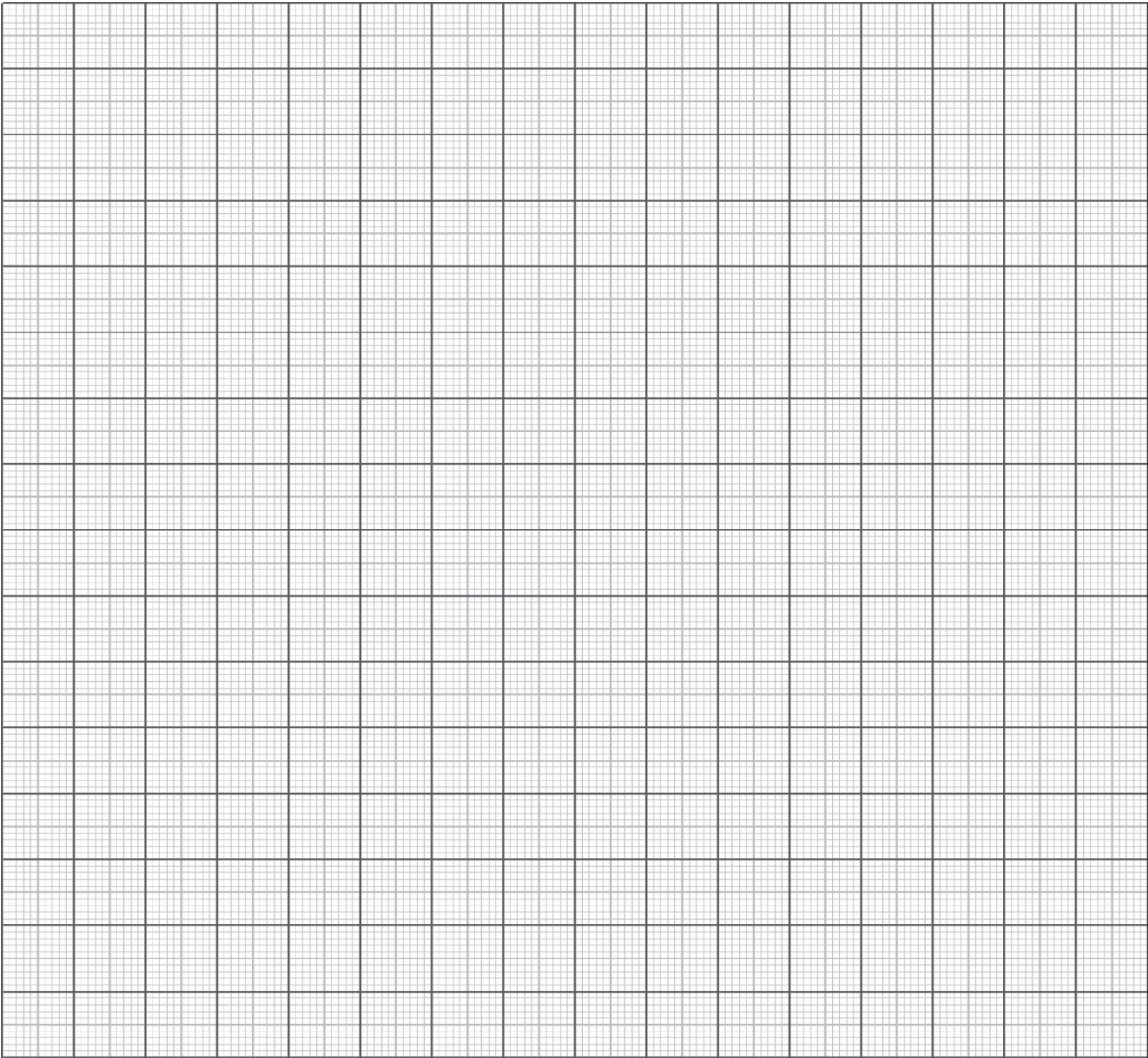
- (a) Explain the potential costs and benefits of **two** breeding technologies compared with conventional breeding systems. Identify how the new technologies may be evaluated in terms of optimising production. (12 marks)
- (b) If producers are unable to access advances in breeding technology, outline **two** management practices that could be implemented to optimise production. (8 marks)

Question 25**(20 marks)**

- (a) Explain the energy flow (Gross energy to Net energy) in a digestive system of an animal you have studied. How is the management of energy flow critical to the animal's performance? (8 marks)
- (b) The rumen is essential for feed conversion. Outline how optimum feed conversion is achieved. Explain the digestive process in terms of the following:
- protein digestion in the rumen
 - carbohydrate digestion in the rumen. (12 marks)

End of questions

Spare grid.



ACKNOWLEDGEMENTS

Section Two

Question 21

Information from: Department of Agriculture and Food. (n.d.). *Sheep worm control in Western Australia*. Retrieved August, 2015, from www.agric.wa.gov.au/livestock-parasites/sheep-worm-control-western-australia?page=0%2C2#smartpaging_toc_p2_s4_h2

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