



# Western Australian Certificate of Education Examination, 2010

## 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

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### 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

#### *To be provided by the candidate*

Standard items: pens, pencils, eraser, correction fluid/tape, ruler, highlighters

Special items: non-programmable calculators satisfying the conditions set by the Curriculum Council for this course

### 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	7	7	90	84	50
Section Three: Production practices	1	1	30	30	15
Section Four: Extended answer	3	2	40	40	20
<b>Total</b>					100

## Instructions to candidates

- The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2010*. 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, do not erase or use correction fluid, and shade your new answer. 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(s) that you are continuing to answer at the top of the page.

**See next page**

## 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, do not erase or use correction fluid, and shade your new answer. 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.

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1. Management can estimate optimal levels of an input by
  - (a) the amount of money earned by the system.
  - (b) dividing the level of output by the level of input.
  - (c) maintaining a good set of records.
  - (d) monitoring the quality of natural resources.
  
2. Good experimental design allows for
  - (a) the interaction of many factors.
  - (b) flexibility in what is being examined.
  - (c) variations in data collection.
  - (d) valid comparisons between treatments.
  
3. To increase productivity and reduce costs, a farmer could
  - (a) adopt new technology.
  - (b) decrease reliance on permanent labour.
  - (c) cut back on major inputs such as fertiliser.
  - (d) prepare a partial budget.
  
4. A subcutaneous injection is made
  - (a) into the muscle.
  - (b) a site high on the neck.
  - (c) under the skin.
  - (d) into a vein.
  
5. A final product from the breakdown of starch that is absorbed into the bloodstream is
  - (a)  $\text{NH}_3$ .
  - (b) butyric acid.
  - (c)  $\text{CO}_2$ .
  - (d) amino acids.

6. The energy that is available to an animal for maintenance is
- (a) net energy.
  - (b) gross energy.
  - (c) digestible energy.
  - (d) metabolisable energy.
7. Least cost rations are best described as
- (a) the cheapest source of feed for maintenance.
  - (b) the cheapest ingredients available at the time of mixing.
  - (c) the optimal mix of ingredients that cost the least.
  - (d) pelletised ingredients purchased for least cost.
8. A main advantage of a feedlot is to
- (a) decrease labour costs.
  - (b) improve feed conversion ratios.
  - (c) manage diseases.
  - (d) isolate shy feeders.
9. Pesticides are applied when the pests reach the
- (a) final equilibrium.
  - (b) economic injury level.
  - (c) economic threshold.
  - (d) maximum growth rate.
10. 'Product dumping' is a marketing method to
- (a) put pressure on smaller producers to drop their prices.
  - (b) clear the market of overproduction.
  - (c) assist inefficient producers to find a market.
  - (d) enable developing countries to buy cheaper products.
11. The feedback loop between the severity of a disease and an animal's health determines the
- (a) rate of growth of the disease and the animal's condition.
  - (b) nutrition level of the animal and feed on offer.
  - (c) economic threshold of the disease.
  - (d) comparative advantage of the disease.
12. Genetic engineering differs from conventional breeding in that
- (a) reproduction is mitotic.
  - (b) foreign DNA is reproduced.
  - (c) genes recombine through meiosis.
  - (d) growth hormones are synthesised.

13. The three principles that govern the ethical use of animals in science are
- (a) Avoidance; Abatement; Analysis.
  - (b) Substitute; Minimise; Specialise.
  - (c) Replacement; Reduction; Refinement.
  - (d) Interchange; Contraction; Clarify.
14. The primary mode of action of anthelmintics is
- (a) interference with egg laying.
  - (b) systemic toxicity through the bloodstream.
  - (c) a nerve poison leading to paralysis.
  - (d) prevention of the reproductive stage.
15. In restoration ecology, 'riparian' refers to
- (a) wildlife along the banks of a river.
  - (b) a population of reptiles.
  - (c) shelter belts preferred by water birds.
  - (d) movement of water to increase oxygenation.

**End of Section One**

## Section Two: Short answer

50% (84 Marks)

This section has **seven (7)** 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(s) that you are continuing to answer at the top of the page.

Suggested working time: 90 minutes.

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**Question 16****(12 marks)**

Animal breeding aims to improve productivity.

- (a) Choose a farm animal and state: (3 marks)

Name: \_\_\_\_\_

Length of breeding cycle: \_\_\_\_\_

Oestrus duration: \_\_\_\_\_

Time of ovulation relative to oestrus: \_\_\_\_\_

- (b) Describe **one (1)** management method that can be used to improve fertility. (2 marks)

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- (c) Outline **three (3)** causes of infertility in farm animals. (3 marks)

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See next page

- (d) Outline **two (2)** factors that need to be considered in developing an efficient breeding program. (4 marks)

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## Question 17

(12 marks)

The following information promotes a new drench that is available for intensive animal production systems.

'Our new product, NilPest, has been found to provide faster and more complete control of internal parasites. Packages are available in 5 and 10 kg lots. The product should be mixed with feed at concentrations of one or two per cent and fed daily for two weeks. The product is safe to users and to the environment. The following results were obtained from one of our trials.'

Product	Kill of internal parasites (%) Days after treatment		
	10 days	20 days	30 days
NilPest	97	93	95
Alternative A	76	85	92
Alternative B	95	89	93

- (a) State, with reasons, whether you believe the results show that NilPest is superior to Alternatives A and B. (4 marks)

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- (b) List **four (4)** details you would need to include in the Materials section of an investigation that you would undertake to provide convincing evidence that NilPest is superior to Alternatives A and B. (4 marks)

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- (c) List **four (4)** details you would need to include in the Methods section of an investigation that you would undertake to provide convincing evidence that NilPest is superior to Alternatives A and B. (4 marks)

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**Question 18**

**(12 marks)**

Animal enterprises use estimated breeding values (EBVs).

- (a) State a benefit of EBVs to a commercial breeding program. (1 mark)

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- (b) Outline **three (3)** EBVs of economic importance. (3 marks)

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- (c) Explain the meaning of the following words when used in an animal breeding program and how each one affects the successful selection of a breeding animal: (6 marks)

Phenotype: \_\_\_\_\_

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Genotype: \_\_\_\_\_

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Environment: \_\_\_\_\_

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- (d) Calculate the EBV of the progeny given that the EBV for the male parent is 60 kg and the EBV for the female parent is 20 kg.

Show your calculations and explain how the genetic gain is calculated. (2 marks)

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**Question 19**

**(12 marks)**

The long-term profitability of a business depends upon financial control through the management of cash flows.

The following is a partial budget for an enterprise:

Enterprise: 150 dry sheep equivalent (DSE) grazing 75 hectares of pasture	\$
Total return	4500
Total variable costs	3015
Gross margin	<b>A</b>
Gross margin per DSE	<b>B</b>

- (a) Calculate the missing information at A and B and insert your answers in the table above. (2 marks)

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- (b) Explain the use of A and B in enterprise management. (4 marks)

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- (c) Explain how A can be used to generate information on operational cash flows (OCFs). (3 marks)

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- (d) Explain how financing cash flows (FCFs) can be used to assist in dealing with fluctuations in OCFs. (3 marks)

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**Question 20**

**(12 marks)**

Feed additives and hormonal growth promotants (HGPs) are used to improve animal productivity.

- (a) Describe in detail a specific example of the uses and benefits of a feed additive and any requirements imposed by the authorities that monitor and control its use. **(4 marks)**

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- (b) Describe in detail a specific example of the uses and benefits of a HGP and the requirements imposed by the authorities that monitor and control its use. **(4 marks)**

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- (c) Explain how feed additives and HGPs can be used together and the likely combined effects of this combined use. (4 marks)

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**Question 21**

**(12 marks)**

It is considered that human activities in recent times have contributed to changes in the weather ('climate change') and that these changes will require changes in the management of animal production systems for long-term sustainability.

- (a) Define what is meant by 'climate change' and describe **two (2)** impacts it could have on animal production systems. (4 marks)

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- (b) Explain **two (2)** ways in which animal production systems contribute to carbon emissions. (4 marks)

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- (c) Describe **two (2)** ways in which animal production systems could change if carbon trading was introduced to help combat global warming. (4 marks)

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Question 22

(12 marks)

The ability of farm animals to digest feed is related to the type of digestive system they have and the feed on offer.

- (a) Describe the main differences between the digestive systems of ruminants and non-ruminants. (4 marks)

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- (b) For a ruminant **or** a non-ruminant, describe how proteins are digested. (6 marks)

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- (c) Describe a method that a producer could use to improve the digestibility of proteins. (2 marks)

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**End of Section Two**

**Section Three: Production practices**

**15% (30 Marks)**

This section contains **one (1)** question. You must answer this question. Write your answer 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(s) that you are continuing to answer at the top of the page.

Suggested working time: 30 minutes.

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**Question 23**

**(30 marks)**

Farm managers plan, execute and monitor many activities to achieve the following general objectives:

- Profitable production over the long term
- Maintenance and improvement of natural resources

Name an animal production enterprise you have studied in your practical work and answer the following parts of the question.

Enterprise: \_\_\_\_\_

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(a) Name **one (1)** of the marketable products for the enterprise and a specific standard of its quality. Explain how you would manage the enterprise to ensure that the product could meet the standard. **(6 marks)**

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- (b) Describe **two (2)** methods for the improvement of production per animal in the enterprise. (6 marks)

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- (c) Describe **two (2)** impacts the enterprise could have on the natural resources of the area and how waste could be managed effectively. (9 marks)

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(d) Describe **one (1)** key performance indicator (KPI) you could use to monitor the success of the waste management program described in part (c) and explain how you would use it. (9 marks)

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**End of Section Three**

## Section Four: Extended answer

(20%) 40 Marks

This section contains **three (3)** questions. You must answer **two (2)** 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(s) that you are continuing to answer at the top of the page.

Suggested working time: 40 minutes.

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**Question 24****(20 marks)**

Farm decisions involve risk and uncertainty because farmers make long-term decisions that commit them to plans of action with incomplete knowledge of future possibilities.

- (a) Discuss **four (4)** common risk management mechanisms that are available to farmers. (8 marks)

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**See next page**

- (b) Explain the farm cost-price squeeze and how it affects the net profit of a specific animal production enterprise. (4 marks)

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- (c) Describe **four (4)** factors that may affect trade of a commodity. (8 marks)

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Question 25

(20 marks)

The endocrine system produces hormones, i.e. 'chemical messengers', that control the reproductive system.

- (a) Name **one (1)** hormone secreted by the pituitary gland and **one (1)** hormone by the sex glands and describe their roles in reproduction. (6 marks)

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- (b) Explain why a producer would use each of the following **three (3)** methods in a breeding program
  - oestrus synchronisation
  - artificial insemination
  - embryo transfer. (9 marks)

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(c) Outline **five (5)** steps in a breeding program that uses artificial insemination. (5 marks)

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**Question 26**

**(20 marks)**

The management of pests is critical to achieving high levels of animal productivity.

- (a) Describe the life cycle of a specific parasite and explain how it affects the animal's productivity. (4 marks)

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- (b) Using the specific parasite you have described in part (a) describe the following:

- (i) The general objectives of an integrated pest management (IPM) program for the pest. (3 marks)

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- (ii) The cultural, biological and chemical methods used in the program. (9 marks)

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- (iii) The ways in which the methods described in (ii) are integrated into the program. (4 marks)

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