Government of **Western Australia**
Curriculum Council

WACE
Western Australian Certificate of Education

Western Australian Certificate of Education
Examination, 2010

Question/Answer Booklet

ANIMAL PRODUCTION SYSTEMS

Stage 2

Please place your student identification label in this box

Student Number: In figures | | | | | | | | |

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

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	20	20	30	20	20
Section Two: Short answer	7	7	100	84	55
Section Three: Production practices	1	1	30	30	15
Section Four: Extended answer	2	1	20	20	10
				Total	100

Instructions to candidates

1. The rules for the conduct of Western Australian external examinations are detailed in the *Year 12 Information Handbook 2009.* Sitting this examination implies that you agree to abide by these rules.

2. 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, Four: Write your answers in this Question/Answer Booklet.

3. 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.

4. 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 **20% (20 Marks)**

This section has **20** 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: 30 minutes.

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1. A major advantage of sexual reproduction in a breeding program is that it

   (a) enables backcrossing to the dominant parent.
   (b) introduces genetic diversity.
   (c) stabilises the genotype.
   (d) segregates the phenotype from the genotype.

2. In order to increase the chances of obtaining a statistically significant result, the design of a field experiment should include

   (a) variation and a control.
   (b) uniformity and repetition.
   (c) randomisation and replication.
   (d) variation and significance.

3. Knowledge of the life cycle of a pest is an aid to the design of an integrated pest management program because it enables

   (a) biological control of the susceptible stage.
   (b) avoidance of resistance.
   (c) treatments to suit the stages.
   (d) integration of the resting stage.

4. An inelastic demand for a product is said to exist when the

   (a) market fails to clear perishable products.
   (b) consumers require high quality produce.
   (c) market is a long way from the farmer.
   (d) consumers are reluctant to accept alternatives.

5. The main benefit to consumers and producers from a guaranteed system of quality assurance is

   (a) better communication between the ‘paddock and the plate’.
   (b) trace-back to the producer.
   (c) decreased costs.
   (d) an assured pathway to defined outcomes.

See next page

6. A feed ration may be considered 'balanced' when it contains

   (a) a least cost mix of ingredients.
   (b) essential nutrients in the correct proportions.
   (c) sufficient energy and protein.
   (d) an amount sufficient for the animal's appetite.

7. Animals can gain lasting immunity from a disease by

   (a) self generated antibodies.
   (b) placental transfer.
   (c) self generated antigens.
   (d) antibody transfer.

8. A market economy differs from a planned economy in that it relies on

   (a) government subsidies for production.
   (b) private ownership of production systems.
   (c) market forces to set priorities.
   (d) centralised marketing systems.

9. In a pest management program, a rise in the numbers of a new pest species could be due to

   (a) control of existing pests.
   (b) pesticide resistance.
   (c) host immunity.
   (d) failure of the control methods.

10. A Dry Sheep Equivalent (DSE) that is used as a benchmark for the calculation of stocking rates is

    (a) a ewe and lamb weighing 50 kg.
    (b) a wether weighing 50 kg.
    (c) any animal weighing 50 kg.
    (d) a ewe weighing 50 kg.

11. The endocrine system

    (a) limits the levels of toxic wastes.
    (b) stimulates passive immunity.
    (c) coordinates chemical messengers.
    (d) regulates the activity of other systems of the body.

12. Estimations of feed conversion ratios require the measurement of

    (a) feed on offer and feed consumed.
    (b) weight gained and feed consumed.
    (c) condition score and feed consumed.
    (d) feed on offer and weight gained.

See next page

13. An animal production system can impact on the natural environment by

    (a) decreasing nutrient cycling.
    (b) reducing energy consumption.
    (c) increasing biodiversity.
    (d) excluding abiotic components.

14. Sustainable management practices benefit producers by

    (a) changing the requirements for markets.
    (b) ensuring long term viability of the business.
    (c) reducing OHS incidents and insurance costs.
    (d) encouraging the use of traditional farming methods.

15. The recommended dose of a pesticide per animal is 10mL of a diluted suspension made from 100g of concentrated product in 1L of water. The concentrations of the diluted product and the dose of concentrated product per animal are

    (a) 10%w/v and 1mL.
    (b) 1%v/v and 10mL.
    (c) 10%v/v and 1mL.
    (d) 1%w/v and 10mL.

16. The development of populations resistant to a pesticide can be delayed by

    (a) pasture rotations.
    (b) biosecurity.
    (c) rotation of chemical groups.
    (d) high rates of application.

17. Inbreeding involves

    (a) mating unrelated animals.
    (b) using the same sire over several generations.
    (c) using animals from the same breed.
    (d) mating of close relatives.

18. A surprising deterioration in the quality of the environment can be caused by a feedback loop, known as a vicious cycle, where the

    (a) smaller it is the faster it gets bigger.
    (b) level of damage feeds back on the rate of deterioration.
    (c) tipping point is reached.
    (d) manager fails to monitor inputs.

See next page

19. The response of a production system to a limiting factor

    (a) changes over time.
    (b) requires other inputs.
    (c) becomes unprofitable.
    (d) decreases with increasing inputs.

20. The process of aerobic respiration with the production of ATP takes place in the

    (a) mitochondria.
    (b) endoplasmic reticulum.
    (c) organelle.
    (d) ribosome.

End of Section One

See next page

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See next page

Section Two: Short answer **55% (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: 100 minutes.

Question 21 **(12 marks)**

Integrated pest management (IPM) programs are used as a whole-farm approach to the long-term management of pests and diseases.

(a) List **four (4)** specific options that could be integrated into an IPM program. (4 marks)

Option one: _____

Option two: _____

Option three: _____

Option four: _____

(b) Explain how the four options described in part (a) can be integrated into an IPM program. (4 marks)

See next page

(c) Define ‘success’ in pest management and explain why an IPM approach is more likely to be successful than an annual control program based upon pesticides alone. (4 marks)

Definition:

Explanation:

Question 22 **(12 marks)**

The table below shows budgets for an animal enterprise.

		Budget 1	**Budget 2**
Gross income	Items	$/Enterprise	$/Enterprise
Sale of animals	Budget 1: 5200 @ $6/animal	31 200	
	Budget 2: 5500 @ $7/animal		**C**
Total gross income		31 200	**D**

Variable costs	Items	$/Enterprise	$/Enterprise
Replacement costs	Breeding males 80 @ $15	1200	
	Breeding females 400 @ $12	4800	
Other costs	Health 2300 @ $1/animal	2300	
Feed costs	Breeding females 400 @ $4/female	1600	
	Growers 5200 @ $2/grower	10 400	
Housing costs	Electricity	800	
	Repairs and maintenance	400	
	Waste disposal	1500	
Marketing costs	Cartage	400	
	Commission	150	
	Slaughter	200	
	Levy	600	
Labour costs		4000	
Sundries		200	
Total variable costs		**A**	**E**

Gross margin		**B**	**F**

(a) Calculate the total variable costs **and** gross margin for an expected sale of 5200 animals at a price of $6 per animal and enter your results in the boxes of the 'Budget 1' column of the table above marked **A** and **B**. (2 marks)

See next page

(b) Calculate a second budget (Budget 2) for the sale of 5500 animals at a price of $7 per animal.

(i) Enter the new total gross income in the boxes labelled **C** and **D** in the 'Budget 2' column of the table. (1 mark)

(ii) Assuming the total variable costs will increase by 10%, due to the increase in animals to 5500, enter the new total variable costs and gross margin in the boxes labelled **E** and **F** in the 'Budget 2' column of the table. (1 mark)

(iii) Explain the change in the estimated profitability of the enterprise as a result of increasing the number of animals. (2 marks)

Explanation: _____

_____

_____

_____

(iv) Explain whether the assumption made about variable costs in part (b)(ii) is likely to have a major influence on profitability estimates. (2 marks)

Explanation: _____

_____

_____

_____

(c) Describe **two (2)** off-farm threats that would have a direct impact on the enterprise's profitability. (4 marks)

One: _____

_____

_____

_____

_____

Two: _____

_____

_____

_____

_____

See next page

Question 23 **(12 marks)**

In the management of farm animals, some activities need to be carried out at specific times.

(a) List **two (2)** activities in the management of farm animals that take place at specific times and explain how features of the animals' physiology determine the optimum timing. (4 marks)

Activity one: _____

_____

Explanation: _____

_____

_____

Activity two: _____

_____

Explanation: _____

_____

_____

(b) Describe **two (2)** activities in the management of farm animals that are determined by market requirements. (4 marks)

Activity one: _____

_____

_____

_____

_____

Activity two: _____

_____

_____

_____

_____

See next page

(c) Outline how an outbreak of a specific pest or disease could disrupt a calendar of farm operations and describe how it could be avoided. (4 marks)

See next page

Question 24 **(12 marks)**

Protoporphyria (photosensitivity) is a condition in Limousin cattle that has a genetic cause. Calves have *Protoporphyria* if they are homozygous for the recessive gene, i.e. their genotype is **pp**. Calves with this condition are sensitive to sunlight, which causes ulcers and inflammation. They will fail to thrive and are generally destroyed. A commercial breeder observed *Protoporphyria* from matings of a new bull. Twenty-eight calves were diagnosed with *Protoporphyria* from the bull's matings with 108 cows.

(a) Complete the following table. Show the genotypes of the bull and cow that would produce *Protoporphyria* offspring in the spaces and insert the resultant four genotypes of the offspring in the boxes of the table. (6 marks)

	Bull genotype ( )	
Cow genotype ( )		

(b) Use the information in the table to explain how the new bull caused *Protoporphyria.* (2 marks)

(c) Explain how the results of the matings with the new bull support your explanation in (a). (2 marks)

(d) If a cow had the genotype **PP** (free of *Protoporphyria)* and was mated with the new bull, explain the implications for the producer. (2 marks)

See next page

Question 25 **(12 marks)**

The management of animal enterprises can be guided by industry codes of practice.

(a) Explain the general purpose of a code of practice (COP). (4 marks)

(b) Describe the specific features of a COP for an enterprise of your choice. (4 marks)

Name of enterprise: _____

Description: _____

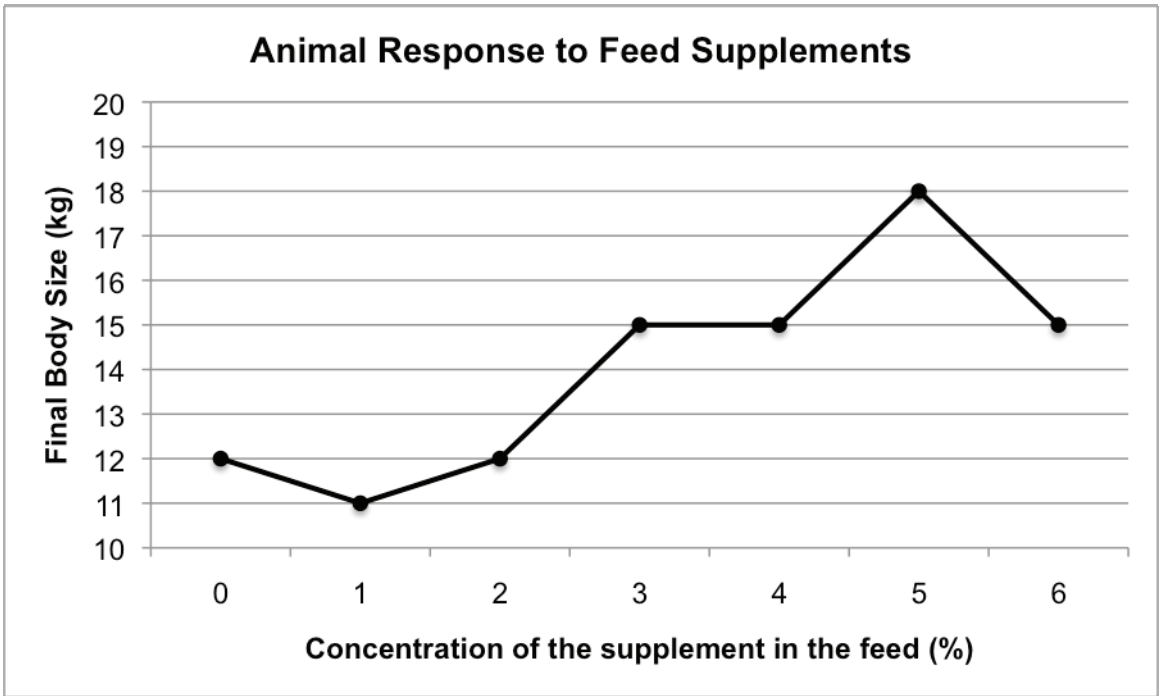
See next page

(c) Explain how managers have a stewardship responsibility for the resources and technology of the industry. (4 marks)

See next page

Question 26 **(12 marks)**

An experiment was conducted to test whether a feed supplement would improve animal growth. Four rations were made with increasing concentrations of the supplement in the diet currently used in the enterprise. The weights of the animals at the end of the experiment are shown in the following graph.



(a) Write an hypothesis for this experiment. (1 mark)

(b) Explain the shape of the graph. (2 marks)

See next page

(c) Explain whether or not the results shown in the graph support your hypothesis. (2 marks)

(d) Outline **two (2)** reasons why the animals may have responded to the supplement. (4 marks)

One:

Two:

(e) List **three (3)** additional details about the experiment that you would need to know before you would use the results to recommend that the producer changes the feed on offer to include the supplement. (3 marks)

One:

Two:

Three:

See next page

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See next page

Question 27 **(12 marks)**

The following tables show how the market price of an animal is determined by its carcase weight and condition score.

Note: For the purposes of this question, 'condition score' is a subjective estimate (sight and feel) of the quality of the meat (muscle and fat) of an animal.

Variation in price with carcase weight

Carcase weight (kg)	Market price ($/kg)
150-199	2.90
200-249	3.60
250-299	4.40

Variation in price discount with condition score

Condition score	Price discount ($/kg)
1	3.00
2	1.20
3	0.00
4	0.00
5	1.00
6	3.50

(a) State the **two (2)** best condition scores and explain why they are the 'best'. (2 marks)

(b) Use the above tables to complete the following table for prices received and total received per head. (4 marks)

Animal identity	Carcase weight (kg)	Condition score	Price received ($/kg)	Total received per head ($)
A	168	5		
B	270	5		
C	251	1		
D	288	6		

(c) Explain how a manager can use the data in part (a) and the results you calculated in part (b) to maximise the total received per head. (2 marks)

(d) A new market has created a demand for animals with carcase weights greater than 300 kg and a condition score of 3. Describe **two (2)** considerations a manager must take into account before making a commitment to supply animals to this market. (4 marks)

One:

Two:

End of Section Two

See next page

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.

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Suggested working time: 30 minutes.

Question 28 **(30 marks)**

Use the animal production enterprise in which you participated during your course this year to answer these questions.

(a) Explain (i.e. details and reasons) the following aspects of the enterprise.

(i) Objectives (i.e. physical and financial) (3 marks)

(ii) Selection of animals (e.g. breeds, types and numbers) (3 marks)

(iii) Production methods (e.g. feeding, housing, stocking rates, pests and diseases) (4 marks)

(iv) Produce (e.g. products and desired quality) (2 marks)

(v) Partial budget (i.e. main incomes, main costs, estimated gross margin) (3 marks)

See next page

(b) Explain the potential impact of the enterprise on the following.

(i) Animal welfare (3 marks)

(ii) Occupational safety and health (3 marks)

(iii) Natural resources (e.g. air, water, soil, biodiversity) (3 marks)

See next page

(c) Explain the major threats to sustainability of your enterprise. (6 marks)

End of Section Three

See next page

Section Four: Extended answer **10% (20 Marks)**

This section contains **two (2)** questions. You must answer **one (1)** question. Write your answer in the spaces provided.

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Suggested working time: 20 minutes.

Question 29 **(20 marks)**

An animal's diet must contain a number of essential nutrients in sufficient quantity, frequency and quality if it is to be productive and its welfare requirements are to be met.

For an animal of your choice:

(a) Describe sources of feed for each of **two (2)** macronutrients and how the quality of the feed is assessed. (4 marks)

See next page

(b) Explain, in general terms, how a manager can determine the amount and frequency of feed to give an animal so that its requirements are met. (8 marks)

See next page

(c) Describe, in general terms, how the feed selected in part (b) is digested. (8 marks)

or

See next page

Question 30 **(20 marks)**

Animals are bred to suit production systems and the market requirements of animal products. For a production system of your choice:

(a) Explain heritability. (4 marks)

(b) Describe in detail **two (2)** heritable characteristics of an animal that would make it suited to a specific production system and the products demanded by the markets. (8 marks)

See next page

(c) Describe a breeding program that could be used to improve **one (1)** of the characteristics (traits) described in part (b) and how you would assess genetic gain.

(8 marks)

End of questions

Additional working space

Question number:_____

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