



# Western Australian Certificate of Education Examination, 2012

# **Question/Answer Booklet**

Number of additional

answer booklets used

(if applicable):

ANIMAL PRODUCTION SYSTEMS Stage 3	Please place your student identification label in this box
Student Number: In figures	3
In words	
Time allowed for this naper	

Reading time before commencing work: Working time for paper:

ten minutes three hours

# Materials required/recommended for this paper

examinations

**To be provided by the supervisor** This Question/Answer Booklet Multiple-choice Answer Sheet

# To be provided by the candidate

Standard items:	pens (blue/black preferred), pencils (including coloured), sharpener, correction tape/fluid, eraser, ruler, highlighters
Special items:	non-programmable calculators approved for use in the WACE

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 total exam
Section One: Multiple-choice	15	15	20	15	15
Section Two: Short answer	7	7	90	83	50
Section Three: Production practices	1	1	30	30	15
Section Four: Extended answer	3	2	40	40	20
				Total	100

# Instructions to candidates

- 1. The rules for the conduct of Western Australian external examinations are detailed in the Year 12 Information Handbook 2012. 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, 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.

- 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.

15% (15 Marks)

#### Section One: Multiple-choice

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. A natural ecosystem has the capacity to recycle minerals and
  - (a) supply all organisms with energy.
  - (b) store excess energy.
  - (c) recycle energy.
  - (d) generate excess energy.
- 2. Which of the following is an example of a negative feedback loop?
  - (a) secretion of oxytocin
  - (b) protein digestion in the stomach
  - (c) body temperature regulation
  - (d) blood clotting
- 3. Biodiversity
  - (a) is a measure of the health of an ecosystem.
  - (b) is directly affected by climate.
  - (c) is most diverse in wheatbelt ecosystems.
  - (d) has not been influenced greatly by humans.
- 4. When feeding livestock by-products, producers must notify their use on
  - (a) the National Livestock Identification System.
  - (b) the National Vendor Declaration.
  - (c) Livestock Waybill.
  - (d) National Animal Health Statement.
- 5. Insect Growth Regulators (IGRs) are commonly used parasite treatments that are applied as a
  - (a) vaccine.
  - (b) drench.
  - (c) supplement.
  - (d) backline.

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- 6. Worm resistance to drenches is most commonly caused by
  - (a) overdrenching.
  - (b) underdrenching.
  - (c) new worm species.
  - (d) environmental variation.
- 7. Which of the following terms describes how individuals of the same breed have their ancestry recorded?
  - (a) phenotype
  - (b) genotype
  - (c) pedigree
  - (d) heritability
- 8. Risk mitigation can **best** be described as a process to
  - (a) reduce the impact of a risk when it occurs.
  - (b) eliminate the risk of an event.
  - (c) reduce the likelihood of a risk occurring.
  - (d) prioritise and spread a risk.
- 9. When planning for sustainability in a livestock enterprise, an important initial step is to assess the
  - (a) current stocking rate.
  - (b) seasonal feed production.
  - (c) land capability.
  - (d) running costs.
- 10. Which of the following statements about an hypothesis is true?
  - (a) It must state a known fact.
  - (b) It must be free from bias.
  - (c) It needs a variable.
  - (d) It must be testable.
- 11. During ruminant digestion, volatile fatty acids are produced from which food group?
  - (a) carbohydrates
  - (b) fats
  - (c) proteins
  - (d) vitamins

- 12. When antibodies pass from the body of the mother into her unborn young, the process is called
  - (a) naturally active.
  - (b) naturally passive.
  - (c) artificially active.
  - (d) artificially passive.
- 13. Which of the following statements is true for fat content in a carcase?
  - (a) Any fat is undesirable and is heavily discounted.
  - (b) Minimal fat improves meat flavour.
  - (c) Fat helps to stop the carcase from drying out.
  - (d) Fat is a valuable by-product in the slaughter process.
- 14. The animals of which of the following industries have limited genetic diversity?
  - (a) Sheep industry
  - (b) Poultry meat industry
  - (c) Beef industry
  - (d) Dairy industry
- 15. Which principles **best** fit the standardised techniques of experimental design?
  - (a) replication, control and variation
  - (b) randomisation, variation and bias
  - (c) randomisation, bias and control
  - (d) replication, randomisation and control

End of Section One

50% (83 Marks)

# Section Two: Short Answer

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.

Quest	tion 16 (	10 marks)	
The im	nmune system is an animal's defence mechanism against disease.		
(a)	List <b>one</b> disease that can be prevented by a vaccine and <b>one</b> disease that can prevented by a vaccine.		
	Disease that can be prevented by a vaccine:		
	Disease that cannot be prevented by a vaccine:		
(b)	What is the difference between an antigen and an antibody?	(2 marks)	
(C)	How is an artificial antibody correctly administered to an animal?	(2 marks)	

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Describe <b>two</b> ways ir	n which an animal can gain a	active immunity.	(4 marks)	

### **Question 17**

(a) A trial measuring the percentage of Non Protein Nitrogen (NPN) in a feed given to calves was conducted. At the end of the trial, the following results were collected.

Percentage NPN in ration	Mean live weight gain (kg) over 20 weeks	Standard deviation
0	40	0.2
1	45	1.8
2	49	1.5
3	41	1.2
4	32	0.3

On the grid below, draw a graph of the mean live weight gain in calves over 20 weeks on the rations in the table above. (5 marks)

If you wish to have a second attempt at this graph, the grid is repeated on page 39 of this Question/Answer Booklet. Indicate clearly on this page if you have used the second grid and cancel the working on the grid on this page.



# STAGE 3

(b)	Define standard deviation and state how it can be used to validate the data in the in Part (a).				
(c)	What conclusion can you draw from the data that would assist in planning a calf that included NPN?	ration (3 marks)			

ANIMA	L PRC	DDUCTION SYSTEMS 10	STAGE 3		
Questi	Question 18				
Globall	y, Aust	ralian farmers have an important role in providing food and fibre.			
(a)	(i)	Define comparative advantage, using an Australian example.	(3 marks)		
	(ii)	Describe how that advantage can be maintained by Australian produ	icers. (2 marks)		

(b) Using a relevant example, describe **one** way in which quarantine is used as a protection strategy for Australian markets. (3 marks)

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(c) Identify and describe an element of a livestock production system that has changed in response to trends in consumer demand. (3 marks)

# **Question 19**

(12 marks)

Heritability and estimated breeding values (EBVs) are useful tools when selecting for productivity.

(a) Using an example from the table below, explain how heritability affects genetic gain.

(2 marks)

# Heritability estimates of production characteristics for Merino sheep

Characteristic	Estimate
Greasy fleece weight	0.30
Clean fleece weight	0.35
Body weight	0.40
Wrinkle score	0.40
Fibre diameter	0.55
Staple length	0.45

(b) At a bull sale two bulls suit your breeding requirements but you only need to purchase one. The following information is available;

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Bull A: 400 day weight EBV +60. Price \$4000 Bull B: 400 day weight EBV +20. Price \$2000

(i) Calculate the estimated gain in growth in the progeny of both bulls. (2 marks)

Justify the purchase of Bull A instead of Bull B by calculating the expected extra income from the progeny of your 50 cows. The projected sale price is \$3/kg live weight for weaned calves. Show your workings.
 (3 marks)

(c) Name the commonly used breeding technique that would maximise the effectiveness of a superior breeding female. Describe the steps followed in using this technique. (5 marks)



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Ques	tion 20			(12 marks)	
The g	ross margin of an enterprise is a u	iseful farm manag	ement tool.		
(a)	Explain the difference between a	i cash budget and	a gross margin.	(2 marks)	

(b) Below are the budgeted incomes and costs for two enterprises on the same farm. Calculate the shaded boxes. (5 marks)

	Grass fed enterprise		Feedlot enterprise			
Income	50 Steers	\$400/ head	\$20,000	50 Steers	\$680/ head	\$
Variable costs	Tags	\$2/head	\$	Tags	\$2/head	\$
	Drench	\$5/head	\$	Drench	\$5/head	\$
	Vaccine	\$4/head	\$	Vaccine	\$4/head	\$
	Cartage	\$4/head	\$	Cartage	\$4/head	\$
	Feed concentrate	Nil	\$	Feed concentrate	\$290/ head	\$
	Sale commission (5% of sale price)	\$20/head	\$	Sale commission (5% of sale price)	\$34/head	\$
Total variable costs			\$			\$
Gross margin			\$			\$

# ANIMAL PRODUCTION SYSTEMS

(c) Compare the profitability of the two enterprises in Part (b) on page 15 and explain two strategies that could be used to improve the gross margin of the less profitable enterprise.
 (5 marks)



### **Question 21**

(15 marks)

Livestock producers do not normally carry out formal scientific experiments to test new products, but do trial new products to establish their effect on production systems.

(a) Your employer has decided to trial a new lice control product called Rid ©. He selects one mob of sheep from his flock, applies the product according to the label directions to half of the mob and returns them to the untreated half. Three months later, he musters the same mob, drafts off the first fifty sheep and inspects them for lice. All of the drafted sheep are found to have some lice so he concludes that the product is not effective. Describe **three** faults in the experimental method of this trial. (6 marks)



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(b) Design a trial that could more reliably test the effectiveness of the new product in Part (a). (5 marks)



(d) If the manufacturer of the product in Part (a) were to carry out field tests of the product, what additional design aspect would be required to make the results more reliable?

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(2 marks)

#### **Question 22**

(13 marks)

There are various strategies for the management of pests and diseases at the local, national and international levels.

(a) Define economic injury level (EIL) and explain what a producer should do before the EIL has been reached. (4 marks)

(b) Australian Quarantine and Inspection Service (AQIS), farm biosecurity and National Vendor Declarations (NVDs) are three strategies for managing pests and diseases.

State at what level (international, national, state, regional or on-farm) each of these strategies is **most** likely to be used and describe how each strategy assists in the management of pests.

(i)	AQIS:	(3 marks)

Farm biosecurity:	(3 marks
NVDs:	(3 marks
	(******

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End of Section Two

#### Section Three: Production practices

This section contains **one (1)** question. You must answer this question. Write your answer in the space 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.
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Suggested working time: 30 minutes.

#### Question 23

#### (30 marks)

The productivity of a farm enterprise relies on a sound knowledge of the production cycle and the ability to respond to problems, so that any loss of production is minimised.

Name an animal production enterprise you have studied and state its marketable product.

Animal production enterprise:	(no marks)
1 1	( , , , , , , , , , , , , , , , , , , ,

Marketable product: \_\_\_\_\_ (no marks)

Using specific examples from that enterprise, answer the following questions.

(a) List **four** critical stages in the production cycle of your selected enterprise that need to be managed well. (4 marks)

One:		
Two:		
Three:		
Four		
T UUI		

15% (30 Marks)

**STAGE 3** 

explain how these are managed. (6	l marks
First selected stage:	
Second selected stage:	

# ANIMAL PRODUCTION SYSTEMS

(C)

(d)

stages you have listed in Part (a) on page 22. (3 marks) For the marketable product nominated at the beginning of the question, identify a quality assurance process that is applicable and list two farm practices that support it. (3 marks)

Describe how the use of a technology can help to optimise productivity at one of the

(e) Consider the following scenario for your selected enterprise.

Livestock are in good condition but your stored feed is running out. A lack of rain has doubled the price of feed. Even if it does rain soon, it will be a short season, with poor pasture growth.

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Discuss **two** strategies you would put in place to reduce your costs and preserve your livestock enterprise for the next twelve months. (6 marks)

Strategy one:	
Strategy two:	

# ANIMAL PRODUCTION SYSTEMS

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# (f) Select a pest or disease you are familiar with in your selected enterprise.

- (i) \_\_\_\_\_\_ (1 mark)
  (ii) Describe an Integrated Pest Management program that attempts to control this
  - Describe an Integrated Pest Management program that attempts to control this pest or disease. (7 marks)

**End of Section Three** 

#### Section Four: Extended answer

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.

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• 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.

#### **Question 24**

## (20 marks)

20% (40 Marks)

Climate variability is a major risk for agricultural production and this risk is likely to increase with further climatic change being predicted for the future.

(a) Define climate change and discuss **three** risks that livestock farmers in the south-west of Western Australia face due to climate change. (11 marks)

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For <b>one</b> of the risks you de be managed by farmers in	escribed in Part (a), desc an attempt to provide in	ribe how 'the triple bottom tergenerational equity.	line' could (9 marks
Risk:			(no marks

(20 marks)

### **Question 25**

Breeding programs in livestock enterprises need to be managed efficiently to maximise productivity.

(a) Explain the benefits of using an artificial program instead of a natural program in a breeding system under the following headings: (8 marks)

- Maximising production
- Breeding for specific markets.

(b) Describe how each of the following is managed in an artificial breeding program, so that optimum results can be achieved. (12 marks)

- female nutrition
- female health
- female heat detection
- female heat synchronisation

## **Question 26**

(20 marks)

Non-Protein Nitrogen (NPN) can be digested by mature ruminants but little is known about its value to developing ruminants.

(a) Give an example of a NPN feed source and describe how a ruminant can digest NPN when it is added to the ration. (8 marks)



(b) A producer is currently feeding equal amounts of wheat and lucerne hay to provide weaners with 6 kg of feed and 72 megajoules (MJ) of energy at a cost of \$2.40 per feed.

Design a ration, using the feeds in the table below, that provides the same weight of feed and energy content but costs less per feed. Show your workings.

Describe the importance of least cost rationing. (12 marks)

# Nutritive value of common concentrates and conserved forages.

	Protein CP %	Metabolisable energy (ME) MJ/kg	Price \$/kg
Oats	8–10	11	0.30
Barley	9–12	13	0.40
Wheat	14	14	0.50
Lucerne hay	20–22	10	0.30
Ryegrass - clover hay	20–25	9	0.25
Oat hay	15–20	7	0.20

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STAGE 3	37	ANIMAL PRODUCTION SYSTEMS
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