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School Curriculum and Standards Authority



ANIMAL PRODUCTION SYSTEMS

GENERAL COURSE

Marking key for the Externally set task
Sample 2016

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Animal Production Systems

Externally set task – marking key

1(a) What is genetic variation, and why is it important to animal production systems? (4 marks)

Description	Marks
Comprehensively describes genetic variation	2
Briefly describes genetic variation	1
Comprehensively describes the importance of genetic variation to animal production systems	2
Briefly describes the importance of genetic variation to animal production systems	1
Total	4
Answer could include, but is not limited to:	
<p>Genetic variation exists both within and between breeds. Genetics sets the production limits that animals can achieve. Some traits are heritable and can be selected for to improve enterprise profitability, as they may produce a product that meets demand, possibly in a shorter period of time.</p> <p>Genetic variation is also important for producing new breeds or types of animals that are:</p> <ul style="list-style-type: none"> • better adapted to their target environments • have increased production yield and quality. 	

(b) Using an example, describe a crossbreeding system, and how producers can use it to optimise profitability. (4 marks)

Description	Marks
Comprehensively describes a crossbreeding system using an example	2
Briefly describes a crossbreeding system	1
Comprehensively describes how producers can use a crossbreeding system to optimise profitability	2
Briefly describes how producers can use a crossbreeding system to optimise profitability	1
Total	4
Answer could include, but is not limited to:	
<p>Crossbreeding involves mating unrelated animals of different breeds of the same species, and increases genetic diversity. The resulting “hybrid vigour” from the cross produces offspring which are phenotypically superior in one or more characteristics to the average of the parents on both sides. Producers can take advantage of hybrid vigour to improve traits such as survivability, hardiness, fertility, growth rates, etc. which can ultimately help improve profitability. Producers can target the desirable traits from both breeds.</p> <ul style="list-style-type: none"> • Example 1: Merino (wool production) x Border Leicester (faster growth, improved carcase, mothering ability, fertility) • Example 2: European breeds of cattle (higher growth rate and muscling) can be crossed with British breeds (earlier maturing and finishing) 	

2. Describe how an animal breeding and selection program can be influenced by:

(a) The need to be profitable (3 marks)

Description	Marks
Comprehensively describes how an animal breeding and selection program can be influenced by the need to be profitable	3
Briefly describes how an animal breeding and selection program can be influenced by the need to be profitable	2
States a fact about a breeding and selection program or related profitability	1
Total	3
Answer could include, but is not limited to:	
Profitability (income-costs) can be largely influenced by the quality and quantity of product produced in the enterprise. Establishing clear breeding aims, and including traits of economic importance, can help support profitability into the longer term. For example, enterprise profit can be largely affected by animals' performance in traits, such as birthing ease, weaning rate. Animal selection allows animals demonstrating desirable traits to be used for breeding. Selection can be objectively or subjectively measured. Culling animals with poor performance can help increase profitability and support genetic progress in the herd/mob.	

(b) Market requirements (3 marks)

Description	Marks
Comprehensively describes how an animal breeding and selection program can be influenced by market requirements	3
Briefly describes how an animal breeding and selection program can be influenced by market requirements	2
States a fact about a breeding and selection program or related market requirements	1
Total	3
Answer could include, but is not limited to:	
Understanding market requirements and consumer demand for products is essential, as it allows the producer to breed and select animals that are more likely to produce a desired product, and hence increase profit to the producer. Producers should source the best genetics they can afford. They should use feedback and market information to alter their breeding and selection program, and monitor their progress. Some enterprises can offer flexibility to change their product if there is a swing in demand. For example, merino ewes offer two alternatives: prime lamb production or wool production, depending on the breed of sire used.	

(c) Environmental conditions

Description	Marks
Comprehensively describes how an animal breeding and selection program can be influenced by environmental conditions	3
Briefly describes how an animal breeding and selection program can be influenced by environmental conditions	2
States a fact about a breeding and selection program or related environmental conditions	1
Total	3
Answer could include, but is not limited to:	
Breeding animals that suit their environment is essential to enterprise success. Therefore initial breed selection will determine how well an animal performs in a particular environment. Animals that demonstrate poor performance and repeated issues with environmental conditions, for example, flystrike in sheep, should be culled, so they don't pass this pre-disposition on. The timing of a breeding program will be determined by the season, and subsequently the availability of pasture.	

3. Using an animal production system of your choice, identify **one (1)** objective and **one (1)** subjective criterion used to select suitable animals for breeding, and describe the importance of each to profitability. **(6 marks)**

Animal production system _____

- (a) Objective criterion (3 marks)
 (b) Subjective criterion (3 marks)

For each type of criterion:

Description	Marks
Identifies a suitable criterion for the enterprise selected and comprehensively describes its importance to profitability	3
Identifies a suitable criterion for the enterprise selected and briefly describes its importance to profitability	2
States a fact about the selection criterion or its importance	1
Total	3
Answer could include, but is not limited to:	
Examples of animal production systems include: prime lamb, beef, wool, dairy, pork. Selection criteria will depend on the enterprise selected. For a wool production enterprise, a suitable objective criterion would be micron (fibre thickness). Micron accounts for approximately 70–80% of the greasy price received by growers. Demand for finer (lower micron) wool has increased, and attracts a price premium. Using micron in ram and ewe selection for breeding will help achieve breeding goals and improve economic sustainability of an enterprise. For a beef production enterprise, a suitable subjective criterion would be cow body condition score, which can be used to assess the nutritional status of cattle. It is a measure of the fat and muscle cover over the cow's bones, regardless of size. It uses a 5-point system (thinfat). Breeders should be selected with a body condition score of close to 3, as a low body score will affect a cow's ability to get in calf and produce a corresponding lactation, to support a healthy calf.	

4. Using examples, describe how the following factors need to be addressed to optimise breeding success and to maximise survival of offspring. **(3 marks)**

(a) Animal health

Description	Marks
Comprehensively describes how animal health can be addressed to optimise breeding success and maximise survival of offspring	3
Briefly describes how animal health can be addressed to optimise breeding success and maximise survival of offspring	2
States a fact about how animal health is related to breeding success	1
Total	3
Answer could include, but is not limited to:	
<p>Animal health needs to be managed prior to, and during, pregnancy, and post-birth in order to maximise conception and survival of offspring. Prior to joining, animals should be assessed for good health status to maximise chances of conception. A breeding soundness check on both should be conducted; for example, the 3T's for males (teeth, toes, testes).</p> <p>Disease/pest outbreak may stop sperm or egg production, cause abortion, reduce health of young, cause losses within enterprise. Females should be vaccinated 2–6 weeks before giving birth to promote immunity of offspring and boost survival.</p> <p>Trace element supplementation if a deficiency is present.</p> <p>Reduce stress factors: avoid handling animals for extended periods in late pregnancy, control predators, provide shelter from adverse climatic conditions.</p>	

(b) Animal nutrition

Description	Marks
Comprehensively describes how nutrition can be addressed to optimise breeding success and maximise survival of offspring	3
Briefly describes how nutrition can be addressed to optimise breeding success and maximise survival of offspring	2
States a fact about how nutrition is related to breeding success	1
Total	3
Answer could include, but is not limited to:	
<p>Level of nutrition needs to be matched to the class and condition of the animals. Puberty is determined by body weight, not by age, of the animal.</p> <p>Condition score: having animals in good condition at joining increases fertility; for example, condition score 3 for ewes. Poor nutrition may cause irregular cycles in females, reduced oestrus, reduced ovulation, weak offspring, pregnancy toxemia, or reduced twinning. A rising plane of nutrition at joining increases ova shed in females (flushing). Over-fat animals may have difficulty mating, conceiving, and birthing. Using pregnancy scanning can mean feed can be targeted towards increased demand; for example, twin bearing ewes. In males, poor nutrition may reduce sperm quantity and quality. Increase sperm production through highenergy and protein rations at least 2 months prior to mating.</p>	

5(a) Identify **three (3)** factors to consider before selecting a selling method for a selected animal product.

(3 marks)

Selected animal product _____

Description	Marks
Identifies three relevant factors to consider before selecting a selling method for a selected animal product	3
Identifies two relevant factors to consider before selecting a selling method for a selected animal product	2
Identifies one relevant factor to consider before selecting a selling method for a selected animal product	1
Total	3
Answer could include, but is not limited to:	
<ul style="list-style-type: none"> • market forecasts: use national livestock reporting service reports to determine correlations between market specifications and price. The time of the year can affect supply, therefore competition and price • number of animals ready for sale • consider the actual price received; for example, “on-farm” price vs delivered price (does the producer need to pay transport costs?) • animal welfare; for example, saleyards sales: animals are transported, yarded, then transported again. Need to consider distance from market and time off feed • levies, fees and charges; for example, saleyard fees, agent commission, MLA levy. 	

(b) Describe **one (1)** marketing system that could be used in your animal enterprise, and state **two (2)** positive and **two (2)** negative aspects associated with it.

(6 marks)

Description	Marks
Comprehensively describes a marketing system applicable to an animal enterprise	2
Briefly describes a marketing system applicable to an animal enterprise	1
States two positive aspects of the selected marketing system	2
States one positive aspect of the selected marketing system	1
States two negative aspects of the selected marketing system	2
States one negative aspect of the selected marketing system	1
Total	6
Answer could include, but is not limited to:	
<ul style="list-style-type: none"> • content taken from http://futurebeef.com.au/topics/markets-and-marketing/selling-options-for-beef-cattle/ • paddock sales: stock are inspected on the vendor's property by the buyer and are sold straight out of the paddock. <ul style="list-style-type: none"> ▪ advantages <ul style="list-style-type: none"> o minimal selling costs o minimal transport and handling o buyers know in advance the number and type of stock to be delivered ▪ disadvantages <ul style="list-style-type: none"> o limited competition and carcase feedback o inefficient for buyers if small numbers are to be sold o potential for difficulties in agreeing on weights, for example, due to unregistered scales 	

- saleyard auction: sold on open market to highest bidder. Usually this is on a cents per kg (c/kg) liveweight basis, or on \$/hd
 - advantages
 - wide competition and accessibility
 - all stock types and lots of any size can be sold
 - vendors can set a reserve price and can compare quality and price
 - payment guaranteed by agents
 - disadvantages
 - transport costs, saleyard dues, weighing fees and commission must be paid
 - possibility of buyer collusion and no negotiation between buyers and vendors
 - limited feedback, no carcase feedback
 - generally the vendor has to accept the price on the day because of the costs incurred whether or not the cattle are sold
 - subsequent animal performance or meat quality can be reduced by stress due to transport, handling and time off feed
- over the hook sales: stock are delivered directly to the abattoir. Stock may be sold with or without an agent at an agreed price. Change of ownership takes place at the abattoir scales
 - advantages
 - subjective appearance values do not affect the price received
 - producers receive clear market and price signals relating to carcase quality and are provided with feedback
 - minimal transport and handling
 - female carcasses of the same quality as male carcasses can achieve the same price/kg
 - disadvantages
 - lack of competition unless selling using AuctionsPlus
 - unless AUS-MEAT-accredited, abattoirs will set differing conditions regarding carcase trim, hot or cold weight and feedback
- AuctionsPlus: selling livestock by description. Cattle sales are held weekly and bids can be taken through your preferred agent or home computer nationally. The sale is on farm. Stock are assessed prior to sale by an accredited AuctionsPlus assessor who enters a description of the cattle, including photos, into a computer-based catalogue
 - advantages
 - competition and exposure is nationwide
 - vendor can set a reserve price; stock do not have to leave the property until it is met
 - no transport costs for vendor
 - payment is guaranteed
 - large range of buying and selling options
 - particularly suits geographically isolated producers, although this method can be used anywhere, with any numbers
 - feedback is provided to producers for c/kg and grid sales
 - minimal transport and handling damage
 - disadvantages
 - buyers have to adjust to using a computer and not viewing live animals
 - vendors and buyers need to have confidence in the AuctionsPlus assessors for accurate stock description.