



B O A R D O F S T U D I E S
NEW SOUTH WALES

2010 HSC Agriculture Paper 2 Sample Answers

This document contains ‘sample answers’, or, in the case of some questions, ‘answers could include’. These are developed by the examination committee for two purposes. The committee does this:

- (a) as part of the development of the examination paper to ensure the questions will effectively assess students’ knowledge and skills, and
- (b) in order to provide some advice to the Supervisor of Marking about the nature and scope of the responses expected of students.

The ‘sample answers’ or similar advice are not intended to be exemplary or even complete answers or responses. As they are part of the examination committee’s ‘working document’, they may contain typographical errors, omissions, or only some of the possible correct answers.

Question 1 (a)***Sample answer:***

A farmer can examine available farm records to determine the overall equity that there may be in the farm. This complete farm budget and cash flow analysis can indicate the position the farm may be in when deciding which enterprises will be operated in future years. Levels of bank deposits, anticipated income levels and any debts, commitments and on-going costs (both fixed and variable) are included in this overall farm budget.

Question 1 (b)***Sample answer:***

One selling system that is available for spatchcocks is the use of farmers' markets in the major city centres. Traditional sales may require the delivery of birds to processors who then sell on to a variety of retailers or restaurants. By direct selling through farmers' markets, the producer may gain higher returns by eliminating processor and/or retailer margins. The producer may also choose to add a premium to the cost per unit based on 'freshness', product quality or personalised service to the consumer. There may also be better direct relationships developed between producer and consumer to improve overall marketing of spatchcocks. This therefore can provide greater overall returns to the producer if they are willing to put in the extra time and effort in travelling to the farmers' markets.

Question 1 (c)***Answers could include:***

- Feedlots impact on surrounding waterways and soils. There may also be increased buildings, fences, dams etc. Feedlots can lead to the establishment and/or expansion of meat processing works in the area and greater transport industry expansion which may have both positive and negative impacts on local communities.
- Similar issues for piggeries, large dairy farms, chicken sheds, hatcheries.
- Issues may include social impacts such as employment; economic impacts such as allied business development; and various environmental impacts, either restorative or damaging.

Question 2 (a)***Sample answer:***

In the cattle industry, *Breedplan* is a program used to determine the genetic potential of male and female animals within that breed. Measurements are taken (eg live weight at various ages, fat depth) to be consolidated in a computer and matched to an animal ID to produce a breeding index. This assists in improving productivity of the beef cattle system.

Question 2 (b)***Sample answer:***

Chemicals may be used to control problem organisms in animals. In any organism population there may be some genetic variation that allows some organisms to have an increased natural resistance level to a particular chemical type. If these organisms are able to survive various chemical treatments, for example through under-dosing or continued treatment with the same chemical type, these particular organisms may then go on to reproduce, passing on the genotype for this resistance to the next generation. Over time, this may lead to the development of a disease-resistant population of these target organisms, making control more difficult.

Question 2 (c)***Answers could include:***

- an explanation of the main hormones involved in animal reproduction and their function
- manipulation related to multiple ovulations, oestrus synchronisation, embryo transfer techniques, heat detection and joining etc.

Question 3 (a)***Sample answer:***

Hydroponic bok choy.

Bok choy is a plant well suited to growing in a hydroponic system. The typical production cycle for hydroponic bok choy in the Sydney Basin includes:

Seedling establishment – seeds are sown into large seedling trays filled with potting mix containing peat moss and vermiculite.

Pricking out – seedlings (3 weeks old) are pricked out and put into growing trays containing a similar potting mix.

Planting out – plants are taken from growing trays and planted into the hydroponic system where essential nutrients are monitored and changed according to the requirements of the bok choy.

Harvesting – the bok choy are harvested after 8–10 weeks, graded and packed for sale at local and domestic markets (eg Flemington).

Question 3 (b)***Sample answer:***

Selling Eucalypt foliage into the Japanese flower market.

In recent times the Japanese flower market has become increasingly stringent in terms of quality and the presence of pest and disease. Australian growers have needed to change post-harvest handling of the foliage. They are now required to sterilise all flowers/foliage and plants sold in Japan. One example is selling Eucalypt foliage in Japan. The Japanese require 80% of leaves to be oval in shape with no blemishes, pest and disease free. Thus Eucalypt foliage must now be graded and sterilised prior to sale in that market.

Question 3 (c)***Sample answer:*****Blueberry production**

- Application of fertiliser may be costly, and there may be environmental concerns such as nutrient loss through runoff and subsequent eutrophication of waterways. However, the benefit of optimum fertiliser application should be greater crop growth and increased economic returns.
- The selection of different varieties/crops may be expensive to adopt or to change over to, and may require a greater level of inputs. However, the adoption of different varieties/crops may result in greater yields/quality and therefore increased economic returns.
- Construction of bird/flying fox nets may be costly and may result in bird/flying fox death. However, such nets may improve the yield and quality of blueberries and increase the economic viability of the system.
- Pruning blueberries may be costly (to employ contract pruners), and may cause environmental damage – eg emission of greenhouse gases when prunings are burnt. However, pruning blueberries may lead to greater yield and better colour/quality, leading to increased economic returns.

Question 4 (a)***Sample answer:***

Electronic animal tagging systems are now being used more widely since the introduction of the National Livestock Identification Scheme (NLIS). Various forms of animal tagging systems available have meant farm managers have had to choose a tag type (eg ear tag or rumen bolus) that best suits their operations. On farms that may not have had thorough animal tracking methods, this may now provide farm managers with greater computer-managed data forms to assist farm operations. It may also have led to changes in farm administration systems with the mandated introduction of this system.

Question 4 (b)***Sample answer:***

Research into a new enterprise must prove that it offers advantages or benefits over existing enterprises. In many cases this may involve scientific research, where new enterprises are compared to existing methods using scientifically designed trials, data collection and appropriate statistical analysis. In other cases, market research may be conducted to see whether there is a market potential for any change in the enterprise. It would be inefficient and potentially unprofitable to implement a new system or product where there was insufficient need or market demand to reward producers. Full implementation of a new enterprise may be expensive. Research discovers whether introduction of the new enterprise would be cost-effective, provides an opportunity to fine-tune the system for maximum benefit and determines whether a market exists at all for the new system.

Question 4 (c)***Sample answer:***

Various marketing techniques are available to producers of products for Australian agriculture. The effectiveness of a particular technique will depend on the type of product that has been developed. Some techniques may also be better used at different stages of product development (trial/development/launch/local selling/expansion/refinement). The technique should also be chosen to target particular consumers. For example, if a chemical company was to develop a new chemical for the treatment of parasites in sheep, this may best be marketed using a variety of techniques:

1. Product launch and/or promotion at a field day. This would give exposure primarily to the end users, that is farmers who may be the field days target audience and the ultimate purchasers of the product.
2. The promotion of the new product by chemical company representatives to rural trading stores and outlets will expose the product to merchandisers. This promotion could include brochures/posters or promotional material, and prizes to expose the product to the market.
3. Exposure through the mass media via retailers' advertising or editorials and articles, may also assist in raising consumers' product awareness.

While these techniques may vary in cost, together they would form an integrated marketing plan for an innovation.

Question 5 (a)***Answers could include:***

Types of cells in plant leaves include;

Guard cells – stomatal operation/gaseous exchange/turgidity

Epidermal cells – protection/gaseous exchange

Palisade mesophyll cells – elongated cells containing chloroplasts – storage/photosynthesis

Spongy mesophyll cells – loosely packed cells containing chloroplasts – storage/photosynthesis

General roles in cellular metabolism/respiration in a number of specialised and accessory cells.

Question 5 (b)***Sample answer:***

The hormone auxin is involved in fruit production in plants. It is involved in signalling and has been shown to be involved with seed set and fruit initiation. The auxin-signalling pathway when repressed by flowers can prevent the development of a flower into a fruit. This feedback mechanism often involves other plant hormones.

Ethylene (C₂H₄) affects fruit ripening. When seeds mature and develop, production of ethylene increases and builds up within the fruit, causing the fruit to ripen. Sometimes the placing of ripening fruit with unripened fruit can hasten the ripening process. This can also be done artificially and is used in horticultural production and marketing, particularly for bananas.

Question 5 (c)***Answers could include:***

Word or chemical equations to outline the overall process of photosynthesis.

Inputs such as:

- water
- carbon dioxide (CO₂)
- sunlight
- heat/temperature
- chlorophyll

Management strategies such as:

- irrigation
- provision of CO₂ in glasshouses
- aspect for planting (eg bananas)
- planting density and effect on input sharing
- variety selection for plant suitability to the environment
- growing plants in correct seasons/optimum temperature

Question 6 (a)***Sample answer:***

The overuse of various types of fertilisers may lead to an increase in soil acidification, due to an increased availability of hydrogen ions in the soil. This high H⁺ concentration, when dissolved in the soil water and taken up by plant roots, may affect the physiological functions within the plant, eventually causing death.

Question 6 (b)***Sample answer:***

- Government intervention in land management involves regulation and legislation as to permissible land clearing (SEPP 46) by farmers and graziers.
- Local government legislation with regard to land management may include such things as the Noxious Weed Act, which requires landholders to remove certain types of weed (W4) from their properties, the Feral Animals legislation that requires landholders to notify their LHPA as regards to feral animals on their properties, and inspection by LHPA officers.
- Local councils may also influence decisions as to land use (according to Land Capability Studies) and the use of effluent disposal systems for dairies/feedlots/common households on agricultural land.
- With regard to water management, both Federal and State Governments, plus affiliated bodies such as Catchment Management Authorities, can intervene in areas of water flow on properties, the siting and construction of dams, the licensing of irrigation systems from open water bodies as well as the licensing and usage of bore water. Water quality is also monitored by the various catchment authorities with respect to algal and bacterial contamination of agricultural and town water supplies.

Question 6 (c)*Answers could include:*

<i>Dry land Salinity</i>	<i>Irrigation Salinity</i>
Causes: <ul style="list-style-type: none">– recharge– cleaning top vegetation	<ul style="list-style-type: none">– over-watering either by natural inflow or by irrigation– cleaning of vegetation
Management: <ul style="list-style-type: none">– planting of deep-rooted perennials– channelling recharge water for targeted use	<ul style="list-style-type: none">– planting of deep-rooted perennials and trees– better utilisation of irrigation techniques ie dippers instead of flood irrigation