



## **2011 Primary Industries HSC Examination 'Sample Answers'**

When examination committees develop questions for the examination, they may write 'sample answers' or, in the case of some questions, 'answers could include'. The committees do this to ensure that the questions will effectively assess students' knowledge and skills.

This material is also provided to the Supervisor of Marking, to give some guidance about the nature and scope of the responses the committee expected students would produce. How sample answers are used at marking centres varies. Sample answers may be used extensively and even modified at the marking centre OR they may be considered only briefly at the beginning of marking. In a few cases, the sample answers may not be used at all at marking.

The Board publishes this information to assist in understanding how the marking guidelines were implemented.

The 'sample answers' or similar advice contained in this document 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.

## Section II

### Question 16 (a)

*Answers could include:*

- Australian Workers' Union
- National Farmers' Federation
- NSW Farmers' Federation
- Industry associations
- Department of Education, Employment and Workplace Relations

### Question 16 (b)

*Answers could include:*

- Knowledge of your entitlements, such as:
  - hours of work, starting and finishing times, daily meal breaks, and pay rates
  - sick leave, holidays and allowances
  - occupational health and safety equipment, and PPE needs
- Ability to calculate gross pay, leave entitlements, etc
- Workplace safety

### Question 16 (c)

*Sample answer:*

$$\begin{aligned}\text{Gross Pay} &= \text{Hourly rate} \times \text{Hours worked per week} \\ &= \$15.50 \times 40 \text{ hours} \\ &= \$620\end{aligned}$$

$$\begin{aligned}\text{Tax Payable} &= \text{Nil on first } \$120 + 15 \text{ cents in the dollar } \$121 - \$710 \\ &= 0 + \$0.15 \times 500 \\ &= \$75\end{aligned}$$

$$\begin{aligned}\text{Net Pay} &= \text{Gross pay} - \text{tax payable} \\ &= \$620 - \$75 \\ &= \$545\end{aligned}$$

$$\begin{aligned}\text{Pay received for the week} &= \text{Net pay} + \text{allowances} \\ &= \$545 + \$15 + \$30 \\ &= \$545 + \$45 \\ &= \$590\end{aligned}$$

**Question 17 (a)*****Sample answer:***

Some of the immediate impacts of the flood could be:

- (1) The chemical, packing and machinery shed and the irrigation pumping shed will be flooded. This could damage equipment, produce or chemicals.
- (2) The cow paddock and lower parts of the horse paddock will be flooded. Any livestock in them could be drowned.
- (3) The bridge over Back Creek may be flooded and the road damaged. This could make it hard to leave and supplies for the house could run out.

***Answers could include:***

- Loss of fences
- Loss of access to property
- Inundation of irrigation pump shed
- Damage to bridge
- Animals caught in floodwaters
- Flooding of chemical and machinery shed, leading to contamination of floodwaters
- Loss of/damage to vegetable and orchard crops, leading to loss of income
- Loss of/damage to lucerne crop

**Question 17 (b)*****Sample answer:***

Some immediate actions that could be taken to reduce the impact of the imminent flood are:

- (1) All animals in the cow and lower horse paddocks should be moved to higher ground.
- (2) Emergency escape routes should be planned if the flood becomes more severe.
- (3) The chemicals in the chemical shed should be moved to higher ground in a secure area or lifted to a level above the predicted flood level.
- (4) Equipment in the packing and machinery shed should be moved to higher ground, such as near the manager's house, for security.
- (5) The irrigation pump should be moved to higher ground and the electricity supply to the irrigation pump shed should be turned off.
- (6) There should be a supply of food in the house and the first-aid kit should also be in the house for easy access.

***Answers could include:***

- Remove irrigation pump to above the expected flood level
- Move all livestock to paddocks above the expected flood level
- Lift chemicals in storage above the expected flood level – reduces the potential impact of contamination

- Stock up on non-perishable food
- Move equipment that is susceptible to water damage to above the expected flood level
- Ensure communication equipment is operational
- Check that the first-aid kit is fully supplied
- Display a list of emergency contacts (eg names, organisations and their phone numbers)

**Question 17 (c)*****Sample answer:***

A plan of action would include changes to asset locations and the addition of an all-weather access to the farm.

The first part of this plan would be the relocation of the chemical shed and the packing and machinery shed to a location on the farm that is above the highest known level of any previous flood in Back Creek.

Re-establishing the vegetable gardens on higher ground would help reduce the possible loss of future income due to flooding.

The plan for moving stock in an emergency should be updated to take account of possible future higher levels of flooding.

The type of fencing used in flood-prone areas of the farm may be reviewed. More gates to higher paddocks would allow for quicker and easier access to those paddocks.

The irrigation pump shed should have circuit breakers installed to reduce loss or damage to equipment and the risk of electrocution from water entering electrical wires.

The access road to the farm may need to be raised or moved to a point where it cannot be covered by floodwaters to allow for people and stock to get off the farm.

***Answers could include:***

- Relocate the chemical storage shed to above the highest recorded flood level, or build a levee around the existing chemical shed and the packing and machinery shed to protect against future inundation
- Relocate the access road (if possible) or build up the existing road to above the highest known flood level
- Build a storage shed for hay above the highest known flood level
- Develop a flood emergency plan
- Build flood gates on fences that lie across Back Creek

**Question 18 (a)*****Sample answer:***

Correct volume = 15 litres

**Question 18 (b)*****Sample answer:***

Quantity remaining on 20/8/2011	=	33
Quantity remaining on 25/9/2011	=	23
Quantity used on 20/10/2011	=	15
Quantity remaining on 20/10/2011	=	8

**Question 18 (c)*****Sample answer:***

- Fulfills legal requirements, as outlined in the *Pesticides Act 1999* (NSW) and the *Education Regulation 2007* (NSW)
- If contamination occurs, it is possible to trace the contamination source or to exclude the application activity from the contamination
- Allows accurate assessment of the withholding periods (WHP) and export slaughter intervals (ESI) to prevent product residue levels exceeding food safety standards and export standards
- The records can be used to make AERP (adverse experience reporting program) reports of adverse impacts from products or of products that did not work as expected
- As evidence to disprove off-site damage through spray drift
- To assist in management decisions on the farm in managing crops and livestock
- To record expiry dates
- To record chemical usage

**Question 19 (a)*****Sample answers:***

- Vehicle – Safely transports materials and staff to the isolated work site. Provides transport in case of emergency
- Two-way radio – Provides a reliable communication method between the work site and home base, both for routine communications and for emergency communication with accident and emergency services

***Answers could include:***

- |                |                 |
|----------------|-----------------|
| • Post remover | • Crow bar      |
| • Pliers       | • Hammer        |
| • Strainers    | • Chainsaw      |
| • Gripples     | • First-aid kit |
| • PPE          | • Mobile phone  |
| • Shovel       | • EPIRB         |

**Question 19 (b)*****Sample answer:***

Standard operating procedure

Purpose – Safe replacement of fence strainer assembly

Scope – To be used in situations where a strainer assembly is being replaced after a fire or flood

Procedure

- Carry out risk assessment of site
- Cut away any wire and timber around strainer assembly
- Remove all wire and bolts from assembly
- Remove stay posts
- Loosen strainer assembly posts by removing dirt from around posts
- Lift posts out using hydraulic lifter, ensuring safety of workers
- Clean out holes
- Replace old posts with new posts
- Ram soil around posts
- Reassemble stays
- Reattach wire
- Clean site of loose material and old posts, and recycle as appropriate
- Pack up equipment and machinery

**Question 19 (c)*****Sample answer:***

Safety of the workers is a high priority. Having a mobile phone that will work in this area, or a CB radio or two-way radio system, allows for quick communication. A first-aid kit, water and food should also be taken on the job. All PPE should be checked, cleaned and packed for the task. The tasks for the work should be planned before leaving town and prioritised so that the work will be undertaken in an efficient manner.

All workers will need to be given SOPs for emergencies and equipment being taken to the site. Staff should be trained in the safe operation of the equipment taken.

A risk assessment of the site must be conducted prior to any work commencing. The tasks for the repair of the fencing should be allocated to workers and instructions provided to ensure that they understand what they have to do.

People undertaking tasks must use supplied PPE and follow the established SOPs in order to complete the fencing repairs safely and efficiently.

Prior to leaving the work site, it must be cleaned and all rubbish must be removed and safely disposed of. On arrival back in town, all equipment must be cleaned and returned to its relevant storage place.

***Answers could include:***

Safety risks:

- Exposure
- Hunger
- Getting lost
- Operating alone
- Injury while operating in an isolated area
- Lack of access to first aid
- Injury from falling timber
- Accident/Injury from operating machinery

Control measures:

- Don't work alone
- Have a good communication system
- Basic first-aid training for at least one crew member
- Let people know where you are and when you will be returning
- Conduct risk assessment of site before commencing work
- Have a reliable vehicle
- Work crew trained in safe operation of machinery and equipment
- Appropriate PPE

Planning for work:

- Work schedule
- Calculation of quantities of all materials and equipment required prior to departure
- Collection of all materials and equipment required prior to departure
- Ensure sufficient fuel for equipment is available
- Ensure first-aid kit on site at all times
- SOP known and understood
- Risk analysis undertaken prior to work commencing
- Workers trained in correct use of equipment
- Task analysis to determine time required for each task and for total job

## Section III

### Question 20

*Sample answer:*

EVALUATION CRITERIA			
	<i>Effectiveness</i>	<i>Environmental impacts</i>	<i>Risks to people</i>
<b>CULTURAL</b>			
<b><i>Crop rotation</i></b>			
Strengths	<ul style="list-style-type: none"> <li>Changes the conditions that the weed grows in, which limits weed growth and population numbers</li> </ul>	<ul style="list-style-type: none"> <li>Reduces the weed seed reservoir</li> <li>Has the same impact on soil and water as growing a crop</li> </ul>	<ul style="list-style-type: none"> <li>Low risk to the health of the wider community</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Does not eradicate the weed</li> </ul>	<ul style="list-style-type: none"> <li>Possible escape of weeds to the environment</li> <li>Possible hybridisation of native plant species</li> </ul>	<ul style="list-style-type: none"> <li>OHS risk to the operator through the use of machinery</li> </ul>
<b><i>Fallow period</i></b>			
Strengths	<ul style="list-style-type: none"> <li>Weeds germinate and can be easily sprayed, etc</li> </ul>	<ul style="list-style-type: none"> <li>Allows water storage</li> <li>Rests the soil</li> </ul>	<ul style="list-style-type: none"> <li>Low risk to the general community</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Needs to be used in conjunction with animal grazing, chemical control or ploughing</li> </ul>	<ul style="list-style-type: none"> <li>Soil more prone to erosion</li> </ul>	<ul style="list-style-type: none"> <li>Some risk from dust created by wind erosion</li> </ul>
<b><i>Planting density</i></b>			
Strengths	<ul style="list-style-type: none"> <li>Increased density uses natural plant competition to increase yields and suppress weeds</li> </ul>	<ul style="list-style-type: none"> <li>Uses natural interactions</li> <li>Limited use of chemical sprays</li> </ul>	<ul style="list-style-type: none"> <li>Low risk to community and operator</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Usually requires improved soil fertility through the application of fertilisers or use of legumes</li> <li>There is an upper limit to plant density before crop yield is reduced</li> </ul>	<ul style="list-style-type: none"> <li>Increased use of fertiliser could lead to eutrophication problems in creeks</li> </ul>	<ul style="list-style-type: none"> <li>Risk of allergic reactions such as hay fever</li> </ul>



<b>EVALUATION CRITERIA</b>			
	<i>Effectiveness</i>	<i>Environmental impacts</i>	<i>Risks to people</i>
<b>MECHANICAL</b>			
<b><i>Slashing</i></b>			
Strengths	<ul style="list-style-type: none"> <li>Useful for easily accessible areas</li> <li>Removes the canes entirely but not the roots</li> </ul>	<ul style="list-style-type: none"> <li>No chemical residue</li> <li>Organic matter could be composted to improve soil fertility</li> </ul>	<ul style="list-style-type: none"> <li>Low risk to the wider community</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Re-growth occurs</li> <li>Roots need treatment</li> <li>Plant parts could be moved by water, etc to a new location</li> <li>Machinery cannot access steeply sloping land</li> <li>Needs dry soil</li> </ul>	<ul style="list-style-type: none"> <li>Noise from machinery</li> <li>Weeds relocated due to wind/animal transportation</li> <li>Clogging of the waterways by debris</li> </ul>	<ul style="list-style-type: none"> <li>OHS risks to the operator from using machinery</li> </ul>
<b><i>Ripping</i></b>			
Strengths	<ul style="list-style-type: none"> <li>Works well in easily accessible areas</li> <li>Good for root destruction</li> </ul>	<ul style="list-style-type: none"> <li>No chemical residues</li> </ul>	<ul style="list-style-type: none"> <li>Low risk to community</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Not useful in inaccessible areas</li> <li>Large machines needed</li> </ul>	<ul style="list-style-type: none"> <li>Soil exposed to erosion</li> <li>Machinery noise</li> </ul>	<ul style="list-style-type: none"> <li>Dust from exposed soil could effect asthma</li> <li>Risk of hearing impairment for machinery operator</li> </ul>
<b>PHYSICAL</b>			
<b><i>Hand weeding</i></b>			
Strengths	<ul style="list-style-type: none"> <li>Immediate destruction of individual weeds</li> <li>No expensive equipment needed</li> <li>Can be used to eradicate a weed from a small area</li> </ul>	<ul style="list-style-type: none"> <li>Limited impact on the environment</li> <li>No chemical residues</li> <li>Weeds can be composted to improve the levels of organic matter in the soil</li> </ul>	<ul style="list-style-type: none"> <li>Low risk and no training needed</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>Not suitable for large areas, as it is very labour intensive</li> </ul>	<ul style="list-style-type: none"> <li>Not suitable for control of weeds over large areas</li> </ul>	<ul style="list-style-type: none"> <li>Back problems from bending over</li> <li>Sunburn</li> <li>Gloves needed to protect hands</li> </ul>

<b>EVALUATION CRITERIA</b>			
	<i><b>Effectiveness</b></i>	<i><b>Environmental impacts</b></i>	<i><b>Risks to people</b></i>
<b><i>Burning</i></b>			
Strengths	<ul style="list-style-type: none"> <li>• Works quickly to destroy the weed</li> <li>• Low cost</li> <li>• Can be used in small and large areas</li> <li>• Can be used in inaccessible areas</li> </ul>	<ul style="list-style-type: none"> <li>• Destroys weed seeds</li> <li>• Removes trash from soil surface</li> </ul>	<ul style="list-style-type: none"> <li>• Low risk of back problems</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• Can only be done in certain conditions</li> <li>• Needs back-up firefighting resources</li> <li>• May need chemical treatment as follow up</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of bushfire</li> <li>• Heat damages soil</li> <li>• Bare soil prone to erosion</li> <li>• May destroy non-target flora and fauna</li> </ul>	<ul style="list-style-type: none"> <li>• Burns to people</li> <li>• Smoke affects asthma</li> </ul>
<b>BIOLOGICAL</b>			
<b><i>Natural predators and diseases</i></b>			
Strengths	<ul style="list-style-type: none"> <li>• Long term, low cost once established</li> <li>• Can manage a weed population</li> <li>• Working as part of the natural ecosystem</li> </ul>	<ul style="list-style-type: none"> <li>• No chemical residues or disturbance to the environment</li> </ul>	<ul style="list-style-type: none"> <li>• Low risk to people</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• Will not eradicate a weed</li> <li>• Long-term research and testing needed, which are expensive</li> </ul>	<ul style="list-style-type: none"> <li>• Could act unpredictably and target other organisms</li> </ul>	<ul style="list-style-type: none"> <li>• May have impact on human health, eg toxins</li> </ul>
<b><i>Companion planting</i></b>			
Strengths	<ul style="list-style-type: none"> <li>• Can use alleopathy (chemical release) of plants to suppress weed growth</li> <li>• Can be low cost</li> </ul>	<ul style="list-style-type: none"> <li>• Uses natural interactions</li> </ul>	<ul style="list-style-type: none"> <li>• May produce toxins</li> <li>• May produce allergens</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• Will not eradicate the weed</li> <li>• Works slowly</li> </ul>	<ul style="list-style-type: none"> <li>• Spread of companion plants and weeds into the native ecosystems</li> </ul>	<ul style="list-style-type: none"> <li>• Some people may be allergic to the companion plants</li> </ul>

<b>EVALUATION CRITERIA</b>			
	<i>Effectiveness</i>	<i>Environmental impacts</i>	<i>Risks to people</i>
<b>CHEMICAL</b>			
<b><i>Spraying</i></b>			
Strengths	<ul style="list-style-type: none"> <li>• Can treat large areas quickly and can be carried into inaccessible areas</li> <li>• Low-cost chemicals</li> <li>• Low labour costs when compared to physical control measures</li> <li>• Re-treatment times are limited</li> </ul>	<ul style="list-style-type: none"> <li>• Soil is not disturbed and therefore is less prone to erosion</li> <li>• Can maintain ground cover to smother the weeds</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces potential of the weed to survive and impact on human health</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• Becomes less cost effective as oil prices rise</li> <li>• Cost of supply and maintenance of PPE equipment</li> </ul>	<ul style="list-style-type: none"> <li>• Operators are required to be trained to reduce the impact of spraying on the environment</li> <li>• Some machinery noise</li> <li>• Chemical residue in crops and water</li> <li>• Non-target impact</li> <li>• Dead weeds still visible</li> <li>• Run-off to stream</li> <li>• Impacts on flora</li> </ul>	<ul style="list-style-type: none"> <li>• Poisoning of the operator</li> <li>• Poisoning of neighbours through drift</li> <li>• Impact on non-target organisms</li> </ul>
<b><i>Dusting powder</i></b>			
Strengths	<ul style="list-style-type: none"> <li>• Easy to store and apply in the right weather conditions</li> <li>• No special training to apply</li> <li>• Can be carried into inaccessible areas</li> </ul>	<ul style="list-style-type: none"> <li>• Reduced spray drift</li> </ul>	<ul style="list-style-type: none"> <li>• Reduces potential impact on human health via absorption through the skin when mixing</li> <li>• Reduces potential for back injury during mixing, as dusts are usually stored in lighter weight packages</li> </ul>
Weaknesses	<ul style="list-style-type: none"> <li>• Wastage due to wind increases costs</li> </ul>	<ul style="list-style-type: none"> <li>• Drift problems</li> <li>• Easily washed off</li> <li>• Chemical contamination</li> </ul>	<ul style="list-style-type: none"> <li>• High risk of dust inhalation</li> </ul>

**Answers could include:**

<b>Method type</b>	<b>Examples</b>
Cultural	Crop rotation, fallow period, change of plant densities, mulching, fertilisers, increasing organic matter, sanitation, time of planting
Mechanical	Slashing, hoeing, chipping, soil tillage, cutting, chaining, ripping
Physical	Hand weeding, burning, drainage, temperature change, light
Biological	Disease resistant varieties, natural predators/diseases, companion planting
Chemical	Artificial chemical sprays, pre-emergent chemicals, powders, pellets

## Section IV

### Question 21 (a)

**Answers could include:**

- Salinity
- Algal bloom
- Erosion
- Decreased water quality
- Reduced biodiversity
- Contamination by chemicals
- Waste disposal
- Nutrient concentration

### Question 21 (b)

**Answers could include:**

<b>Threat</b>	<b>Description of impact</b>
<b>Salinity</b>	<ul style="list-style-type: none"> <li>• Decrease in water quality</li> <li>• Land use is restricted as plant growth is inhibited</li> <li>• Bare soil appears, which may result in increased erosion</li> <li>• Increase in water turbidity</li> </ul>
<b>Erosion</b>	<ul style="list-style-type: none"> <li>• Poor-quality dirty water from soil washed into creeks</li> <li>• Sedimentation of water storage areas reduces water storage capacity</li> <li>• Exposes land, leading to landslip/mudslides</li> <li>• Decreases velocity of water flow from creeks, which may lead to the silting of cultivated land</li> <li>• Silt of streams reduces biodiversity</li> </ul>

### Question 21 (c)

*Answers could include:*

<b><i>Threat</i></b>	<b><i>Strategies</i></b>	<b><i>Strengths</i></b>	<b><i>Weaknesses</i></b>
<b>Soil erosion</b>	Planting trees	<ul style="list-style-type: none"> <li>• Lowers water table to ensure sustained use of land</li> <li>• Can bind soil along riparian zones and reduce soil erosion</li> <li>• Slows water run-off speed</li> <li>• Source of income for agroforestry</li> </ul>	<ul style="list-style-type: none"> <li>• High establishment cost</li> <li>• Reduces flexibility of land use</li> <li>• Long establishment time before becoming effective</li> </ul>
	Legislation to protect area	<ul style="list-style-type: none"> <li>• Provides shade and shelter for livestock</li> <li>• Can be enforced to override short-term gain by individuals</li> </ul>	<ul style="list-style-type: none"> <li>• Social unrest and civil disobedience</li> <li>• Can have unintentional negative effects for the wider community</li> </ul>
	Incentive to withdraw areas from production	<ul style="list-style-type: none"> <li>• Increases biodiversity, which can increase the number of native plants and animals</li> <li>• Financial incentives for producers</li> <li>• Research indicates that there will be increases in the percentage of native vegetation</li> </ul>	<ul style="list-style-type: none"> <li>• Decreases productive area</li> <li>• Harbours feral pests and weeds if not well managed</li> </ul>
	Education at schools and farms	<ul style="list-style-type: none"> <li>• Informs people of the value of establishing a culture of caring for country</li> </ul>	<ul style="list-style-type: none"> <li>• Long term and is slow to change people's attitudes on cultural change</li> </ul>
	Land care	<ul style="list-style-type: none"> <li>• Local initiatives motivate and foster community cohesion</li> <li>• Solves local problems</li> <li>• Finances available for otherwise uneconomic rehabilitation</li> <li>• Helps increase biodiversity</li> </ul>	<ul style="list-style-type: none"> <li>• Requires motivated change agents</li> <li>• Takes time to establish success</li> <li>• Not all agree on the approaches to be taken</li> </ul>

<b><i>Threat</i></b>	<b><i>Strategies</i></b>	<b><i>Strengths</i></b>	<b><i>Weaknesses</i></b>
<b>Salinity</b>	Planting trees	<ul style="list-style-type: none"> <li>• Lowers water table to ensure sustained use of land</li> <li>• Can bind soil along riparian zones and reduce soil erosion</li> <li>• Slows water run-off speed</li> <li>• Source of income for agroforestry</li> </ul>	<ul style="list-style-type: none"> <li>• High establishment cost</li> <li>• Reduces flexibility of land use</li> <li>• Long establishment time before becoming effective</li> </ul>
	Growing salt-resistant plants	<ul style="list-style-type: none"> <li>• Increases ground cover and reduces bare earth area</li> <li>• Increases organic matter and water infiltration</li> </ul>	<ul style="list-style-type: none"> <li>• Varieties may be lower yielding than more traditional plant varieties</li> <li>• Less palatable for livestock</li> </ul>
	Drainage earthworks – ditches or subsurface drains	<ul style="list-style-type: none"> <li>• Lowers water table</li> <li>• Increases the area of arable land</li> <li>• Quick results</li> </ul>	<ul style="list-style-type: none"> <li>• Passes the salt onto neighbours</li> <li>• High costs of engineered earthworks</li> <li>• Needs to be coordinated by a regional body</li> </ul>
	Growing deep-rooted crops – perennials rather than annuals	<ul style="list-style-type: none"> <li>• Increases ground cover and helps lower water table</li> </ul>	<ul style="list-style-type: none"> <li>• Risk of plant mono-culture</li> </ul>