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1998 HSC

**EXAMINATION
REPORT**

**Sheep Husbandry
and Wool
Technology**

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1998 HIGHER SCHOOL CERTIFICATE EXAMINATION REPORT

SHEEP HUSBANDRY AND WOOL TECHNOLOGY

Introduction

In 1998 26 candidates sat for the examination in Sheep Husbandry and Wool Technology.

Questions 1 and 2 on the examination paper covered the special topic, which this year focused on 'Improved Pastures'.

Questions 3 to 9 on the paper covered the 16 Learner Outcomes as listed in the Sheep Husbandry and Wool Technology Syllabus.

Each question consisted of a number of sub-parts, ranging from simple recall to a more detailed explanation (Bloom's taxonomy).

Marking Scheme

The Examination Committee provide a number of possible answers to each question, the Marking Panel review these and add additional points where appropriate.

Under each section heading in the examination paper, the candidates are informed that, in each question, parts (a), (b) and (c) are of equal value and worth 10 marks. The paper is set out logically with a single line answer implying one mark; if three points are required, however, three marks are usually allocated.

SECTION I: SPECIAL TOPIC

Question 1

- (a) (i) Most candidates were able to identify the pasture species from the diagrams correctly. The pastures were Fescue or Lovegrass, Cocksfoot, Sub-clover, Paspalum, Perennial Ryegrass and White Clover.
- (ii) The majority of candidates were able to answer this section correctly, although a few were unable to name part C as being Burr.
- (iii) Two reasons were required in answering this section. Acceptable answers included the ability to add nitrogen to pastures, fixation of nitrogen and high quality of feed.
- (b) (i) 1 Some candidates incorrectly gave a month instead of a season. Spring was the required answer.
- (i) 2 This question allowed candidates a large scope of acceptable answers. January, February, March, May, June, and July were acceptable.
- (i) 3 The limiting factor to pasture growth in July was low temperatures.
- (i) 4 Few were able to reason that extra feed is required to flush the ewes to increase ovulation rates and hence reproductive performance.
- (ii) Candidates were required to list four possible advantages of improved pastures. Common answers were: higher carrying capacity, better quality and quicker turn-off of livestock, increased enterprise flexibility, higher profits, increased reliability of production, reduced rate of acidification, reduced rate of salination, reduced water tables, reduced weed invasion and drought protection.
- (iii) Most candidates incorrectly answered this question. They confused inoculation of seed with the use of vaccination in stock. Seed inoculation means coating the seed with a bacterium, normally *Rhizobium* spp. to promote nodulation of the roots.

- (c) (i) The unnecessary provision of more than one line forced candidates to waffle. The answer was simply 'an increase in stocking rate'.

- (ii) Candidates were able to read the graph correctly and so provide the correct answer – 2 DSE/ha for part 1 and 8.2 DSE/ha for part 2.

- (iii) Candidates were able to answer this question correctly as 3 DSE/ha.

- (iv) Most candidates were unable to define one dry sheep equivalent. The required description was the maintenance requirement of a 45kg Merino wether in store condition over a 12 month period. Most candidates gave the comparison between various classes of stock.

- (v) Over half the candidates thought superphosphate contains Nitrogen. The two principal nutrients in superphosphate are: Phosphate and Sulphur.

- (vi) Most candidates indicated that a possible effect of a superphosphate application was that yield would increase but very few indicated that soil pH would not change.

Question 2

- (a) (i–iii) Most candidates were well prepared and correctly answered these three parts.
- (b) (i) Candidates were required to state that in a set stocking system, a set number of stock were placed in a paddock for a period of twelve months. Few candidates were able to indicate this.
- (ii) In a rotational grazing system, candidates were required to state that a set number of stock were placed in a paddock for a period of time and then moved to another paddock. The first paddock was then rested.
- (iii) Most candidates were able to explain the cell grazing system correctly.
- (iv) The principle governing the use of different grazing systems is the recovery of the pasture.
- (c) (i) Any two States were acceptable, although some candidates gave the Northern Territory and were marked incorrect!
- (ii) Spring is the season of the year in which most fodder is conserved.
- (iii) Summer, Autumn and Winter were accepted as seasons when conserved fodder is fed out to sheep in South-Western NSW.
- (iv) Autumn and Winter were accepted as seasons to feed sheep on the Northern Tablelands of NSW.
- (v) Hay is the most common form of fodder conservation in Australia. 'Small square bales' was accepted as being correct.
- (vi) Other forms of fodder were grain and silage.
- (vii) The most appropriate stage for harvesting in a plant's growth cycle is the flowering stage (10% flowering in lucerne).

SECTION II

Question 3

- (a) (i–iv) Candidates provided the correct answers from the graphs for parts (i), (ii), (iii) and (iv).
- (v) 1. The only acceptable breed was the Merino. Strains given included Saxon and Spanish; Superfine and Fine were also acceptable answers.
2. Any British based breed was acceptable. The Corriedale was also accepted.
- (vi) Some candidates gave an area such as the Tablelands rather than the agricultural zone as requested. They were marked incorrect. The correct answer was the High Rainfall Zone.
- (b) (i) Most candidates were able to give correct answers for this question.
- (ii) Candidates failed to link the availability of large framed Merino ewes to first-cross ewe production.
- (iii) Candidates correctly gave irrigation and good quality pastures as the special conditions for prime lamb production needed in this area.
- (c) (i) Most candidates correctly answered this question. Those who did not do so, tended to reverse small intestine and caecum. The correct order was mouth, oesophagus, reticulo-rumen, omasum, abomasum, small intestine and caecum.
- (ii) Most candidates failed to gain full marks in this section. Answers should have been in the following range.

| | | |
|--------------------------------|---------------------|-----------------------|
| Maintenance | 8-9 ME (MJ /kg DM) | 9-11% Crude Protein |
| Optimum (growing/finishing) | 10-11ME (MJ /kg DM) | >12-15% Crude Protein |

Question 4

- (a) (i) Most candidates correctly answered this question, with the month being May.
 - (ii) Candidates correctly gave decreasing day length as the answer.
 - (iii) This question was correctly answered by most candidates, who listed nutrition/bodyweight, disease, breed and age as factors influencing reproductive performance in ewes.
 - (iv) Candidates were able to list correctly the management procedures a farmer should undertake to maximise fertility of individual rams.
 - (v) Some candidates were unable to calculate the correct number of rams required; 'six' was the required number.
- (b) (i) Most candidates were able to complete the table correctly.
 - (ii) The majority of candidates were able to complete the required graph correctly; many, however, missed marks by not naming the graph.
 - (iii) A twelve week weaning period was the correct answer and was favoured by most candidates because of the quicker time in which to finish the lambs.
- (c) (i) Most candidates were able to answer parts (i) and (ii) correctly.
 - (iii) Some candidates became confused with the information presented in the diagram. They circled the parent as well as progeny!
 - (iv) Most candidates were able to state that 75% of the progeny would be white.
 - (v) Candidates were well prepared for this question and were able to define clearly the four terms listed. The majority received full marks.

Question 5

- (a) (i) The majority of candidates were able to indicate that the resistant flock had a lower faecal egg count compared with the control and the susceptible flock.
- (ii) Almost all candidates were able to answer this question correctly.
- (iii) This question was well answered.
- (iv) A range of answers was accepted: depending on the chemical being used, any part of the body louse life cycle can be susceptible.
- (v) The majority of candidates indicated either plunge dipping, back lining or spray dipping as methods of control of body lice in sheep.
- (vi) Most candidates correctly stated that lice are transferred by direct contact.
- (b) (i) Most candidates correctly observed that real net value of farm production is declining over time and is variable from year to year.
- (ii) This question was correctly answered.
- (iii) Candidates correctly deduced that drought caused the dramatic fall in farm production.
- (iv) Very few candidates were able to state that the appropriate percentage increase in net value of farm production was 100%.
- (v) Candidates had trouble in answering this question; a figure of around \$6000 million was acceptable.
- (vi) Most candidates were able to give four advantages of providing shelter belts and trees on a farm.

- (c) (i) Very few candidates were able to gain full marks for this question. The correct ranking of the three fibres is shown in the following table:

| PROPERTIES | FIBRE | | |
|-----------------|--------|------|------------|
| | Cotton | Wool | Synthetics |
| Price | 2 | 1 | 3 |
| Elasticity | 3 | 1 | 2 |
| Uniformity | 3/2 | 2/3 | 1 |
| Fire resistance | 2 | 1 | 3 |
| Prickle factor | 2 | 3 | 1 |

- (ii) Most candidates correctly indicated that superfine Australian wool is used mainly for high quality fashion clothing.
- (iii) Candidates correctly indicated that wool from Tunkidale sheep is used to produce carpets.
- (iv) Candidates successfully answered this question. Most stated that the reasons for blending either cotton or synthetic fibre with wool were to reduce the cost and increase durability.

Question 6

- (a) (i) Candidates correctly stated that the three types of wool follicles found in the skin of sheep are Primary, Secondary and Secondary Derived.
- (ii) This question was well answered by the majority of candidates. The follicle ratios for Merino = 25:1, and Border Leicester = 5:1.
- (iii) Candidates showed a reasonable understanding of the three accessory structures associated with a specific wool follicle.
- (iv) Most candidates indicated that binding fibres or cross fibres hold staples together.
- (v) This question was poorly answered. Candidates could not recall that medullated fibres contain an air-filled centre.
- (b) (i) Candidates offered two approaches to this question. A number listed fibre diameter, staple strength, staple length, vegetable matter and marketing options; others listed overseas demand, the value of the Australian dollar, contamination, relative price of competing fibres and the uniformity of the product. Most answers were accepted.
- (ii) This question was very poorly answered. The calculation is as follows:

$$630 \times \frac{100}{70} = 900 \text{ cents /kg clean.}$$

- (iii) Most candidates obtained full marks for this question.

- (c) (i) This was a poorly answered question. Candidates found it difficult to understand the table and the information presented. The correct answers were: -
1. scouring/drying
 2. VM or alkaline insoluble test
 3. and 4. residual dirt/ash test or residual grease/alcohol extractable test
 5. mean fibre diameter/airflow test
- (c) (ii) Most candidates easily described grab sampling as the process being carried out. They could not indicate, however, that the grab sample is a representative sample for the display box and is used for testing staple length, staple strength and position of break on the Atlas machine, if requested by the grower.
- (c) (iii) The majority of candidates stated that staple strength was being tested, but could not correctly name the machine used as being the Atlas.

Question 7

- (a) (i) The majority of candidates indicated that the wool classer is the first person with a major responsibility for preparing shorn wool for market.
- (ii) This part was poorly answered. Acceptable answers for the responsibilities of the wool classer included: follow the Code of Practice, eliminate contamination and supervise shed staff.
- (iii) The important assumption to be made about the wool from a mob of sheep that have run together is that it will be uniform in its wool characteristics. This question was poorly answered.
- (iv) Candidates had little trouble in listing three contaminants to eliminate from bales of wool.
- (v) A few candidates were able to answer this question. Information found on a classer's report includes:
- owner and classer's address
 - lot details
 - mob description
 - lines of wool and the bale numbers in each line of wool
 - classer's AWEX registration number, and
 - property brand
- just to mention a few.
- (b) (i) A number of candidates failed to list, let alone describe, five wool selling options available to wool producers. Examples of selling options available to wool producers include: Auction, Private Treaty, Direct sale to the Processor, Futures/Options and Tender.

Sale by Description is not an option at this stage.

- (ii) Most candidates had no idea of the processes involved in early stage wool processing. Early stage processing involves any operations up to and including combing (i.e. scouring, carding, gilling and combing).
 - (iii) A few candidates were able to indicate that up to 30% of the Australian wool clip is early-stage processed within Australia.
 - (iv) Very few candidates understood that wool dumping involves a reduction in the volume of farm bales, in order to increase the weight/number of bales that can be fitted into a container.
 - (v) Given the limited space available, most candidates indicated correctly that the Asian economic crisis could affect the Australian wool industry.
- (c) (i) Very few candidates knew that system A represented Worsted processing and system B represented Woollen processing.
- (ii) Again, most candidates were unable to show where carding, scouring and spinning occur in the two sequences of events listed in the diagram.
 - (iii) Candidates failed to indicate adequately the type of wool processed on the two systems. The Worsted System uses long, strong, low VM wool, which is free grown and is less than 24 microns. The Woollen System uses carding length wool, higher in VM and wool which could be cotted and/or tender.

SECTION III: ESSAYS ON SHEEP HUSBANDRY AND WOOL TECHNOLOGY

General Comments

The general standard of essays showed a marked improvement over that of recent years. Candidates underlined the main points and showed some sense of order in their presentation.

Question 8 (a)

In general, candidates failed to answer this question adequately. The majority could not fully comprehend the fact that they needed to write concise details covering a wide range of management practices. They failed to present information under the headings of Late Pregnancy and/or Lactation, to ensure that the maximum number of lambs born grow successfully through to weaning.

It is suggested that the following points could have been covered to maximise candidates' marks:

Late Pregnancy

1. High nutritional plane in the last 6 weeks of pregnancy. The feed should contain an Energy level of 10-11.5 MJ /kg DM and a Protein content between 12-15%. This will ensure: -

- normal gestation
- normal birth weight – lamb having more vigour and ability to withstand extremes of temperature.
- higher ewe milk production – for lamb survival and growth
- stronger ewes – better mothering ability

2. Drench ewes – to maintain health and vigour

3. Vaccinate ewes (6 in 1) – passive immunity transmitted to lamb(s) via the colostrum

4. Crutch/shear ewes prior to lambing. This will: -

- stop ewes 'casting'
- help the lamb find the teat
- make ewes seek shelter from wind and rain

5. Remove detected dry ewes, which will result in more feed for the remaining pregnant ewes.

6. Remove twin/multiple-lamb-bearing ewes for extra supplement and observation during lambing.

7. Make sure ewes are not over-fat, keep in condition, score 3-4.

Lambing

1. Sheltered lambing paddock(s) with good quality pasture (avoid pregnancy toxaemia)

2. Separate maiden ewes from the mature ewes – stops stealing/mismothering of lambs

3. Keep predators out!

4. Inspect ewes late in the morning for dystocia

5. Drift lambing

Lactation

1. Good quality feed for ewe and lamb(s)

2. Keep predators out !

3. Clean/hygienic lamb-marking technique, carried out in portable yards.

Question 8 (b)

Most candidates who attempted this question managed to obtain a good mark. Again candidates clearly set out their answers, using the five headings provided. There were some outstanding answers that fully covered and explained each factor. Johne's disease was discussed by most candidates.

Possible answers included:

| Johne's Disease | Foot rot | Sheep Lice |
|---|--|---|
| <p>(i) Farm Management</p> <p>Don't overstress sheep Good boundary fences Don't share rams Monitor –ve flock only Don't mix sheep of unknown disease status</p> | <p>In susceptible times/areas inspect feet, footpare; chemical bath feet Strategic plan in place Good boundary fences</p> | <p>Good boundary fences Control after shearing – dip Quarantine introduced sheep for 12 mths Backline – Vanquish</p> |
| <p>(ii) Agistment of stock</p> <p>Don't agist Change to cattle Vendor Declaration</p> | <p>Don't agist Vendor Declaration Only from protected area Accredited footrot-free flock scheme</p> | <p>Don't agist Check treatment history Keep separate from your flock</p> |
| <p>(iii) Buying sheep from saleyards</p> <p>Minimise Obtain signed Johne's declaration form Vet. Inspect regularly PP Board Inspector check the pens for sheep showing only symptoms of these and other diseases. Vet. Monitor if suspected Keep separate</p> | <p>Minimise Obtain signed Footrot free declaration form Check history, one earmark Vet. Monitor if suspected Keep separate and monitor</p> | <p>Minimise Inspect carefully Ask for treatment history Keep separate for 12 months</p> |
| <p>(iv) Government policy on disease eradication.</p> <p>Notifiable disease Cannot sell in public saleyards Producers have a responsibility to ensure flock is investigated to rule out OJD Designated saleyards to sell stock</p> | <p>Notifiable disease Cannot sell in public saleyards Approval for use of the vaccine must be obtained under the provisions of the Stock Disease Act</p> | <p>Cannot sell in public saleyards Prosecution</p> |
| <p>(v) Veterinary services</p> <p>Rural Lands Protection Board District Vets., NSW Agriculture, Local Vet</p> | <p>Laboratory diagnosis Whole farm plan</p> | <p>Advice on planning AWTA Lice test</p> |

Question 9 (a)

Most candidates by-passed this question due to its very complex nature. Those who attempted it hedged their answers to cover any possible misinterpretation of it, and kept steadily to the sub-headings of harvesting, transport and sale of merino wool.

Any answer should have started with a definition of Total Quality Management (TQM). By definition, TQM implies:

'The sustained, ongoing improvement in all sections of an industry. It involves a plan, action, check and evaluation cycle that results in continuous improvements in the operation's costs, savings, productivity and, perhaps most of all, customer satisfaction. Quality is defined by the customer.'

The following points about TQM are offered under the headings stated in the question.

1. Harvesting

Includes all operations in presenting wool for sale. It includes mustering, shearing, skirting, classing and wool pressing. Shearers and wool classers have a major impact on the quality of the wool.

- Adequate qualified shed staff for quality control
- Classing to the Code of Practice set out by AWEX
- No contamination in paddocks, yards and shed, correct labelling of bins and bales.

2. Transport

Classer's specification sheets must match the wool transported and go with the truck or be faxed to the broker. Follow the Code of Practice for transportation of wool (tied down and tarped).

Bales must not be ripped/torn during road/rail transport.

Correct paperwork from the Clearing House for Broker. Dump and containerisation and shipment.

3. Sale of Merino Wool

Registered sampling sites and showfloor. Security of showfloor.

Specification of each lot, in terms of objective measurement of fibre diameter, vegetable matter, yield and the additional measurements of staple length, staple strength and position of break.

Use of an ISO 9000 accredited wool broker.

Question 9 (b)

This question was preferred by most candidates, who relished the opportunity to display knowledge under the sub-headings of drought, supplementary feeding, reproduction and internal parasites. Answers included a discussion along the following lines:

| | Growth | Strength |
|----------------------------|--|--|
| (i) Drought | Decreased growth. Not reaching genetic potential. Decreased staple length. Finer fibre diameter. | Decreased staple strength. |
| (ii) Supplementary feeding | Production feeding – Increased growth and therefore staple length and fleece weight. Increase in fibre diameter. Maintenance feeding – maintain staple length and fleece weight. | Increased staple strength. Maintain staple strength and avoiding a break. |
| (iii) Reproduction | If nutrition is not adequate then a decrease in fleece weight will occur. Lactation and multiple births will decrease fleece weight. Finer fibre diameter. | A decrease in staple strength could occur if not fed adequately. |
| (iv) Internal parasites | If the burden is reasonable there will be a decrease in staple length and fleece weight. Finer fibre diameter. | A decrease in staple strength and, possibly, a window will occur. |

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