

1999 HSC

**Sheep Husbandry
and Wool Technology**

Notes from the Examination Centre

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1999 Higher School Certificate Sheep Husbandry and Wool Technology Notes from the Examination Centre

2 Unit

In 1999, 22 candidates presented for the examination in Sheep Husbandry and Wool Technology as compared with 26 in 1998.

Section I - Special Topic - Short answers (20 marks)

General Comments

Candidates should endeavor to write neatly on the examination paper; numerous papers were very hard to read which disadvantages both student and examiner.

Candidates generally answered the questions in this section correctly. Most showed adequate preparation and were able to answer the application and evaluation level questions satisfactorily.

Specific Comments

Question 1

- (a) Most candidates were unable to name correctly Captains Waterhouse and Kent as the importers of the first Merinos into Australia. The rest of this section was well answered.
- (b) The majority of candidates were able to interpret the graph correctly and to answer the associated questions.
- (c) Candidates showed ability in correctly answering this part.

Question 2

- (a) Candidates were able to answer this part well, with most showing an understanding of the possible future trends in the wool industry's processing sector.
- (b) In answering this part, the majority of candidates showed a depth of knowledge of the export industry and the principles of supply and demand.
- (c) Most candidates were able to interpret and apply the information from the table supplied.

Section II - Short-response Answers (50 marks)

General Comments

Most candidates attempted to answer the questions asked in this section, which required candidates to recall numerous facts from the whole Syllabus. In general, candidates were more confident with questions on Sheep Husbandry than with those on Wool Technology. Candidates should be aware that the examination paper is usually divided equally between Sheep Husbandry and Wool Technology topics.

Question 3

- (a) Most candidates were able to match the supplied sheep breed correctly with the appropriate information and to answer the additional questions.
- (b) Candidates supplied a range of correct answers for this part. Their answers showed a depth of knowledge of the different grazing management systems (set stocking, rotational grazing and cell grazing).
- (c) Most candidates showed a good depth of understanding of sheep nutrition and the part on ration calculation was well handled.

Question 4

- (a) Candidates had few problems with most of this part; part (iv), however, did cause problems. The optimum survival rate for lambs occurs at 4.2 kg birth weight. This produces a negative parabolic curve with maximum survival rate of 90% at 4.2 kg birth weight.
- (b) Most candidates were able to answer this part correctly. Sheep A was the Poll Dorset Sheep, Sheep B the Southdown. The Merino growth curve line should have been drawn below the curve of that for Sheep B.
- (c) Flocks K and S were the correct answers for this part. The genetic principle required was 'selection differential'. The remaining parts were satisfactorily answered.

Question 5

- (a) Most candidates were not able to state correctly the cause of the diseases, which were, in order, Lice, Ovine Johnes, Brucellosis and Footrot. In most cases candidates were able to give a simple distinguishing symptom (eg Brucellosis leads to infertile rams).
- (b)(i) The majority of candidates were not able to answer this question correctly, as they were unsure of the meaning of the term 'adult mortality rate'. Some showed the age structure increasing substantially as the animals increased in age. The number of ewes at 2 years should be approximately 200. For each year after this, the number of ewes decreases by 10.
- (ii) Few candidates found this problem difficult, understanding that total income minus total variable costs equals the gross margin of the enterprise. Total income = \$32 000, therefore Gross Margin = \$20 100.
- (iii) Candidates who understood the term 'break-even price' had little trouble with this question. The majority, however, did not understand it and so did not attempt this part. The gross return from wool needed to equal \$12 000. The break-even price per kg of wool = $\$12\ 000 / 4500\text{kg} = \2.67 .
- (c)(i) Most candidates correctly listed wool's non-flammability, hygroscopic power, affinity for dyes, felting capacity, heat of wetting and elasticity as being its unique textile properties.

- (ii) The majority of candidates correctly grouped the animal fibre (mohair, cashmere, vicuna, silk), vegetable fibre (linen, cotton, jute) and man-made fibres (nylon, viscose, rayon).
- (iii) The worsted and woollen systems were correctly identified as being the two major processing systems.
- (iv) This question was well answered by most candidates who correctly indicated AAAM, AAA, BBB as being worsted yarns and LKS, CRT and high VM PCS as being woollen yarns.

Question 6

- (a)(i) Candidates correctly identified the wool fibre, sebaceous gland, sudoriferous gland and papilla as the parts in the vertical cross section of the sheep skin portrayed.
 - (ii) Part B, the sebaceous gland, produces wax which protects the wool fibre.
 - (iii) Typical breeds of sheep for the cross sections were Border Leicester and Merino.
 - (iv) Candidates were able to define S:P as being the ratio of secondary to primary wool follicles.
 - (v) Most candidates were able to state that Y has the highest S:P ratio.
 - (vi) Almost all candidates concluded that example Y was the ideal wool product to be worn close to the skin.
- (b) (i) A range of responses were acceptable here but most candidates identified the hard contaminants pictured in the examination paper.
 - (ii) The majority of candidates stated that hard contaminants cause damage to carding machinery.
 - (iii) Surprisingly, not all candidates could state four different soft contaminants that may be found in greasy wool. Correct responses included: baling twine, clothing, cigarette filters, pack material, while incorrect responses included chemical contamination and boots.
 - (iv) Most candidates correctly stated that soft contaminants could be spread throughout the fabric, cause uneven dye uptake and are difficult and costly to remove.
 - (v) Candidates listed fibre diameter, staple strength, vegetable matter, staple length and colour as the important factors that influence the price of wool.
- (c)(i) This question was extremely well answered, with candidates correctly identifying the mid-side as the preferred site for taking a fleece sample.
 - (ii) Most understood the reasoning behind the selection of the mid-side for taking a representative sample of the whole fleece.
 - (iii) Most candidates were not able to outline more than one advantage of testing a mid-side sample. The advantages included: used in ram selection, to cull out coarse fibre animals.
 - (iv) Most candidates easily gained full marks for this question, listing average F.D., % fibres $>30\mu$, staple length and yield as important information that might be obtained from the testing of a fleece sample.
 - (v) Some candidates did not understand the question and did not give a meaningful answer. Others correctly drew a curve to represent Sheep A with a tight CV% and Sheep B with a broad CV%.

Question 7

- (a)(i) Most candidates answered this part fairly well. Candidates should have indicated on the classer specification that Mobs 1 and 2 should be lotted separately due to the differences in the wool characteristics.
- (b)(i) Candidates successfully calculated the difference between forward contract price and auction price for the two dates.
- (ii) Two advantages of forward contracting wool were: guaranteed price for budgeting and limited losses.
- (iii) Candidates had difficulty in listing six specifications that are included in a forward contract. The following characteristics are normally specified in a forward contract:-
Fibre Diameter ($\mu \pm 0.5\mu$). Staple Length (Av. mm ± 5 mm). Staple Strength (min. SS AOL [any one lot]) VM% (max. VM% AOL) VM exclusion (eg seed) Weight of wool. No Interlots/Bulk Class wool. All lots must be Additionally Measured.
- (iv) Candidates were unable to give two reasons to show why wool producers are reluctant to enter into forward contracts. The reasons suggested are: fear of the unknown, afraid of not meeting specifications and lack of trading partners.
- (c)(i) Many candidates had difficulty with this question. For the high quality worsted suit, Clip F was the obvious choice, as it was very fine. The minor disadvantage was the shive present. Clip G was the choice for producing light-coloured jumpers using worsted yarn, the disadvantage being the high VM%. To produce woollen blankets, Clip E was the obvious choice. The disadvantage of this clip was the H3 colour, its high prickle factor and the fact that it was tender.
- (ii) It appeared that most candidates had a poor understanding of wool manufacturing, consequently very few were able to define correctly the manufacturing terms given. The following definitions would have led to full marks:
- Carbonising: A process involving the application of a sulphuric acid solution to high VM wools in order to char the VM. The wool is then dried, baked and put through heavy rollers to reduce the VM to dust.
- Hauteur: The average fibre length in the top.
- Noil: The short fibres, neps and VM removed during combing.
- Gilling: Straightening of fibres by pulling the slivers through rows of pins; this prepares the sliver for combing.

Section III - Essays (30 marks)

General Comments

Candidates should write as neatly as possible in the examination booklets. Many papers were difficult to read; the use of spacing between points, underlining or highlighting headings would assist in clarity.

Question 8 (a)

Specific Comments

Most candidates attempted this question.

Many had difficulty in describing in detail FIVE health problems commonly associated with a good season. Simply saying 'pink eye', 'hogget ill-thrift', 'mastitis' and 'johnes disease' were not considered acceptable answers. Those who managed to name a few health problems, were able to address briefly the cause, symptoms, treatment and prevention points raised in the question.

Health problems associated with a good season include the following: -

Flystrike, worms, footrot, foot abscess, pulpy kidney, liverfluke, fleece rot, bloat and dystocia.

A brief summary table is included below as a sample answer.

	CAUSE	SYMPTOMS	PREVENTION	TREATMENT
FLYSTRIKE	Lucillia cuprina	Green stain, flies.	Mulesing, shearing, crutching, breeding	Clip/remove wool around wound, chemical dressing.
WORMS	Barber's Pole Black scour worm	Scouring, loss of condition.	Drenching, drench rotation, clean pasture (worm free). Breeding worm-resistant sheep.	Drenching
FOOTROT	Fusiformis nodosus	Lameness, crawling, weight loss, death.	Vaccination. Culling suspect animals. Spell/ cultivate pasture.	Footbath, pare feet, identify and remove affected animals.
PULPY KIDNEY	Clostridium welchii	Sudden death, nervous symptoms, head drawn back, diarrhoea.	Vaccination.	No satisfactory treatment.
LIVERFLUKE		Bottlejaw, anemia, black disease	Drain/fence off swamps. Kill fresh water snail, clean paddocks.	Drenching

Question 8 (b)

Specific Comments

Only a few candidates attempted this question.

The main points that should have been raised in a discussion of this graph were:

August lambing: Average fibre diameter would be finer than Autumn lambing. This would have led to a higher value.

August lambing: Ewes have a greater average staple strength. There is less nutritional stress on these ewes during pregnancy.

Autumn lambing: Ewes would be prone to tenderness, as the fibre diameter profile varies greatly between December and May. The tenderness would greatly lower the value of the fleece.

Question 9 (a)

Specific Comments

All candidates attempted this question.

The wool marketing options available to wool growers include:

- Private Treaty (Private Sale)
- Auction
- Sale x separation
- Direct sale to mill
- Fibre direct
- Electronic - sale x description
- Wool Futures
- Forward marketing - Options contracts
- Tender

A discussion of the advantages and disadvantages could have included the following points:

Option	Advantages	Disadvantages
Private Sale	Immediate payment Price negotiable Savings in costs & freight	No test information, unless requested Price subject to test results Price taken No competition, less security
Direct to Mill	Price negotiable, savings in costs, possible savings in shed costs	No competition Only feasible for large clips Proceeds delayed with Top ownership
Auction	Competition, security Grower reserve Marketing advice from broker	Time delay in payment Price volatility, small lot size
Forward Marketing – Options contracts	Price certainty for growers, and mills; know in advance price for wool Can budget	Limited inducement for growers Need to understand concept
Electronic sale	24 hr selling Wool available to look at all the time No showfloor	Buyers used to looking at sample; high growers reserves; small quantities Buyer opposition

Question 9 (b)

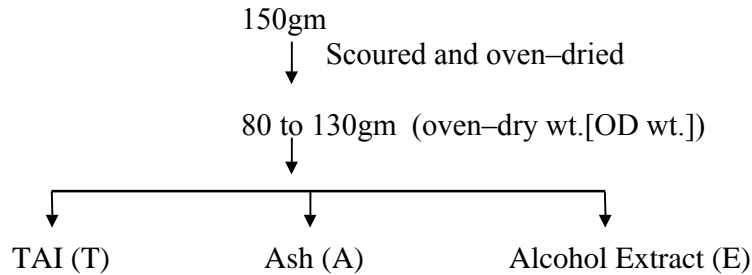
Specific Comments.

No candidates attempted this question.

A detailed summary of the testing methods used to measure objectively the natural impurities in greasy wool - wax, dust, moisture and vegetable matter is shown.

A 1000gm core sample is air blended.

Two 150gm Air Dry (ADwt) subsamples are then taken.



Scouring: 150g greasy subsample (AD wt) in hot water and detergent
Spun dry in a centrifuge
Rapid Dryer - 105°C till constant weight obtained (OD wt.)
= removal of the moisture, and most of the grease and dirt (not VM!)

The oven dry subsample is divided into two 10g samples and one 40g sample. (The rest is used to determine FD and kept as residual, in case further testing is required).

Residual Grease [wax] (E):

10g oven-dried sample

Using a Soxhlet apparatus and ethyl alcohol, boiled.

20 cycles or 2 hours. Residual alcohol-soluble matter recovered.

$$E = \frac{\text{wt grease}}{10\text{g}} \times 100$$

Mineral Matter (A):

10g oven-dried sample

Placed in a furnace at 750°C +/- 50°C for 2hrs

$$A = \frac{\text{wt ash}}{10\text{g}} \times 100$$

Vegetable Matter (VM) and TAI (T):

40g oven-dried sample

Boiled in a solution of sodium hydroxide (caustic soda)

Dissolves the wool, leaves VM. Dried.

Separate and weigh burr, seed and hard heads to calculate correction factor for VM

$$T = \frac{\text{wt VM}}{40\text{g}} \times 100$$

Next, the calculation for Wool Base (WB) (wool fibre free of all impurities).

$$\text{WB} = \frac{\text{OD wt}}{\text{AD wt}} \times [100 - (\text{A} + \text{E} + \text{T})]$$

From Wool Base the four (4) commercial yields are calculated.

1. ACY = Australian Carbonising Yield = $1.1972 \times \text{WB} + 0.162 \times \text{VMB} - 5.12$
2. JCSY = Japanese Clean Scoured Yield = $\text{WB} \times 1.1777$
3. SCH DRY = IWTO Schlumberger Dry Top and Noil Yield = $\text{WB} \times 1.207 - (\text{PA} + \text{VA})$
4. SCD DRY = IWTO Scoured Yield at 17% Regain

If a wool sale catalogue is checked, the objectively measured natural impurities appear as test results under the following headings:

BSH – Subjective estimate of Burr, Seed and Hard heads

ACY – Australian Carbonising Yield

JCSY – Japanese Clean Scoured Yield

SCD DRY – IWTO Schlumberger Dry Top and Noil Yield

SCH DRY – IWTO Scoured Yield at 17% regain

VMB – Vegetable Matter Base