BOARD OF STUDIES
NEW SOUTH WALES

STUDENT NUMBER

CENTRE NUMBER

HIGHER SCHOOL CERTIFICATE EXAMINATION

2000

SHEEP HUSBANDRY AND WOOL TECHNOLOGY

2 UNIT

Time allowed—Three hours
(Plus 5 minutes reading time)

DIRECTIONS TO CANDIDATES

- Write your Student Number and Centre Number at the top right-hand corner of this page, and on each Writing Booklet.
- Board-approved calculators may be used.

Section I (20 marks)

- Attempt BOTH questions.
- Answer the questions in the spaces provided in this paper.
- Allow about 30 minutes for this Section.

Section II (50 marks)

- Attempt ALL questions.
- Answer the questions in the spaces provided in this paper.
- Allow about 90 minutes for this Section.

Section III (30 marks)

- Attempt BOTH questions.
- Answer each question in a SEPARATE Writing Booklet.
- You may ask for extra Writing Booklets if you need them.
- Allow about 60 minutes for this Section.

MARKER'S USE ONLY

Section	Question	Mark
I	1	
I	2	
II	3	
II	4	
II	5	
II	6	
II	7	
III	8	
III	9	

SECTION I
SPECIAL TOPIC

(20 Marks)

Attempt BOTH questions.

Each question is worth 10 marks.

In each question, parts (a), (b) and (c) are of equal value.

Answer the questions in the spaces provided in this paper.

QUESTION 1

(a) (i) What is ovine Johne's disease (OJD)?

.....

.....

(ii) Which micro-organism is responsible for ovine Johne's disease?

.....

Use the photographs *A*, *B* and *C* to answer parts (iii) to (vi).

A *B* *C*

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(iii) Sheep *B* is described as having sub-clinical Johne's disease. What does this mean?

.....

.....

(iv) Sheep *C* is described as infected with Johne's disease. What does this mean?

.....

.....

QUESTION 1 (Continued)

(v) What symptoms might Sheep *C* exhibit?

.....

.....

.....

(vi) Why are the sheep in photographs *A* and *B* identical in appearance but labelled differently?

.....

.....

(b) (i) How do sheep become infected with ovine Johne's disease?

.....

.....

(ii) What age group of sheep is most susceptible to infection by OJD?

.....

(iii) How long does it take for recently infected sheep to start shedding OJD bacteria in their faeces?

.....

(iv) What conditions favour the survival of OJD micro-organisms?

.....

.....

(v) What is the most common means of introducing OJD to 'clean' flocks?

.....

.....

Question 1 continues on page 4

QUESTION 1 (Continued)

(c) (i) Name TWO tests currently used to check sheep flocks for OJD.

1 .....

2 .....

(ii) For ONE of the tests named above, describe how a sample is obtained.

Test (1 OR 2) .....

.....

.....

(iii) Why do large numbers of sheep need to be tested to detect the presence of OJD micro-organisms?

.....

.....

.....

(iv) What is the most reliable way to determine if a positive test is accurate?

.....

.....

.....

QUESTION 2

(a) (i) List SIX ways OJD can be introduced to a property.

1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

(ii) What are the THREE major levels of assurance a buyer can ask for when trying to source sheep free of OJD?

1 .....

2 .....

3 .....

(iii) 1 Which of the assurances you have listed has the highest assurance status?

.....

2 Explain your answer.

.....

.....

.....

Question 2 continues on page 6

QUESTION 2 (Continued)

(b) (i) On the map of NSW, shade in THREE Rural Lands Protection Board areas that have a tested high prevalence of OJD.

(ii) New classifications relating to OJD were introduced to NSW on 1 July 1999. Describe what is meant by:

1 residual zone;

.....

.....

.....

2 control zone.

.....

.....

.....

(iii) What process would a stud breeder in a residual zone need to apply to sell rams freely throughout NSW?

.....

.....

.....

QUESTION 2 (Continued)

(c) (i) List FOUR types of economic loss/costs that might occur on a property because of diagnosis of sheep with OJD.

1 .....

2 .....

3 .....

4 .....

(ii) List TWO social costs to a farming family of OJD diagnosis on their property.

1 .....

.....

2 .....

.....

(iii) 1 Can embryos from OJD-infected flocks carry the disease?

.....

2 What relevance does this have to a stud diagnosed with OJD?

.....

.....

.....

(iv) In NSW, why has there been a reluctance to introduce a vaccine against OJD?

.....

.....

.....

SECTION II

(50 Marks)

Attempt ALL questions.

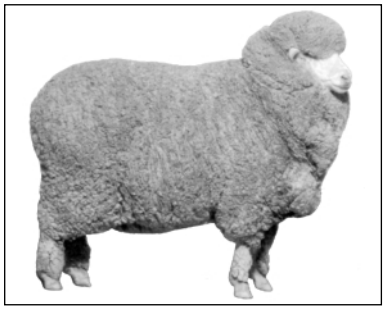
Each question is worth 10 marks.

In each question, parts (a), (b) and (c) are of equal value.

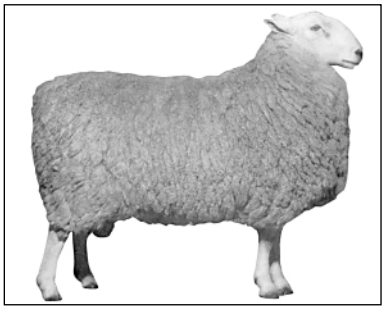
Answer the questions in the spaces provided in this paper.

QUESTION 3

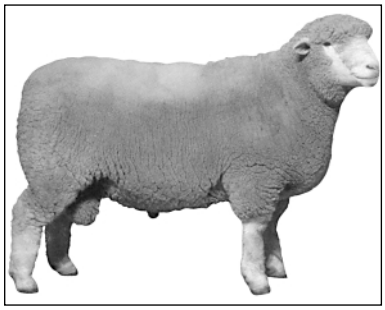
(a) The photographs show six breeds/types of sheep.



A



B



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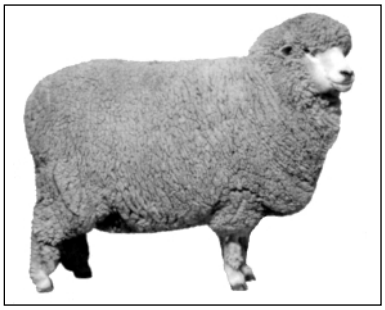

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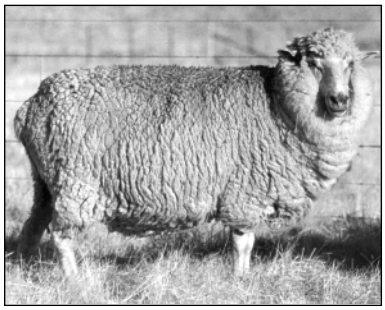
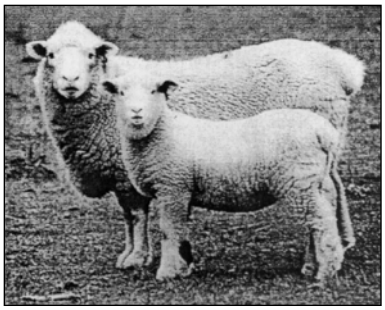


E



F

QUESTION 3 (Continued)

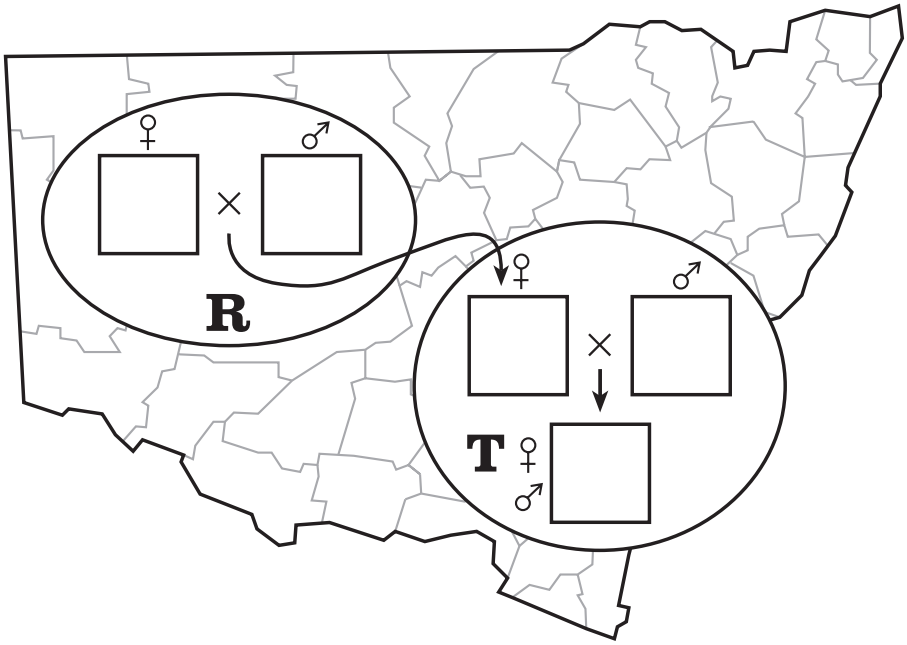
Complete the table by identifying the six breeds/types (*A* to *F*), and for each, outline their role(s) in the production of prime lamb.

	Breed/type	*Role(s) in lamb production*
A		
B		
C		
D		Dual-purpose meat/wool breed
E		
F	Prime lamb	

Question 3 continues on page 10

QUESTION 3 (Continued)

(b) (i) Using the information in Question 3 part (a), place FIVE of the breeds/types (*A* to *F*) in the boxes on the map to indicate the usual combination for prime lamb production in NSW.



R AND *T* INDICATE DIFFERENT REGIONS OF NSW

(ii) Describe TWO reasons why individual sheep types are typically located in specific parts of the state (*R* and *T*).

1 .....

.....

2 .....

.....

(iii) Outline typical grazing strategies that may be employed within location *R* compared with location *T*.

.....

.....

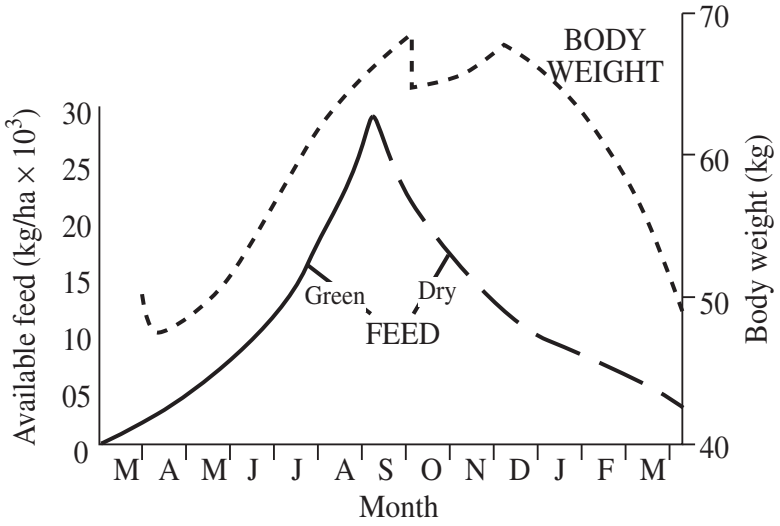
.....

.....

.....

QUESTION 3 (Continued)

(c) The graph shows twelve months of feed availability, and the body weight of Merino wethers.



From Alexander, G and Williams, O B (eds), Pastoral Industries of Australia, 2nd edition. 1986

(i) Indicate the month(s) of maximum feed availability.

.....

(ii) Indicate the month when hay would be most likely to be made.

.....

(iii) When would be the optimum time to start providing the sheep with supplementary urea blocks?

.....

(iv) Outline the basic principle of supplementation of sheep with urea blocks.

.....

.....

.....

(v) Suggest a reason for the sudden body weight decline of the Merino wethers at the end of September.

.....

(vi) Explain the likely reason(s) for the rise and fall in weight of wethers from the beginning of October until the end of March.

1 Rise .....

.....

2 Fall .....

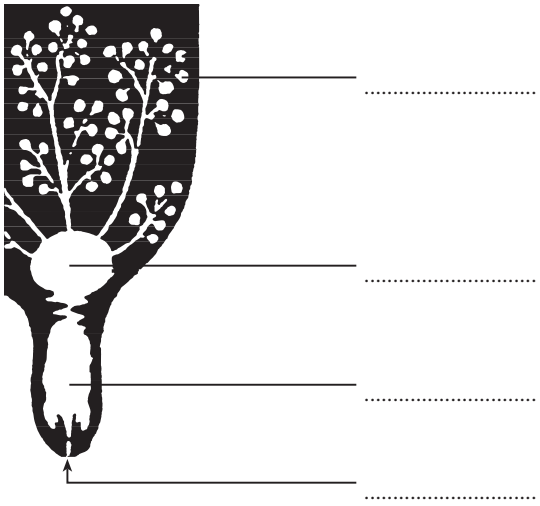
.....

QUESTION 4

(a) (i) The diagram shows the internal structure of a sheep's udder.

On the diagram, label the following parts:

A Alveolus
B Teat canal
C Gland cistern
D Streak canal



(ii) What is the function of the alveoli?

.....

.....

(iii) Why is it important that a lamb receive colostrum within the first twenty-four hours after birth?

.....

.....

(iv) Describe TWO factors that affect the length of lactation in ewes.

1 .....

.....

.....

2 .....

.....

.....

(v) Name TWO hormones that are involved in lactation.

1 .....

2 .....

QUESTION 4 (Continued)

(b) Use the following data from two lamb carcasses to assist in answering parts (i) to (v).

	Live weight (kg)	*Carcass weight* (kg)	*Dressing (%)*	*Muscle depth* (mm)	*Rump fat depth* (mm)	*Rib fat depth* (mm)	*Fat in carcass* (%)
Lamb *A*	40	18	–	28	20	11	20·7
Lamb *B*	50	26	52	40	9	6	16·2

(i) Which lamb, *A* or *B*, would produce a modern high-yielding carcass?

.....

Give TWO reasons for this answer.

1 .....

2 .....

(ii) Calculate the dressing percentage for lamb *A*.

.....

.....

.....

(iii) State TWO reasons why a butcher might prefer to buy lamb *B* in preference to lamb *A*.

1 .....

2 .....

(iv) Indicate TWO management strategies a producer may use to ensure the production of modern high-quality lamb carcasses.

1 .....

.....

2 .....

.....

(v) Name FOUR carcass traits, other than those in the table, that can be measured.

1 .....

2 .....

3 .....

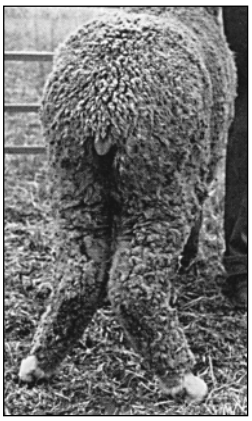
4 .....

Question 4 continues on page 14

QUESTION 4 (Continued)

(c) The photographs indicate two structural faults which may occur in sheep.

A



B

(i) Name the structural faults.

A .....

B .....

(ii) Outline TWO problems associated with fault *B*.

1 .....

.....

2 .....

.....

(iii) List FOUR characteristics that are commonly visually assessed by sheep classers.

1 .....

2 .....

3 .....

4 .....

(iv) Indicate the importance of genetic correlations when sheep breeders are selecting for increased fleece weight.

.....

.....

.....

.....

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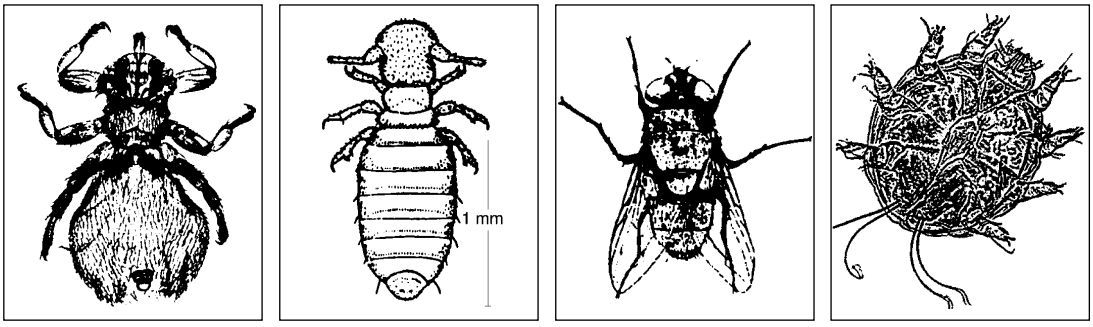
Please turn over

QUESTION 5

(a) (i) Identify the four parasites of sheep shown in the diagrams (*A* to *D*) and use the information to complete the table.



A *B* *C* *D*

Parasite	*Name*	*Internal/external*	*Control measures*
A			
B			
C			
D			

(ii) For parasite *C*, indicate SIX different strategies that may be incorporated into an Integrated Pest Management (IPM) program.

1 .....

2 .....

3 .....

4 .....

5 .....

6 .....

(iii) Which parasite (*A* to *D*) is of greatest economic importance to the Australian sheep industry?

.....

QUESTION 5 (Continued)

(b) (i) List TWO advantages of:

1 early (ten weeks) weaning;

Advantage 1 .....

Advantage 2 .....

2 late (twenty weeks) weaning.

Advantage 1 .....

Advantage 2 .....

(ii) Why is internal parasite control more important in weaners than in other age groups of sheep?

.....

.....

(iii) Why should young animals be the first to be supplementary fed during hard times?

.....

.....

(iv) Explain why low joining weights can be a problem for maiden ewes.

.....

.....

.....

Question 5 continues on page 18

QUESTION 5 (Continued)

(c) Table 1 provides a series of descriptors for various attributes of textile fibres.

TABLE 1

Absorbency	1 2	Very absorbent Very low water retention
Elasticity	3 4	Inelastic Excellent recovery from stretching
Flammability	5 6	Smoulders and is self-extinguishing Progressively softens and melts
Handle	7 8	Crisp and stiff Medium, surface feels smooth
Lustre	9 10	A beautifully soft subdued lustre Dull, due to surface and crimped configuration
Resilience	11 12	Sheds, creases easily, especially when damp Poor, creases easily
Uses	13 14	Used extensively in towels and underwear Especially valued for its insulative property in jumpers, blankets, suits and coats

QUESTION 5 (Continued)

(i) Complete Table 2 by inserting the number that corresponds to the most appropriate descriptor from Table 1 (each descriptor may be used only once).

TABLE 2

Characteristics	*Wool*	*Cotton*	*Silk*	*Nylon*
Absorbency		Very absorbent	Less absorbent than wool	
Elasticity	Very good elastic recovery	Inelastic		
Flammability		Burns with a yellow flame	Smoulders	
Handle	Medium to soft			Medium to hard
Lustre		Dull, mercerising gives subdued lustre		Light is reflected from smooth regular surface
Resilience	Excellent		Wrinkles easily	
Uses			Luxury items, evening wear, lingerie, scarves	Lingerie, socks, apparel, curtains

(ii) Explain why the term for number of fibres greater than 30 microns has been changed recently from ‘prickle’ factor to ‘comfort’ factor.

.....

.....

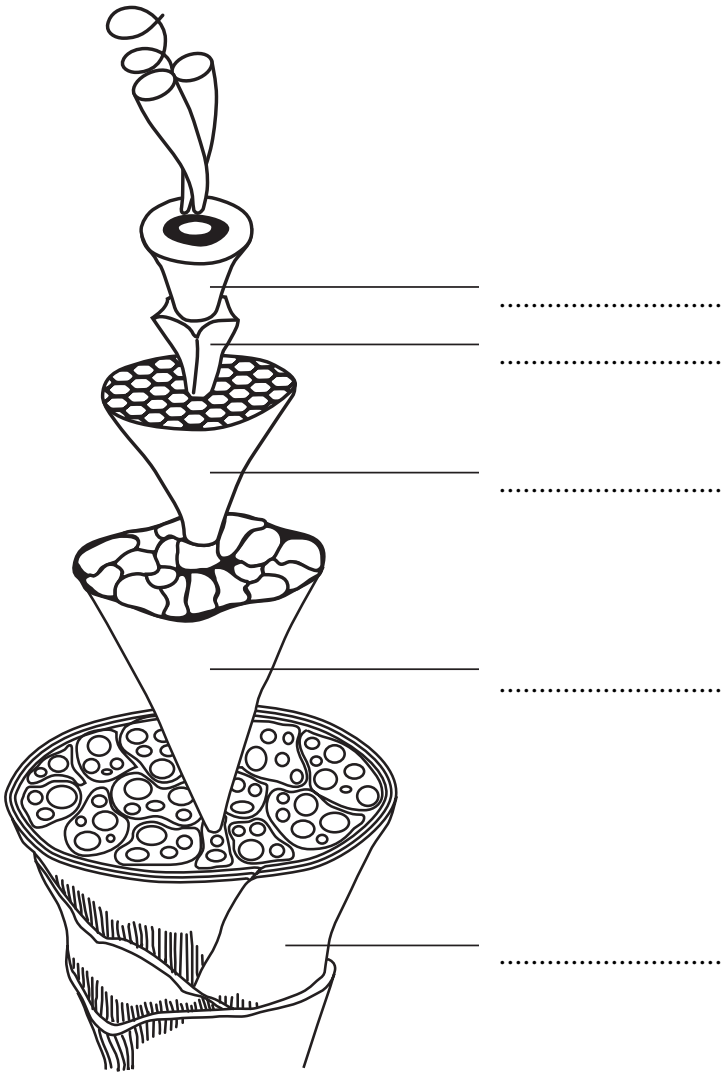
.....

QUESTION 6

(a) (i) Examine the diagram of the wool fibre.

On the diagram label the following parts:

A Para-cortex
B Cuticle
C Microfibril
D Matrix
E Macrofibril



(ii) Compare the wool produced by a medium-wool Merino with that produced by a Border Leicester, by using the words high, medium and low to complete the table.

Property	*Medium-wool Merino*	*Border Leicester*
Proportion of suint	Medium	High
Staple length		
Proportion of wax		
Mean fibre diameter		
Follicle density		
S : P ratio		

QUESTION 6 (Continued)

(b) (i) The diagrams show the seeds of four plant species that contribute to vegetable fault in wool. Give their common names.

....

....

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(ii) Choose ONE seed from part (b) (i). Outline why it can be a problem to grazing sheep.

.....

.....

(iii) List FOUR management strategies a grazier can use to reduce vegetable matter contamination of fleeces.

1 .....

2 .....

3 .....

4 .....

Question 6 continues on page 22

QUESTION 6 (Continued)

(c) (i) Explain how a wool sample is obtained from a sale lot for staple strength measurement.

.....

.....

.....

.....

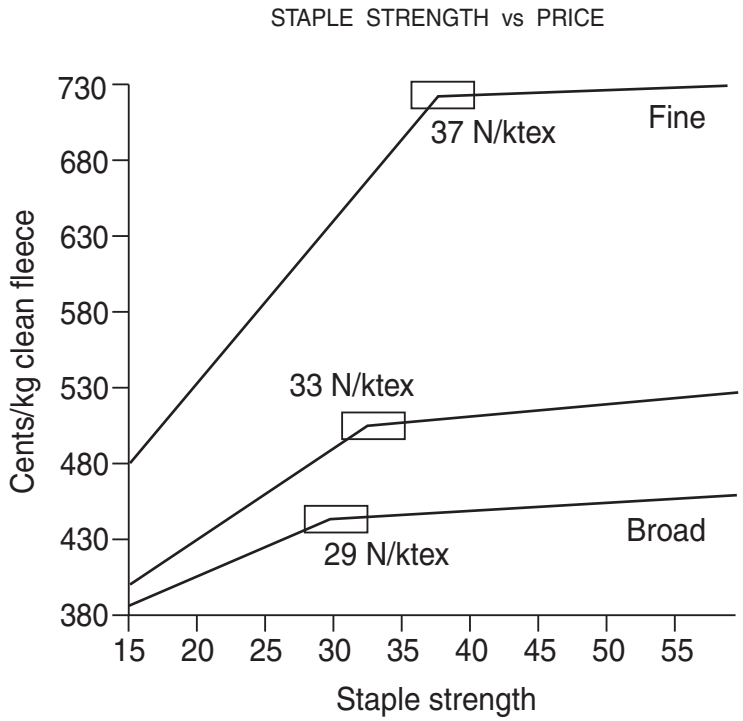
(ii) Name the machine used to measure staple strength.

.....

Name ONE other measurement this machine can perform.

.....

Use the graph as an aid to answer parts (iii) to (v).



Reproduced with permission of the Land

QUESTION 6 (Continued)

(iii) Which staple strength value represents rotten wool?

.....

(iv) Below which staple strength is broad wool regarded as tender?

.....

(v) Fine wool shows the greatest decline in price due to tenderness. Why?

.....

.....

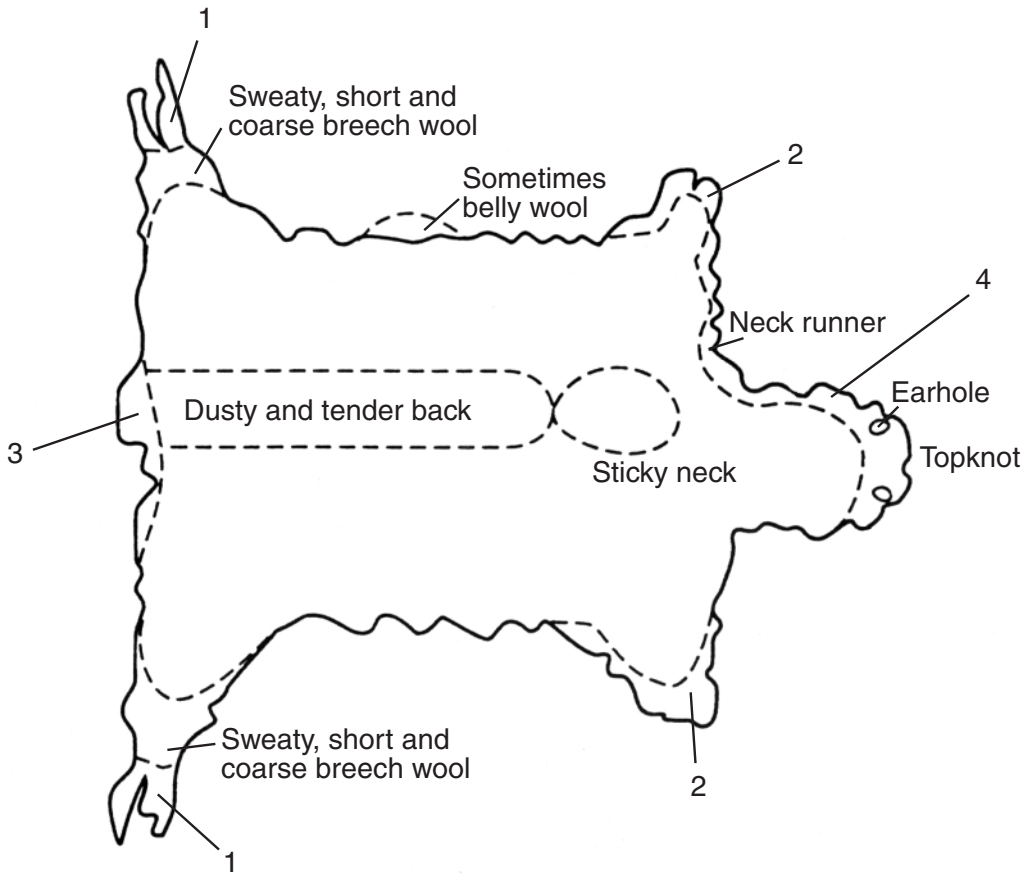
.....

.....

Please turn over

QUESTION 7

(a) (i) Use the diagram as an aid to completing the table.



Number	*Description*	*Reason(s) removed from the fleece*
	Shank	
2		
		Uneven dye uptake; fleece unable to be dyed pastel colours
	Cotted jowls	

(ii) Give the minimum and maximum bale weights (kilograms) for non-speciality wools.

Minimum .....

Maximum .....

QUESTION 7 (Continued)

(b) (i) Describe ONE method of selling wool.

.....

.....

.....

(ii) What are TWO criteria involved in a wool quality assurance program?

1 .....

2 .....

(iii) What is a wool marketing alliance (such as HR Wool)?

.....

.....

.....

.....

(iv) What are TWO possible advantages of being involved in a wool marketing alliance?

1 .....

.....

2 .....

.....

Question 7 continues on page 26

QUESTION 7 (Continued)

(c) (i) Complete the table by providing details of wool manufacturing processes.

Process	*Purpose(s)*	*By-products*
Scouring		
Carding		
Combing		
Carbonising		

(ii) Explain the difference(s) between the woollen and worsted systems of wool processing.

.....

.....

.....

SECTION III

ESSAYS

(30 Marks)

Suggested time: 30 minutes per essay

Write TWO essays, choosing ONE from Question 8 and ONE from Question 9.

The questions are of equal value.

Answer each question in a SEPARATE Writing Booklet.

Headings, subheadings, diagrams, graphs, tables, etc may be included in your essays.

QUESTION 8

EITHER

(a) In many areas of Australia, farms are set up for the production of Merino wool. With falling wool prices, however, many of the owners are seeking to develop alternative forms of commercially viable livestock production.

For FIVE of the following sheep breeds, describe their particular attributes (wool, fertility, milk production etc), and outline any specific management or marketing requirements.

- Awassi
- Domah
- Dorper
- East Friesian
- Finn
- Karakul
- South African Mutton Merino
- Texel

OR

(b) Discuss the advantages and disadvantages of breeding your own rams, as opposed to buying-in rams from a stud. In your discussion, you should consider some of the following issues:

- costs
- facilities
- disease implications
- measurements, record-keeping and labour
- genetic progress
- flock structure
- management skills.

QUESTION 9

EITHER

(a) Describe EACH of the following wool marketing methods, and outline the advantages and disadvantages of each.

- Sale by sample
- Private treaty
- Wool futures
- Forward contract
- Tender

OR

(b) Discuss the effects that changing a Merino flock from an average of 22 μ to 19 μ might have on the farm, the flock, and the fleeces grown by the sheep.

In your essay, you should make reference to factors such as:

- flock structure
- mature live weight
- handle
- fleece weight
- crimp frequency
- wool colour
- style
- staple strength
- wool value
- comfort factor.

End of paper