BOARD OF STUDIES
NEW SOUTH WALES

HIGHER SCHOOL CERTIFICATE EXAMINATION

1997

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.

EXAMINER'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)   Outline FOUR advantages of selling stud rams at an on-property auction.

        1. ....

           ....

        2. ....

           ....

        3. ....

           ....

        4. ....

           ....

    (ii) List TWO disadvantages of selling store lambs at a saleyard auction.

        1. ....

        2. ....

    (iii) Name ONE other system for selling store lambs. Describe THREE advantages of this system compared to auction.

        Selling system ....

        1. ....

        2. ....

        3. ....

QUESTION 1. (Continued)

(b)   (i)   Describe sale-by-sample wool selling.

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....

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....

    (ii)   Describe the process of selling sheep and sheep products by auction.

....

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....

    (iii)   Superfine wool growers are generally dissatisfied with centralised selling and sale-by-description. Give FOUR reasons for this.

1. ....

....

2. ....

....

3. ....

....

4. ....

....

QUESTION 1. (Continued)

(c)   A wool producer is forward selling a wool-clip. Use the following table as a guide to answer part (i).

CONTRACT PRICE 400 c/kg (PLUS OR MINUS PREMIUMS/DISCOUNTS)

Wool characteristic	Specifications	Premiums (cents/kg)		Discounts (cents/kg)	
Fibre Diameter	21·0	10	−0·1μ	20	+0·1μ
Vegetable Matter	3%	10	−0·2%	10	+0·2%
Strength	35 N/KT	5	+1·0 N/KT	10	−1·0 N/KT
Length	90 mm	2	+10 mm	15	−10 mm
Colour	Nil			20	H1

(i)   Fill in the following table by calculating the premium(s) or discount(s) for each wool characteristic, and calculate the final price (cents/kg).

Wool characteristic	Specifications	Premiums (cents/kg)	Discounts (cents/kg)
Fibre Diameter	21·2μ		
Vegetable Matter	2·0%		
Strength	40 N/KT		
Length	60 mm		
Colour	H1		
Totals Premiums/Discounts			
Variation from contract price			
Contract price (cents/kg)			
Final price (cents/kg)			

(ii)   List TWO advantages of forward selling a wool-clip.

1.   ……………………………………………………………………………

2.   ……………………………………………………………………………

QUESTION 2

(a)   Use the following graph as an aid to answer parts (i) to (iii).

MARKETING METHOD FOR LAMBS—COWRA DISTRICT
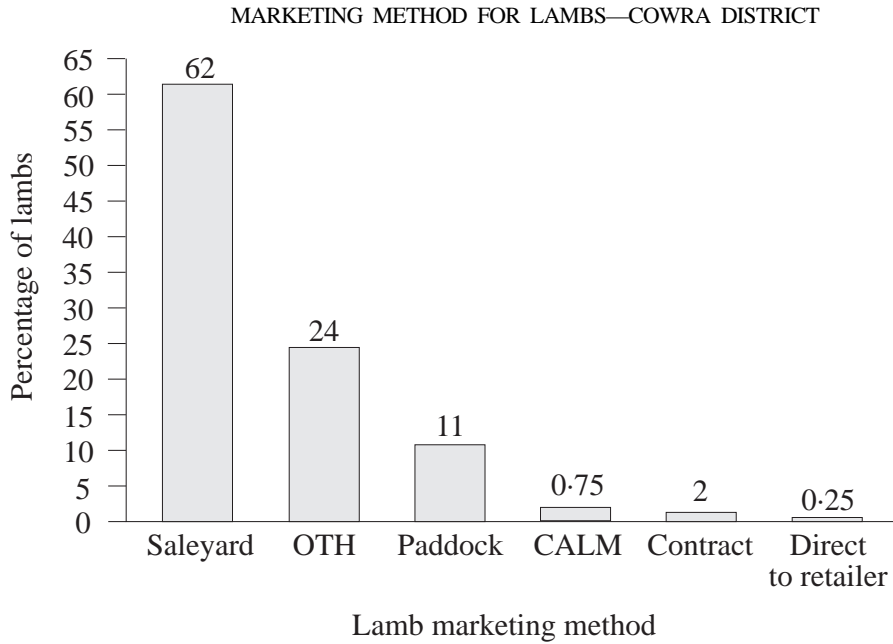
(i)   Name the most popular method of selling lambs in the Cowra District.

………………………………………………………………………………………………

(ii)   Describe the method of selling lambs in the paddock.

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

(iii)   1.   What does OTH stand for?

………………………………………………………………………………………………

2.   Describe this method of marketing lambs.

………………………………………………………………………………………………

………………………………………………………………………………………………

………………………………………………………………………………………………

QUESTION 2. (Continued)

Use the diagram below as an aid to answer the question.

(iv) AUS-MEAT Standards for OTH.
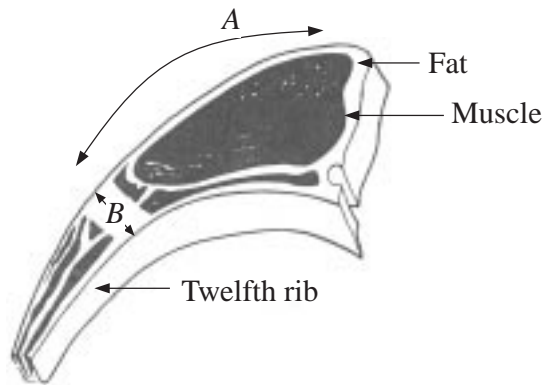
On the diagram, what do the labels *A* and *B* indicate?

A   ………………………………… mm

B   ………………………………… site

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QUESTION 2. (Continued)

(b)   Use the information below as an aid to answer parts (i) to (iii).

CALM LAMB SALE RESULTS

Sale lot	Location	Stock category	Breed type	Major fat score	Av. skin length	HSCW		Price quotations (farm gate equiv.)	
					(inches)	Range	Av.	(c/kg HSCW)	($/HD)
31	CENTRAL NSW	Lambs	WS / MER	2–3	1·5	26·0–28·0	27·2	216	58·75
32			PD / SUF	2–3	2·0	19·0–22.0	20·9	220	45·98
33			CORR	4	0·5	20·0–26·0	24·4	196	57·90
34			T / BLM	2–3	1·0	16·0–19·0	17·8	218	40·94
35			MER	1–2	1·5	–16·0	12·7	132	20·00

(i)   What do the following abbreviations stand for?

CALM…………………………………………………………………………………

HSCW …………………………………………………………………………………

(ii)   Explain how fat score is determined in the paddock prior to sale.

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

…………………………………………………………………………………………

(iii)   List FOUR factors that influence average skin value.

1.   ……………………………………………………………………………………

2.   ……………………………………………………………………………………

3.   ……………………………………………………………………………………

4.   ……………………………………………………………………………………

QUESTION 2. (Continued)

(c)   Use the table on page 8 as an aid to answer parts (i) and (ii) below.

(i)   A lamb producer wishes to offer lambs on CALM similar to sale lot 33. What would be the minimum and maximum *live-weights* and *fat depths* (in millimetres) of those animals on farm (assume: dressing 45%)? Show calculations where appropriate.

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

………………………………………………………………………………………

Minimum live-weight ………………………… kg

Maximum live-weight ………………………… kg

Minimum fat depth …………………………… mm

Maximum fat depth …………………………… mm

(ii)   State the sale lot number(s) that would most appropriately fill the following market specifications.

Sale lot	Market specifications
	Fresh Australian range lamb
	Elite lamb
	Middle East
	Trim lamb

(iii)   List FOUR factors that affect the dressing percentage of lambs.

1.   ………………………………………………………………………………

2.   ………………………………………………………………………………

3.   ………………………………………………………………………………

4.   ………………………………………………………………………………

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)   Study the following graph of pasture growth and herbage intake and use it as an aid to answer parts (i) to (iv).
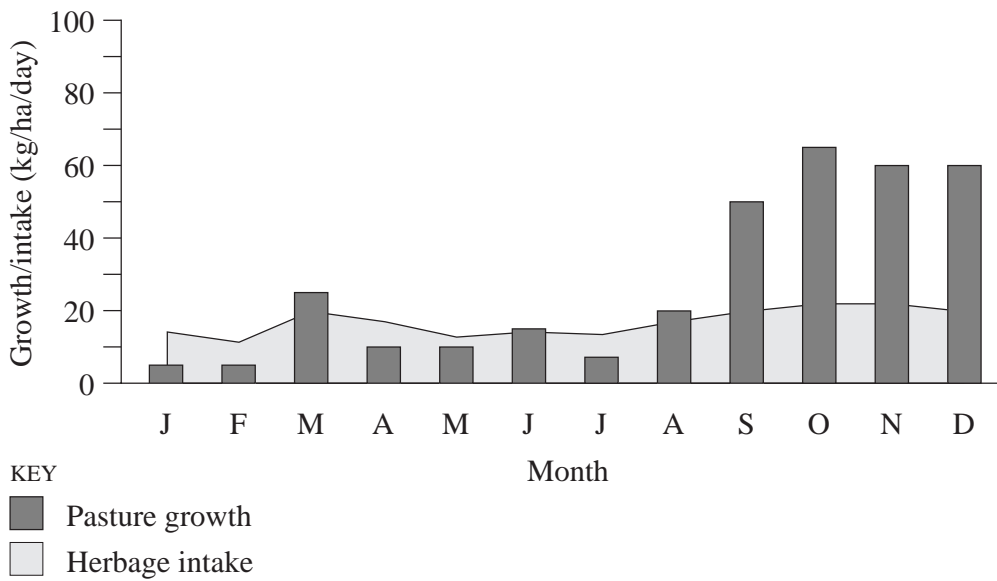
(i)   Indicate the month of maximum pasture growth.

   …………………………………………………………………………………………

(ii)   State TWO reasons why herbage intake varies over the year.

   1.   …………………………………………………………………………………

   2.   …………………………………………………………………………………

QUESTION 3. (Continued)

(iii) 1. Indicate the month(s) when pasture growth is below herbage intake.

…………………………………………………………………………………

2. State THREE ways to fill the feed gap.

A. ………………………………………………………………………

B. ………………………………………………………………………

C. ………………………………………………………………………

(iv) In which month would a prime lamb producer join ewes?

…………………………………………………………………………………

Give TWO reasons for this (related to the graph on page 10).

1. ………………………………………………………………………

2. ………………………………………………………………………

QUESTION 3. (Continued)

(b)   (i)   The map below shows representative areas of NSW where various types of sheep production occur.
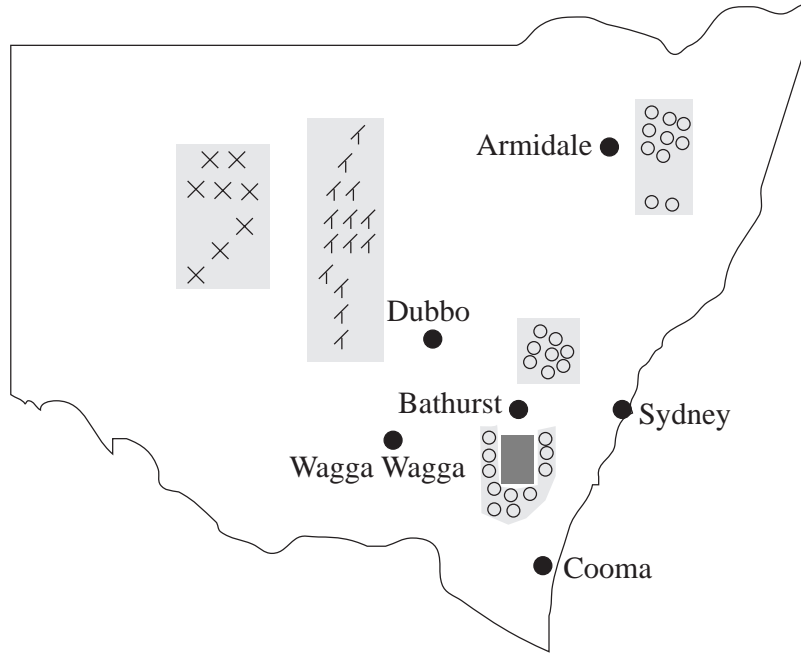
Each of the symbols on the map represents one of four different types of sheep production.

(A)   Self-replacing Merino flock (18μ)

(B)   Merino wether (23μ)

(C)   First-cross lamb production

(D)   Carpet wool production

In the table below, write the appropriate letter (A, B, C, or D) to identify the type of sheep production indicated by the symbols.

Symbol	Type of sheep production
×× ×	
⭕⭕⭕	
⬛	
⁄⁄ ⁄⁄	

QUESTION 3. (Continued)

(ii) Outline TWO environmental characteristics required for top quality prime lamb production.

1. ……………………………………………………………………………………

2. ……………………………………………………………………………………

(iii) Describe the following type of grazing system.

1. Rotational grazing ……………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

2. Strip grazing …………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

(c) (i) Complete the table below by indicating in the spaces provided the listed mineral most likely to be associated with the deficiency symptoms.

- Nitrogen
- Selenium
- Copper
- Fluorine
- Zinc
- Magnesium
- Cobalt
- Calcium

Mineral	Symptoms of deficiencies
	White muscle disease; reduced reproductive rate
	Grass tetany
	Steely wool; loss of pigmentation
	Abnormal skeletal growth; milk fever
	Increased teeth damage
	Reduces the rate of cell division in the wool follicle; reduces sperm production.

QUESTION 3. (Continued)

    (ii)   Name the FOUR parts of the ruminant stomach.

         1.   …………………………………………………………………………………

         2.   …………………………………………………………………………………

         3.   …………………………………………………………………………………

         4.   …………………………………………………………………………………

QUESTION 4

(a) (i) List FOUR parts of the reproductive organs of a ram.

1. …………………………………………………………………………………

2. …………………………………………………………………………………

3. …………………………………………………………………………………

4. …………………………………………………………………………………

(ii) Define the following reproductive terms.

1. Oestrus cycle ……………………………………………………………………

…………………………………………………………………………………

2. Parturition ………………………………………………………………………

…………………………………………………………………………………

(iii) List FOUR factors that influence the milk yield of a ewe.

1. …………………………………………………………………………………

2. …………………………………………………………………………………

3. …………………………………………………………………………………

4. …………………………………………………………………………………

(iv) Use the following table as an aid to answer the question below.

THE EFFECT OF TIME OF MATING ON REPRODUCTIVE PERFORMANCE OF MERINO
EWES AT THE AGRICULTURAL RESEARCH STATION, TRANGIE, NSW

Time of mating	Unmated ewes (%)	Wet ewes (%)	Multiple births (twins %)	Wet ewes losing lambs (%)	Dead ewes (%)	Lambs weaned (% of ewes joined)
Spring	18·0	72·1	12·0	5·6	2·1	66·7
Autumn	5·0	87·8	37·5	7·7	2·1	99·5

Give TWO reasons why the autumn joining resulted in a higher percentage of lambs weaned to ewes joined.

1. …………………………………………………………………………………

…………………………………………………………………………………

2. …………………………………………………………………………………

…………………………………………………………………………………

QUESTION 4. (Continued)

(b)   (i)   Use the diagram in answering the question below.

PRIME LAMB GROWTH CURVE (LATE MATURING)
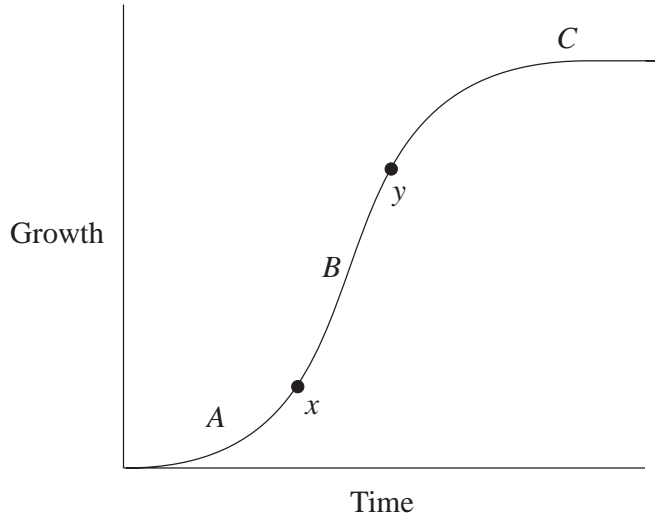
1.   Name the growth curve.

……………………………………………………………………………

2.   On which section of the curve is the animal growing at the fastest rate?

……………………………………………………………………………

3.   Which point on the curve indicates puberty?

……………………………………………………………………………

4.   Draw on the above diagram the growth curve for an early maturing prime lamb.

(ii)   List FOUR factors that affect the growth rate of a prime lamb.

1.   ……………………………………………………………………………

2.   ……………………………………………………………………………

3.   ……………………………………………………………………………

4.   ……………………………………………………………………………

(iii) Explain why ram lambs grow bigger and faster than ewe lambs.

……………………………………………………………………………

……………………………………………………………………………

QUESTION 4. (Continued)

(c)   (i)   Define the following terms.

1. Inbreeding ……………………………………………………………………

………………………………………………………………………………

2. Line-breeding …………………………………………………………………

………………………………………………………………………………

(ii) Use the information in the table below as an aid to answer the following questions.

MULTI-VENDOR PRIME LAMB RAM SALE
(SALE CATALOGUE COMPILED FROM THE LAMB PLAN ACROSS THE FLOCK FIGURES)

Ram tag number	Stud	EBV			Index values	
		YWT	YFAT	EMD	60:20:20	80:10:10
23 4343 1997 970005	Teacart	1·7	−2·8	1·0	158·1	133·7
23 2251 1997 970003	Warrego	5·3	−1·2	0·4	143·4	135·8
23 2253 1997 970041	Erinalee	5·9	−3·0	−1·2	140·2	133·2
Average breed		1·11	−0·53	−0·14	107·7	106·5

1. Describe how YWT, EBVs are calculated.

………………………………………………………………………………
………………………………………………………………………………
………………………………………………………………………………

2. The index value for the Teacart ram is 158·1. How would this have been calculated?

………………………………………………………………………………
………………………………………………………………………………
………………………………………………………………………………
………………………………………………………………………………

3. A prime lamb grower wants to produce heavy lean lambs. Which ram would you recommend, and why?

………………………………………………………………………………
………………………………………………………………………………
………………………………………………………………………………

QUESTION 5

(a)   (i)   A ewe lamb is to be born in October and retained for breeding in a self-replacing ewe flock. Outline a vaccination program against clostridial diseases.

……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

(ii)   1.   List the cause and symptom(s) of Johne's disease in sheep.

Cause …………………………………………………………………

Symptom(s)……………………………………………………………

……………………………………………………………………

……………………………………………………………………

2.   Identify the age at which symptoms of Johne's disease usually become apparent.

……………………………………………………………………

3.   Outline TWO environmental conditions that favour the spread of Johne's disease.

A.   ……………………………………………………………

B.   ……………………………………………………………

4.   Describe the responsibility of owners who have sheep infected with Johne's disease.

……………………………………………………………………

……………………………………………………………………

……………………………………………………………………

(iii)   Name FOUR factors that increase the incidence of fly strike in sheep.

1.   ……………………………………………………………………

2.   ……………………………………………………………………

3.   ……………………………………………………………………

4.   ……………………………………………………………………

QUESTION 5. (Continued)

(b)   Study the following calendar of operations for a self-replacing Merino flock.

MAJOR ACTIVITIES IN A SELF-REPLACING MERINO FLOCK (NUMBERS 1 TO 10)

Months of the year
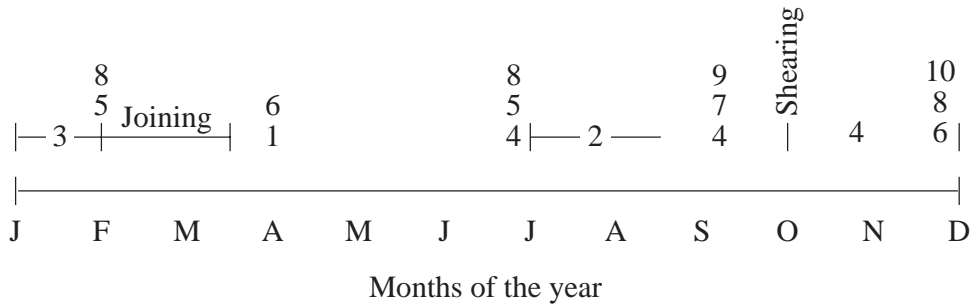
Match the *numbers* on the diagram with the operations listed below.

Weaning	
Vaccinations (3)	
Lambing	
Pregnancy scanning	
Lamb marking	
Flushing	
Drenchings (3)	
Mulesing	
Crutchings (2)	
Jettings (2)	

QUESTION 5. (Continued)

(c)   Parts (i) to (vi) are multiple-choice questions. Circle the alternative A, B, C, or D that best answers the question.

(i)   In 1996, wool's contribution to Australian export earnings was

(A) $40 million.

(B) $100 million.

(C) $3 billion.

(D) $20 billion.

(ii)   In 1996, wool's contribution to Australia's GDP was

(A) 25%

(B) 10%

(C) 1%

(D) 0·05%

(iii)   In 1996, the country that imported most Australian wool (by volume) was

(A) USA.

(B) Japan.

(C) Korea.

(D) Italy.

(iv)   In 1996, what proportion of the Australian greasy wool-clip was first-stage processed in Australia?

(A) 1%

(B) 10%

(C) 30%

(D) 60%

(v)   In 1996, the number of sheep in Australia was

(A) 96 million.

(B) 124 million.

(C) 150 million.

(D) 180 million.

(vi)   In 1996 the international wool clip's contribution to the total world textile fibre industry was

(A) 3%

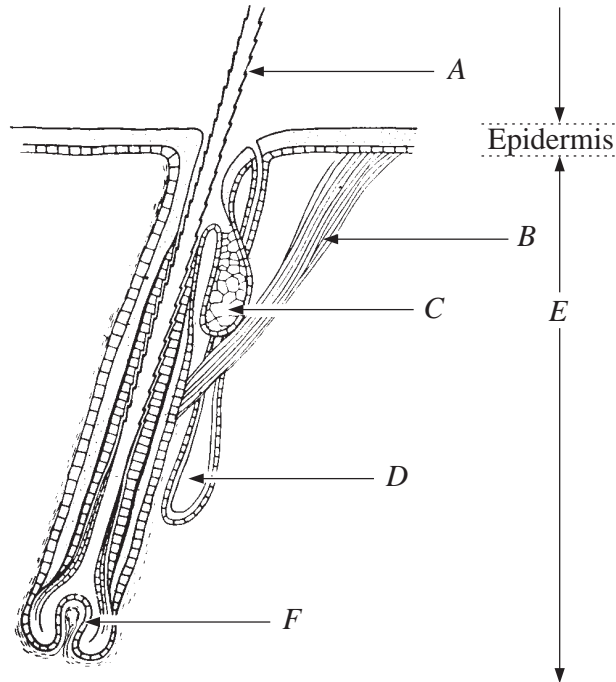(B) 10%

(C) 20%

(D) 50%

QUESTION 5. (Continued)

(d) *Name* and *explain* TWO treatments, in addition to normal manufacturing processes, that aim to improve the performance of wool as a textile fibre.

(i) ……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

(ii) ……………………………………………………………………………………

……………………………………………………………………………………

……………………………………………………………………………………

QUESTION 6

(a)   (i)   Name the type of wool follicle shown below, and name the parts (labelled
            A to *F*).

Follicle type   ....

A   ....

B   ....

C   ....

D   ....

E   ....

F   ....

(ii)   1.   What is the name of the gland that produces wax in the skin of the sheep?

            ....

       2.   What is the main function of wax in the fleece? ....

            ....

            ....

QUESTION 6. (Continued)

    (iii) 1.   What is the name of the process that removes wax from the fleece?

          …………………………………………………………………………………

         2.   Name a product derived from wool wax.

          …………………………………………………………………………………

(b)   (i)   Study the table of AWEX industry descriptions. From the list, enter the correct *qualifier* for each description in the table.

- A^1
- H^3
- W^3
- S^1
- C^3
- H^1

Qualifier	Description
	Light unscourable colour
	Very tender
	Light stain, where the line is made for stain
	Medium and hard cotts in all combing lines
	Light, odd sticks of dermatitis
	Heavy unscourable colour

    (ii)   Name FOUR plants that can contribute to vegetable fault in wool.

        1.   ………………………………………………………………………………

        2.   ………………………………………………………………………………

        3.   ………………………………………………………………………………

        4.   ………………………………………………………………………………

QUESTION 6. (Continued)

(c)   Use the following information as an aid to answer parts (i) and (ii).

<div align="center">RAM SALE CATALOGUE EXTRACT</div>

Lot no.	Tag no.	CFW %	Yield %	FDCV %	1 yo FD	1 yo DEV
61	467	113	77·9	20·0	21·2	–0·2
62	345	95	75·6	28·6	22·2	1.0
63	969	125	65·5	14·5	21·1	–0·1

(i)   Name TWO machines that could have measured the fibre diameter for the ram sale catalogue extract.

1. …………………………………………………………………………………

2. …………………………………………………………………………………

(ii)   Which ram lot number has the most desirable FDCV%?

…………………………………………………………………………………

(iii)   What undesirable trait may be associated with a garment made from wool with a high FDCV%?

…………………………………………………………………………………

(iv)   Define the term 'yield'.

…………………………………………………………………………………

…………………………………………………………………………………

(v)   List the *process* for determining each of the FOUR components of wool-base.

1. …………………………………………………………………………………

2. …………………………………………………………………………………

3. …………………………………………………………………………………

4. …………………………………………………………………………………

QUESTION 7

(a)   (i)   List FOUR reasons for skirting a fleece for sale.

        1. ……………………………………………………………………………………

        2. ……………………………………………………………………………………

        3. ……………………………………………………………………………………

        4. ……………………………………………………………………………………

    (ii) Explain the 'Code of Practice' requirements for a fleece containing a single black spot.

        ……………………………………………………………………………………

        ……………………………………………………………………………………

        ……………………………………………………………………………………

    (iii) Outline the problem(s) that can arise during processing due to the presence of polypropylene twine in a sale lot.

        ……………………………………………………………………………………

        ……………………………………………………………………………………

        ……………………………………………………………………………………

    (iv) Outline the major principle involved in Total Quality Management (TQM).

        ……………………………………………………………………………………

        ……………………………………………………………………………………

        ……………………………………………………………………………………

        ……………………………………………………………………………………

QUESTION 7. (Continued)

(b) The following people (numbered 1–10) are associated with wool (sold by sale-by-sample) in its trip from the sheep's back to an overseas mill.

  1. Auctioneer
  2. AWTA tester
  3. Broker
  4. Buyer
  5. Classer
  6. Farmer
  7. Rouseabout
  8. Shearer
  9. Wool presser
  10. Wool dumper

Place the numbers from the above list in the flowchart to show the order in which these people are associated with wool during its trip (numbers should only be used once).
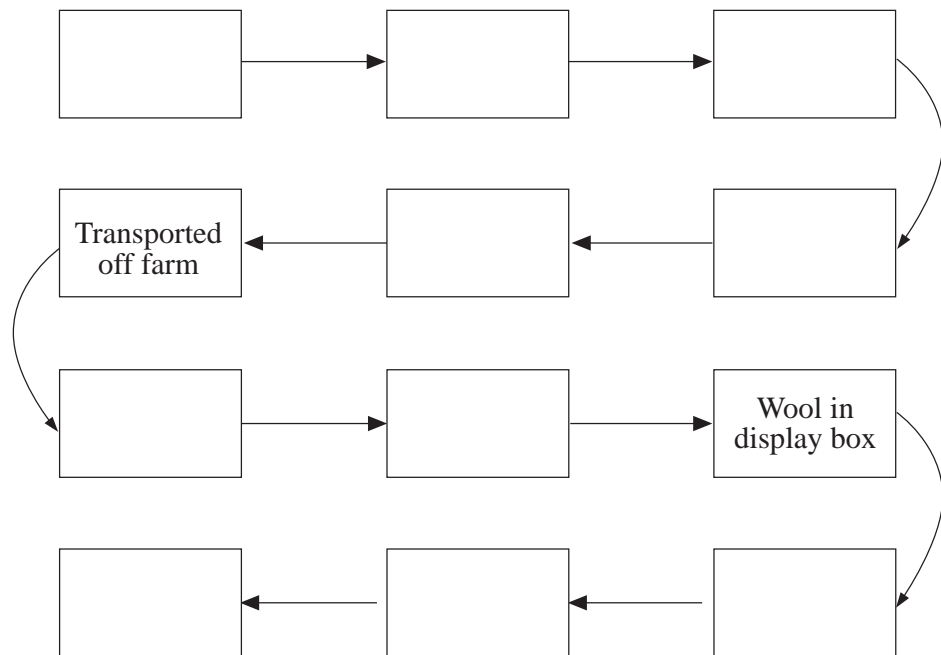
QUESTION 7. (Continued)

(c)   From the list of wool textile manufacturing terms below, select the most appropriate for the statement in the table, and write the term in the space provided.

- Fellmongering
- Weft
- Weaving
- Scouring
- Drawing
- Backwashing
- Gilling
- Warp
- Carbonising
- Spinning
- Carding
- Combing
- Twisting
- Dyeing
- Yarn

Statement	Term
Introduces a permanent twist, and reduces the thickness of the yarn	
Separates the short from the long fibres	
Thread that runs along the length of cloth in the loom	
Two sets of yarn interlaced at right angles to each other to form a fabric	
The process of washing wool	
Lays the fibres nearly parallel, to form a soft rope called a sliver	
Slivers are blended together to obtain a sliver of even thickness and with the fibre lying parallel	
The thread formed at the completion of the spinning process	
Removal of heavy amounts of vegetable matter from wool	
Removal of wool from a pelt	

SECTION III
ESSAYS ON SHEEP HUSBANDRY AND WOOL TECHNOLOGY

(30 Marks)

Suggested time: 30 minutes per essay.

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

Both 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)　　(i)　Describe the characteristics most typical of the breeds of sheep listed below.

　　　　　Include in your answers:

　　　　　1．　wool characteristics;

　　　　　2．　carcass characteristics;

　　　　　3．　reproductive performance.

　　　(ii)　Explain the role of each breed in the wool and/or meat production systems in NSW.

　　　　　1．　Medium Merino

　　　　　2．　Poll Dorset

　　　　　3．　Tukidale

　　　　　4．　Corriedale

　　　　　5．　Border Leicester

OR

QUESTION 8. (Continued)

(b)   Farmers in western NSW wish to improve the overall quality of their wool-clip.

Select FIVE of the following wool faults growers may encounter.

- mineral matter
- vegetable matter
- unscourable colour
- urine stain
- doggy wool
- staple strength
- fleece rot
- flystrike
- cotted wool.

For each selected wool fault, discuss the role (if appropriate) of

　(i)   grazing management;

　(ii)   sheep husbandry operations;

　(iii)   sheep selection;

　(iv)   shearing shed management;

in improving the overall quality of the clip.

QUESTION 9

EITHER

(a) Farmers keep many types of records on-farm.

These include:

- wool book
- tally book
- break-even budgets
- lamb plan data
- farm diary
- classes specifications
- gross margin analysis
- rainfall chart
- Merino ram progeny tests
- stud flock returns.

Choose FIVE of these and describe

(i)   the information contained in each;

(ii) how the information is gathered;

(iii) the purpose and benefit of the information to the farmer;

(iv) the purpose and benefit of the information to the industry.

OR

(b) You have been employed as a salesperson to promote wool to a wide range of business people throughout the world. Describe the characteristics, attributes, and benefits of wool that you would stress in promoting it with a view to increasing sales.

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