

POSSIBLE ANSWERS FOR :
APPLIED AGRICULTURAL SCIENCE

SECTION A
QUESTION 1

- | | | | |
|-----|-------|--|-------|
| 1.1 | 1.1.1 | Long - narrow - slight hollow - mouth broad - horns not too big | [5] |
| | 1.1.2 | Thin - longish - well attached | [3] |
| | 1.1.3 | Narrow - thin - good connection to hump - firmly joined - no looseness | [3] |
| 1.2 | | Ancestors
Phenotype of animal
Progeny
Relatives | [4] |
| 1.3 | 1.3.1 | Effective measure against spreading venereal diseases
Economic method of breeding
Reliable method
Rapid method improving herd
Obtaining semen outstanding bulls
Larger progeny obtained
Freezing semen | [7] |
| | 1.3.2 | Diseases spread if semen is infected
Limited no of bulls
Inexperience may cause injury
Inbreeding may occur
Undesirable characteristics may spread | [5] |
| 1.4 | 1.4.1 | Cards caught between jaws
Closure crush cards
No damage to skin
One card at a time
Guard against slipping out | 4 |
| | 1.4.2 | Secure calf on its side
Nip of unwanted teat
Using sterile surgical scissors
Dress the wound | 4 |
| | 1.4.3 | Has economic value
Eliminate injuries
Four weeks old can be dehorned
Bolt is heated
Almost red hot
Pressed over bud three seconds | 4 |
| 1.5 | | Use plastic containers
Keep containers covered
Optimum fermentation temp 10-21°C
Add preservatives | .../2 |

Stir daily
 Don't add bloody colostrum
 Mastitis milk may be added
 Feed sour colostrum within a month
 Can be mixed with a milk substitute
 Can be diluted 2-3 parts on 1 part water

10

- 1.6 Breed
- Lactation
- Age
- Feeding
- Oestrus
- Gestation
- Diseases
- Inefficient milking
- Number milkings
- Exercise
- Climate

[20]

1.7 FEEDS

ROUGHAGES

CONCENTRATES

DRY

JUICY

RICH PROTEIN

POOR PROTEIN

PROTEIN RICH
 POOR IN PROTEIN

PROTEIN RICH
 POOR IN PROTEIN

[11]

- 1.8 Done some time each day
- Animals driven slowly
- Feeding before milking
- Quarters may be washed
- Milking done same people every day
- Milker must be clean
- No noise
- No smoking
- Teat dip must be applied

[10]

- 1.9 Umbrella shelter
- Movable calf pen
- Indoor pens
- Indoor standing crates

[4]

- 1.10 Sour tastes
- Shrub tastes
- Fodder tastes
- Tastes due to udder disorders
- Stuffy taste dirty cans
- Absorbed taste.

[6]

..../3

QUESTION 2

- 2.1 Near a market
Near clean water
Slight slope
Light breeze
Secure against theft
Erect in such a way - slop face north [6]
- 2.2 Preparation
Temperature
Ventilation
Lighting
Litter material
Disease control [8]
- 2.3 2.3.1 Coarse and worn
Moults at a late stage
Stop laying for short time
Moults and resumes 4
- 2.3.2 Back wide and flat
Chest braod
Breastbone long and straight 4
- 2.3.3 Strong
Broad without excessive fat
Eyes big-prominent and clear
Beak short strong 4
- 2.4 Breed differences
Egg size
Differences in sex
Heterosis or hybrid vigour
Inbreeding
Feeding
Management [10]
- 2.5 Posistion of eggs
Preferably they should be turned
Temperature
Relative humidity
Air flow [10]
- 2.6 Wheather conditions
Crates
Time
Handling
Vaccination
Age
Tranquillisers

- 2.7 Light weight
 Medium particle size
 Highly absorbent
 Dry rapidly
 Soft and compactable
 Low thermal conductivity
 Absorb little moisture from atmosphere
 Must be cheap
 Use as fertilizer 14
- 2.8 Except the first 2 days
 24 hours light is not recommended
 Do not reduce daylight length with hens in production
 Light intensity should not be reduced during switch over
 From growth to production
 Keep light bulbs clean
 Obtain a sunrise and sunset chart
 Total light-hours refers to the sum of natural and artificial light [5]
- 2.9 Deep and dark
 Material must not easily scratched cut
 Easy for hens to reach
 Not too low
 One nest for every four hens
 Open nest should be fitted with durable washable curtaining (8)
 Regular cleaning
- 2.10 Extra large > 61 g
 Large 51 g
 Medium 43 g
 Small 43 g 5
- 2.11 Temperature too high
 Eggs not turned properly
 Poor nutritional conditions
 Poor air conditioning
 Disease conditions breeding hens
 Too high moisture content
 Breeding hens too old [7]
- 2.12 Handle more easily
 Early cannibalism prevented
 Does not disturb vaccination
 Cheaper
 Less stress
 Efficiency of food consumption improves
 Viability improves
 More uniform growth
 Ample time to correct [7]

QUESTION 3

- 3.1 The plain - no visible transverse frontal folds in full fleece. Small wrinkles after sheering.
- Light and medium. Front types.
Subtypes (1) light types one or two transverse frontal types
Small body wrinkles.
- (2) Medium front type - two or three medium transverse frontal folds
small body wrinkles full fleece
- Full front type - three medium heavy to heavy transverse frontal folds
body folds visible in full fleece
pleats on tail
- Over developed type - excessive development in number and size on front and body
unsuitable for sheep farming [12]
- 3.2 Knockknees, cow hook, sickle hooks, hooks too straight, weak pastern joints, widely split hoofs,
sandy leap, black hoofs [7]
- 3.3 3.3.1 fertility material characteristics and milk production of the ewe flock - directly
associated with weaning percentage
- 3.3.2 high lambing percentage -
multiple births are essential
qualifications
- 3.3.3 selection of fertility
select against ewes with poor milk production, spoiled udders and poor mothering
characteristics
- 3.3.4 it is extremely undesirable annually to select for conformation and wool characteristics
ewes that have weaned lambs
- 3.3.5 with increasing age, depending on feeding conditions there is a decline in wool and
milk - eliminated at age of 6 years
- 3.3.6 old ewes must be withdrawn and market - contribute to meat market
- 3.3.7 systematic selection must be applied to ewes in a breeding program - according to
fertility, milk production, material characteristics [14]
- 3.4 Maintenance of her physical reserves
Production of wool
Building up of physical reserves
Development of her udder so that sufficient milk can be produced
Supplying of nutrients so that the foetus can develop [5]
- 3.5 3.5.1 It is necessary to earmark sheep to identify the sheep
Also able to keep record
Records is useful for breeding /6

- Small tag with number
Registration in the case of pedigree animals [5]
- 3.5.2 Done to prevent blow flies from laying eggs around the tail
A short tail or no tail will also help with mating
Done at age of 1 to 2 months
Rubber rings are used [5]
- 3.5.3 Regular inoculation is done
Protect sheep against diseases
Different diseases in particular region
Blue tongue, pulpy kidney [5]
- 3.6 Causes by virus
Recently three new strains have been identified
Transmitted by midges
Has seasonal incidence
Mid summer to autumn
Occur during good rains
Will also appear during hot conditions
During hot and wet weather large number of midges hatch in vleis, rivers, dams
Transmitted when midges which are infected bite and feed on healthy sheep [8]
- 3.7 Report the matter
Notify the owners of any other sheep on property
Notify his neighbours
Isolate such sheep
Prevent access to such animals
Refrain from removing any sheep
Prevent such sheep from straying
Maintain a register
Comply with the instructions of the state veterinarian [10]
- 3.8 Starts by clipping cheeks and top knot
Short wool above the knees and greasy wool around the pare parts
Slips the belly wool
Clips the rest of the fleece
Starts from right front leg
Continuous to the back of the right ear
Cleans the neck
Shear the left side
Then the right side [8]
- 3.9 Remove lose and short pieces
Pul off all the seedy broken bits from the breeches shoulders
Remove all the short pieces
Remove all hairy breeches
Make sure no belly wool is still attached
Remove all the malted pieces [6]
- 3.10 Use letter stencils
All marks at least 38 mm high7

Must be marked on the end opposite the opening flap

Each bag of wool must be clearly marked with the name or registered trade mark - also address

The class of wool indicated by class symbol

[8]

3.11 Supply supplementary feeding

Allow a few culled ewes to graze with them

Weaning the older lambs first

Do not pen them overnight

Keep them on pastures they are used to

Do not change the grazing or feeding program

Not over loading the grazing

[7]

QUESTION 4

4.1 Main stalk stem

Beard

Bract

Guide cell

Internode

Node

Bud

Earstem

Leaf sheath

(9)

- 4.2 4.2.1 9 physiological maturity
 4.2.2 3 twelve leaves stage
 4.2.3 8 hard dough stage
 4.2.4 7 soft dough stage
 4.2.5 0 planting to seed emergence
 4.2.6 2 eight leaves
 4.2.7 4 sixteen leaves
 4.2.8 5 silk appearance and pollen

[8]

4.3 Texture

Structure

Bulk density

Porosity

Hydraulic properties

(6 x 2) [12]

- 4.4 4.4.1 Weed control
 Incorporation of residues
 Reducing wind and water erosion
 Improving soil structure
 Loose the control

(6)

- 4.4.2 Control weeds
 Preparing seedbed

[3]

4.5 No till

Stubble mulch tillage

Reduce tillage

..../8

Conventional tillage

(4 x 3) [12]

- 4.6 4.6.1 Planting date can be determined by temperatures - climatic conditions
 Planting can commence as soon as groundwater and soil temp are sufficient
 Minimum air temperature 10°C to 15°C for five to seven days
 Occurrence of mid summer drought from mid Dec to mid Jan play important role [5]

- 4.6.2 Varies 5 to 10 cm
 Depending soil type
 Planting date
 Shallower in heavier soils
 Planted early - planting can be shallower [4]

- 4.7 2 : 3 : 2 (21)
 N P K
- N $\frac{2}{7}$ of 21 = $21 \div 7 \times 2 = 6$
- P $\frac{3}{7}$ of 21 = $21 \div 7 \times 3 = 9$
- K $\frac{2}{7}$ of 21 = $21 \div 7 \times 2 = 6$

- 4.8 Wetting agents
 Adhesive agents
 Penetrators
 Suspension agents
 Buffers
 Droplets (6 x 2)[12]

- 4.9 4.9.1 Eat holes in the seed
 Damage kernels at tip of maize ear
- 4.9.2 Smutted ears appear round and lack silks
 Large black spore mass
 Spikelets on tassels
- 4.9.3 Develop alternating dark and light green stripes
 Spread from leaves to all plants
 Plants appear yellow-green
- 4.9.4 Leaf damage
 Holes into ear [8]

- 4.10 4.10.1 If plant too deep don't emerge
 Mesocotyl may open below soil
 Seedling may die off
 Too much fertiliser may burn the roots

4.10.2 Drift sand damage
Hail damage
Frost damage
Water logging may occur

4.10.3 Nutrient deficiencies will restrict leaf growth
Hail damage
Water logging

[9]

QUESTION 5

5.1 If origin is unknown it should be sterilized
Disinfectants are suitable for use only when the disease organisms are carried on the seed-coat
Use hot water
Place bags in water
Add boiling water
Correct temperature should be maintained
Transfer to cold water
Plant immediately
If not spread out to dry

[8]

5.2 5.2.1 Sandy loam
High humus
Clay which compact unsuitable
Well drained
Deep
Sensitive to acidity

(5)

5.2.2 Almost any type soil
Prefer fertile loam
Plant after heavily manured
Light application of lime

[5]

5.3 Ensure enough water
Protect against too high or too low temperatures
Erect shelters
Alter programme of planting to eliminate hail

(4)

5.4 Main crop should be selected with care - be suited to the areas
Include crops which permit the frequent use of the cultivator -
Destroy weeds
Include kraal manure or compost
Maintain the fertility
Include a legume
Increase nitrogen in the soil
Deep rooted and shallow rooted crops should be planted
Draw food from different levels
Crops of the same habit of growth should not follow

[12]

5.5 Rob the cultivated crops of moisture
Rob the cultivated crop of nutrients
Smother young plants

..../10

- Retard growth
Reduce production
Breeding place for insects [6]
- 5.6 5.6.1 Dark black areas on leaves
Spreading to stem
- 5.6.2 Holes in leaves
Many small caterpillars
- 5.6.3 Silvery streaks on raised patches on lower surface of leaves
- 5.6.4 Silvery streaks on leaves
Small white insects at base of leaves
- 5.6.5 White powdery growth on leaves when plants are old [10]
- 5.7 Picked when pods are still young
Before seed in the pod is fully developed
If picked when young plants remain in production
Up to six pickings
Market in packets 10 kg
Sugar bags 20 kg
Only new clean bags may be used [6]
- 5.8 Combat weed - lice live on weed - new generations are produced
- Destroy isolated infested plants
Infestation does not take place on a large scale immediately
Examine crop - pull out infested plants
They should be banded or burnt
- Spraying of metasytox - systematic insecticide - absorbed by the leaves penetrates the tissues
As soon as lice suck the juice they die [12]
- 5.9 Plant healthy tubers
Disinfect tubers with chloride of mercury - leave for 1½ hours in solution
Avoid infected soil - spores remain
Apply crop rotation - crops which are not susceptible - crops which are not susceptible to the disease
Application of sulphur - fungus develops very poorly in acid soil
Avoid fertilizers such as lime and Karoo manure - they sweeten the soil and create favourable conditions [12]
- 5.10 Remove seedlings carefully
Remove in the same way as cauliflower
Remove only for one day
Do not damage roots
Wrap in moist bags
Select and plant only healthy strong seedlings
Field should be harrowed to obtain fine surface /11

Drop seedlings at each spot
 Second person plant
 Rows 1 metre apart and plants
 Use handspade to dig hole
 Press down the soil
 Make little dam around each plant
 Water thoroughly [12]

- 5.11 -Cultivate tomatoes on soil not infected
 Remove infected plants
 Insect control
 Apply crop rotation
 Make use of resistant plants
 Sterilized seed (6 x 2)[12]

QUESTION 6

- 6.1 6.1.1 Cutting is a critical stage of lucerne for seed production or fodder production
 When grown to a certain stage new stems starts to grow
 Harmful to cut this new growth
 Cut before new growth starts
 ± 10% flower stage [3]
- 6.1.2 Use side delivery rakes to get cut lucerne into windrows
 If wheather permits it may be done when still well
 When in windrows and it rain it may rot
 Baling care should be taken to minimize leave loss. Value lies in leaves
 Different makes of balers
 Popular one is the square baler
 Do not bale when to wet [5]
- 6.2 6.2.1 Very critical after cutting
 Beginning of new season
 Energy is stored in the form of carbohydrates
 Should have been stored in the roats
 Sufficient moisture should be available [4]
- 6.2.2 Should be cut when new shoots emerge
 If crown have grown out enough
 ± 10% flower stage
 Do not cut to short [4]
- 6.3 1 st grade - sound, sweet cool, well matured, dry, peagreen, not more than 3% grasses
 2 nd sound sweet, cool and well matured, dry, peagreen, not more than 10% grass [6]
- 6.4 Large variety of soils
 Deep well drained soil
 Sandy loam
 Good fertility
 High potassium content
 Neutral to slightly alkaline pH [5]

6.5 Temperature of the day
Quantity of lucerne
Method of cutting
Humidity of the air
Irrigation before cutting
Length of the day

(6)

6.6 Grow in most climatic regions
Do not grow when it is too cold
Do not want frost
Roots will regrow as soon as it becomes warmer
Needs a lot of water
Risk of rain during cutting and baling
Loss of production and quality
Hay cured in drier areas gets a premium price

[8]

6.7 Sound conservation measures
Danger for water and wind erosion
Prevent run-off - soil loss and seed loss
Protect fields against erosion
Make contour banks
Prevent excess water from rushing down
Subdivisions of long slopes
Should be suitable for the area
Depressions in contour often give rise to water logging
Wet patches also affect hay making
Soil prone to wind erosion require special protection
Plant wind breakers
Reduce compaction of soil
Control weeds
Moderately deep tillage is required
Primary tillage 200 mm
Followed up by a number of secondary tillage with disc

[12]

6.8 High crude-fibre content
Amino-acid composition unsuitable
Great variation in quality
Uneconomical

[4]

		Pest	Control measure
6.9	6.9.1	Lucerne earth flea Small greyish-white insect. Jump into air when disturbed. Found under moist conditions. Feeds on stem.	Sprayed when observed, in early spring or autumn. Use mercaptotion. (5)
	6.9.2	Black sand mite Small soot-like mite with four bright red legs. Found under moist, cool conditions.	Cover spray of omethoate after the first heavy autumn rain and repeat 3 weeks later. (7)
	6.9.3	American boll-worm (mature) Almost black and has long hair. With each moult it becomes lighter. Later dark green with light yellow stripe along the side	As soon as it is seen it must be sprayed with a converting spray (Methomyl) (3)

..../13

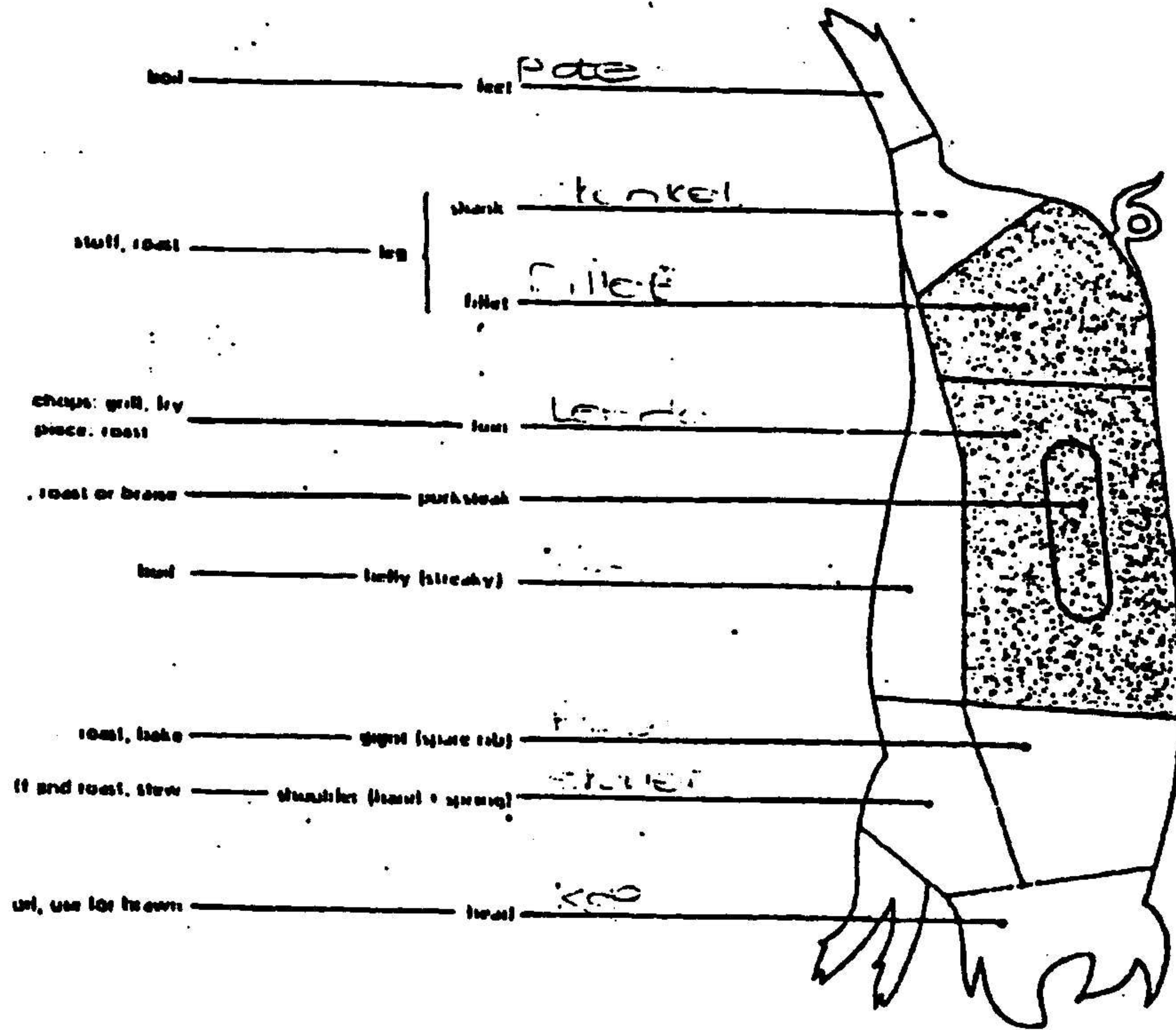
- 6.10 Upington, Hartswater, Douglas, Leeudoringstad, Oudtshoorn, Ladysmith, Prieska, Lutzville [6]
- 6.11 Topography, soil, water source [3]
- | | | | | | |
|------|-----------------------------|------|-------------|---|------------------|
| 6.12 | | 6.12 | Lime | - | neutralised acid |
| | | | Phosphorous | - | ± 30 ppm |
| 6.13 | Medicago saliva | | Nitrogen | - | inoculate seed |
| | Perennial herbaceous legume | | Potassium | - | 30 ppm |
- Produce 10 - 20 years
Replant every 4 to 5 years
Tap root system
First stem develops from growing point between two cotyledons
Crown is base from which all stems develop when cut
Every time it is cut or graze new growth sprouts from the crown
Stems are erect and reach a height of 400 - 600 mm
Stem 6 - 12 internodes
Leaves are composed of three small leaflets on slender petiole
Leaves may vary in shape and size [8]

QUESTION 7

- 7.1 Eggs we eat are not usually fertile - contain all the nutrients a developing chick would need is present
White 58% of the weight
Yolk 31%
Shell 11%
Composition of edible portion of whole egg
Water 73,7%
Protein 12,9%
Fat 11,5%
Ash 1,0% [10]
- 7.2 Liquid eggs may become contaminated with pathogenic and spoilage micro-organisms
May survive in uncooked foods
Or foods given a minimum cooking such as soft scrambled eggs
Salmonella organisms must be destroyed
Heating up to 60°C for 3½ minutes
This treatment has little or no effect on the performance of the eggs
Dried egg whites can be pasteurized to eliminate any recontamination
Dried whites containing not over 5% moisture can be held at 50°C [8]
- 7.3 Close abdominal opening with skewers
Draw thighs close to body and tie
Lace the string along the skewers and tie
Twist the wings so that tips are folded in under the back
Insert skewer through the wings
Draw neck skin over the back [6]
- 7.4 Poussins
Spring chickens
Broilers
Capons/14

- 7.5 Does not contain nutrients in the correct proportion
Too many proteins - too few carbohydrates
Does not aid peristalsis
Completely absorbed
Price varies - according to the locality - and season
Comparatively expensive
Often excluded from diet of lower income groups
Not expensive if compare with other protein containing foods
Only filling for the moment [8]
- 7.6 Do not leave milk bottles standing in sunlight
Should be packed in bottles or cans
Leave bottles sealed if possible
Transfer to clean milk jugs
Should be kept cool - refrigerator
Do not store near strong-smelling foods [5]
- 7.7 Buy from reputable dairy
Clean containers before pouring in milk
Cover containers
Do not add fresh milk to a previous supply
Do not store with strong-smelling foodstuffs
Bring bottles of milk indoors
Wash bottles before putting into refrigerator (7)
- 7.8 7.8.1 If too thick fat globules cannot move easily
Will not form butter granules
Sometimes will form very quickly from thick cream - this is a fatty mass
Will not keep well - much of fat goes to waste in the buttermilk (4)
- 7.8.2 Churning will take a very long time
Final result may not be all that good
Ideally the cream should have a fat content of 33%
Practise should teach one what the liquid should look like
Better to be too thin than too thick (4)
- 7.9 It is an extremely concentrated food
Large quantity of fat forms a layer around the casein
Fatty acids irritate the digestive tract
Age and texture of cheese affect its digestibility [4]
- 7.10 Cut into meal-size portions
Cut steaks and chops to prevent curling
Divide into separate smaller quantities
Saw away any unnecessary bits of bone (4 x 2)[8]
- 7.11 Very lean
Lean
Medium
Fat
Moderately over fat
Excessively over fat [6]

7.12



[9]

7.13 7.13.1 Bacon, corned beef, spiced beef, sausages, brown pate, terrine, meat pie

[6]

7.13.2 Affal, liver, kidney, heart, sweetbreads, brains, tripe, oxtail feet

[8]

TOTAL : [100]