education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

EXEMPLAR 2009

MARKS: 150

TIME: 2½ hours

This question paper consists of 21 pages and an answer sheet.

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INSTRUCTIONS AND INFORMATION

1. This question paper consists of FOUR questions. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read ALL the questions carefully and make sure you answer what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Write neatly and legibly.

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SECTION A

QUESTION 1

1.1 Various options are provided as possible answers to the following questions. Choose the correct answer and make a cross in the block (A – D) next to the question number (1.1.1 – 1.1.10) on the attached ANSWER SHEET. NO marks will be awarded if more than one cross (X) appears for an answer.

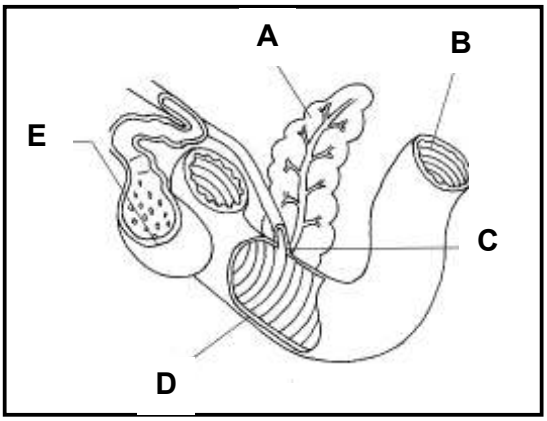
Example:

1.1.11	~~A~~	B	C	D

1.1.1 Nutrients in feeds are digested in the alimentary canal through physical and chemical processes. The process by which nutrients are taken in by the small intestine is called ...

A assimilation.
B adsorption.
C absorption.
D digestion.

1.1.2 The duct labelled C opens into the ...



A stomach.
B large intestine.
C proventriculus.
D small intestine.

1.1.3 After a ruminant animal has chewed the cud, it is then swallowed and passed through to the ...

A rumen and reticulum.
B rumen, omasum and abomasum.
C omasum and abomasum.
D reticulum, omasum and abomasum.

1.1.4 In the evaluation of a ruminant ration, the nutritive ratio is determined. A nutritive ratio of 1:7 in a ration is ...

A ideal for growth.
B narrow.
C wide.
D ideal for production.

1.1.5 The crude protein value of a feed is calculated by using the nitrogen content of the feed. This value represents the …

A true protein value of the feed.
B non-protein nitrogen value of the feed.
C true protein and non-protein nitrogen value of the feed.
D amino acid composition of the feed.

1.1.6 The desired digestible protein value (DP) of a feed is 14%. Feed A has a DP value of 16% and feed B a DP value of 9%. Determine the ratio in which parts of feed A and Feed B need to be mixed to get the desired DP value.

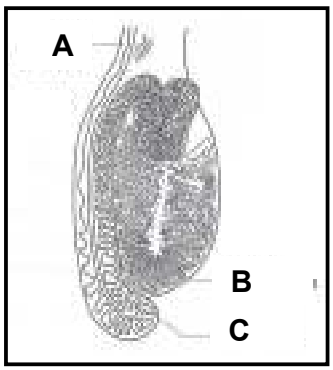
A Feed A: 5 parts and Feed B: 2 parts
B Feed A: 4 parts and Feed B: 3 parts
C Feed A: 3 parts and Feed B: 4 parts
D Feed A: 2 parts and Feed B: 5 parts

1.1.7 The following materials were used to construct an animal handling facility to keep farm animals in an excluded rural area of the country. Which materials would be most suitable for this animal handling facility that is constructed by using indigenous knowledge?

i Wooden poles
ii Steel cables
iii Thatching grass
iv Corrugated iron plates

A i, ii, iii and iv
B i, iii and iv
C i and iii
D ii, iii and iv

1.1.8 The organ labelled B in the diagram below is called the primary reproductive organ of a bull, because it …



A is the largest of the reproductive organs.
B produces the liquid in which the sperm moves.
C secretes all the reproduction hormones.
D produces gametes and testosterone.

1.1.9 The picture below represents a disease condition of the udder caused by bacteria and found in a producing dairy cow. The disease illustrated below is called …

A brucellosis.
B milk fever.
C tetanus.
D mastitis.

1.1.10 The picture below represents the treatment of an acute metabolic disease caused by a severe shortage of calcium in the blood of the milk cow after giving birth. The treatment of the disease below represents a/an …

A dosage with calcium solution.
B insertion of calcium solution in the oesophagus of this animal.
C intravenous injection with a calcium solution.
D inoculation of a calcium solution. (10 x 2) (20)

1.2 In the table below, a statement and two possible answers is given. Decide whether the statement in COLUMN B relates to A only, B only, both A and B or none of the answers in COLUMN A and make a cross in the appropriate block next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET. .

EXAMPLE:

COLUMN A		COLUMN B
A:	Maize meal	an example of concentrate that is rich in protein
B:	Fish meal	

ANSWER:

The statement refers to:			
Only A	**Only B**	**A and B**	**None**
A	~~**B**~~	**C**	**D**

COLUMN A/Answers			COLUMN B/Statements
1.2.1	A	Rumen	fermentation of waste products occurs in this part of the digestive system of an animal
	B	Duodenum	
1.2.2	A	Curled-toe paralysis	vitamin A deficiency disease
	B	Night-blindness	
1.2.3	A	Silage	an example of a juicy roughage
	B	Green fodder	
1.2.4	A	Oestrogen	the hormone(s) produced by the wall of the developing Graafian follicle
	B	FSH	
1.2.5	A	Blowfly	this parasite causes anaemic symptoms in the farm animal when an animal is infected
	B	Liver fluke	

(5 x 2) (10)

1.3 Give ONE word/term for each of the following descriptions. Write only the word/term next to the question number (1.3.1 – 1.3.5) on the ANSWER SHEET.

1.3.1 The soft bag-like enlargement in the oesophagus of a fowl

1.3.2 The energy that is released as heat when a feed is completely oxidised to carbon dioxide, water and gases

1.3.3 The intensive farming enterprise where cattle are kept in a small area and fed for maximum production output

1.3.4 The type of a heifer calf which is part of a twin consisting of a bull and heifer calf combination

1.3.5 The phenomenon where the testes remain in the abdominal cavity

(5 x 2) (10)

1.4 Change the underlined words in the following statements to make them TRUE. Write the appropriate word next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET.

1.4.1 The enzyme in the small intestine of animals which splits the fat molecule is called amylase.

1.4.2 When cattle swallow foreign objects such as nails, glass or bailing wire, these items collect in the abomasum.

1.4.3 The cheapest source of animal feed for the production of wool and meat is a concentrate.

1.4.4 The production of spermatogonia takes place in the epididymis.

1.4.5 Leidig cells are responsible for the feeding and development of sperms. (5 x 1) (5)

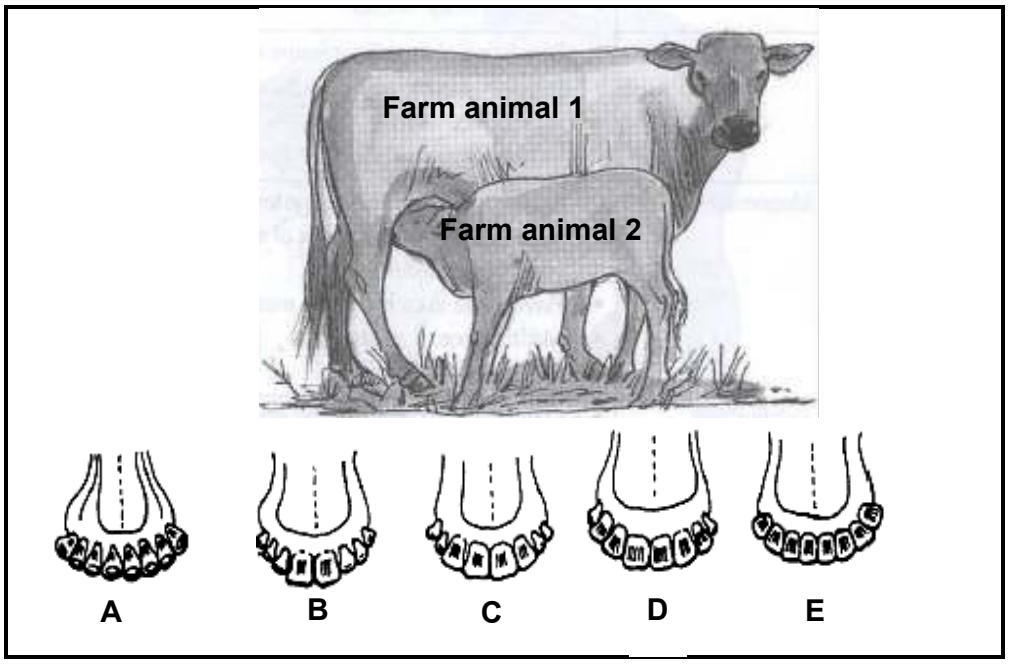
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 2: ANIMAL NUTRITION

2.1 The diagrams below indicate farm animals marked 1 and 2. Farm animal 1 is older than 4 years. Also indicated are diagrams A to E which represent the teeth in the mouths of these farm animals.



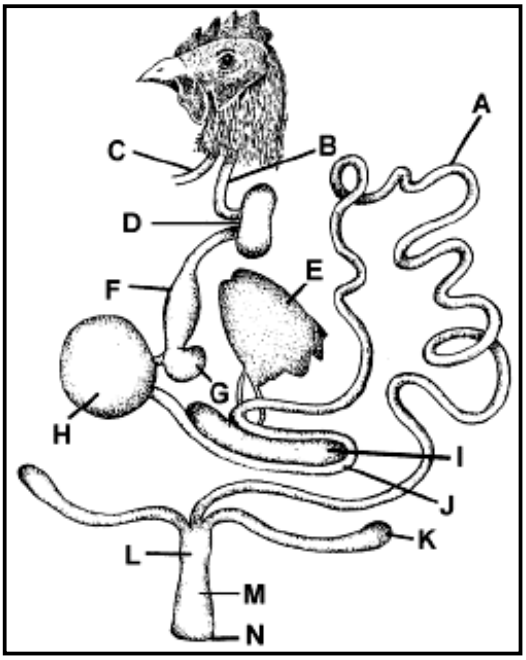
2.1.1 Do these diagrams represent the lower or upper jaws of these animals? (1)

2.1.2 Match the teeth of farm animal 1 indicated above with the teeth marked A to E. Give a reason for your answer. (2)

2.1.3 Briefly describe THREE functions of teeth in the process of digestion. (3)

2.1.4 Indicate the diagram with teeth marked A to E above that matches a farm animal with a poorly developed rumen. Motivate your answer. (2)

2.2 The diagram below represents the alimentary canal of a farm animal.



2.2.1 Identify the farm animal represented in the diagram above. (1)

2.2.2 Name of the parts labelled B, D, F, H and N. (5)

2.2.3 The structure labelled N serves TWO functions. Name these functions. (2)

2.2.4 What is the product produced in E that helps with emulsification of fats? (1)

2.2.5 Give the letter of the part in which the following processes take place:

(a) The grinding of food
(b) The storage and softening of food
(c) The depositing of pancreatic juice (3)

2.3 Identify the nutrient element deficiency associated with each of the following conditions observed in livestock:

2.3.1 A dairy cow chewing a dry bone (1)

2.3.2 A decrease in thyroid action (1)

2.3.3 Increasing the oxygen-carrying capacity of blood (1)

2.3.4 Paralysis of the hindquarters (1)

2.3.5 Bright red skin on the stomach area of pigs (1)

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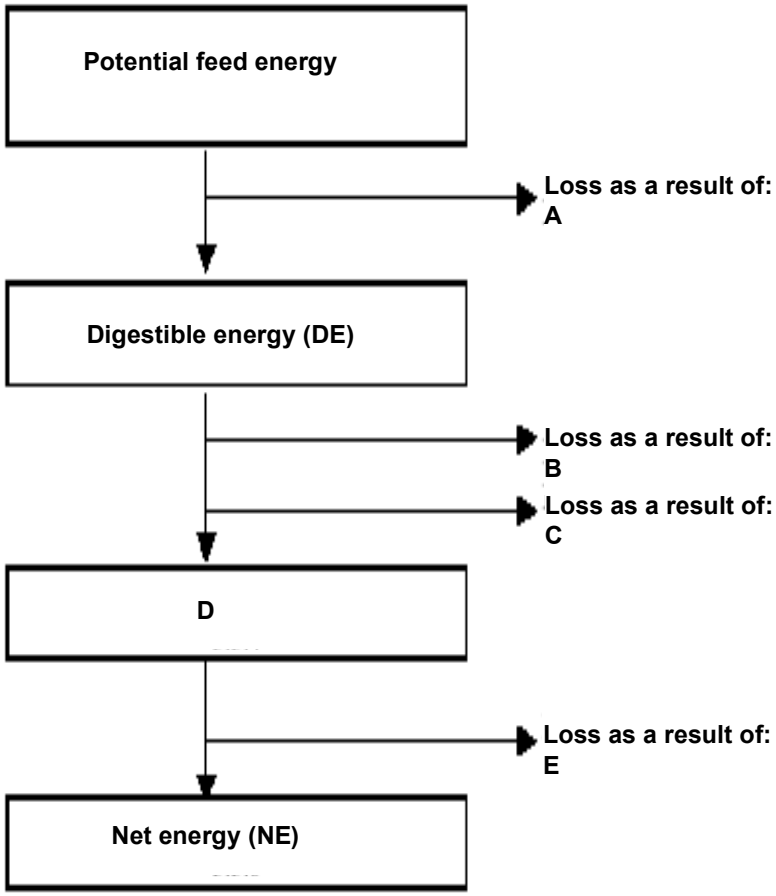
2.4 'The digestive coefficient is that part of a feed that is not excreted but absorbed by the animal.'

The moisture content of the lucerne hay is 10%.
A goat consumed 5 kg of the lucerne hay and 2 kg (dry mass) is excreted in the manure.

Refer to the information above and calculate the digestive coefficient (as a %) of the lucerne hay.

Show ALL the calculations. (5)

2.5 The schematic representation below illustrates the relationship between the different types of energy or measures of energy in a feed. Redraw the schematic representation and complete the missing information indicated by A to E.

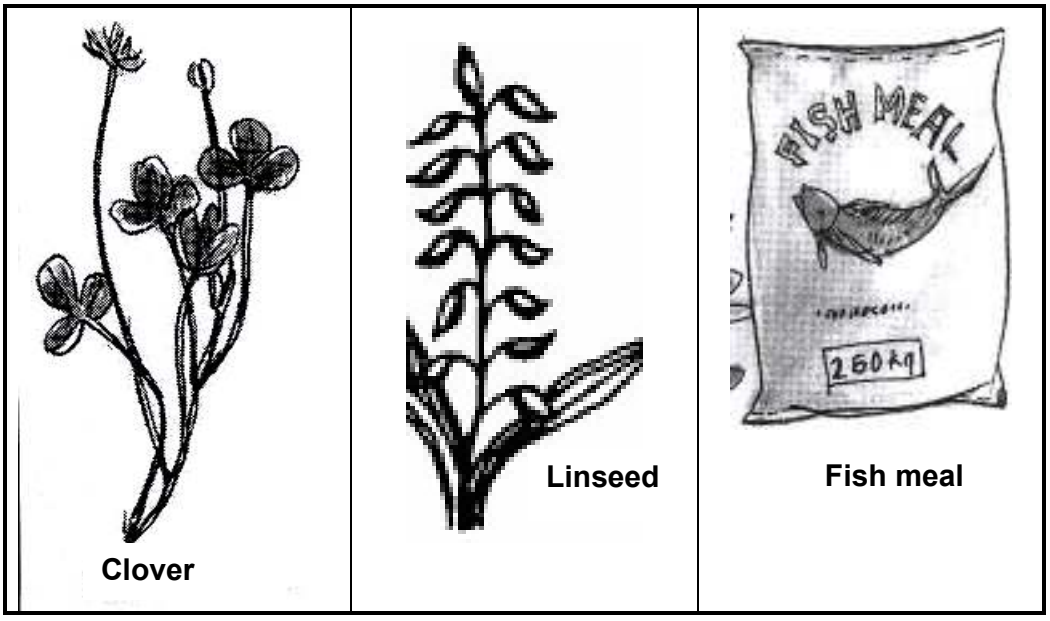


(5)
[35]

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 3: ANIMAL PRODUCTION

3.1 The illustrations below are examples of protein sources used in the feeding rations of farm animals.

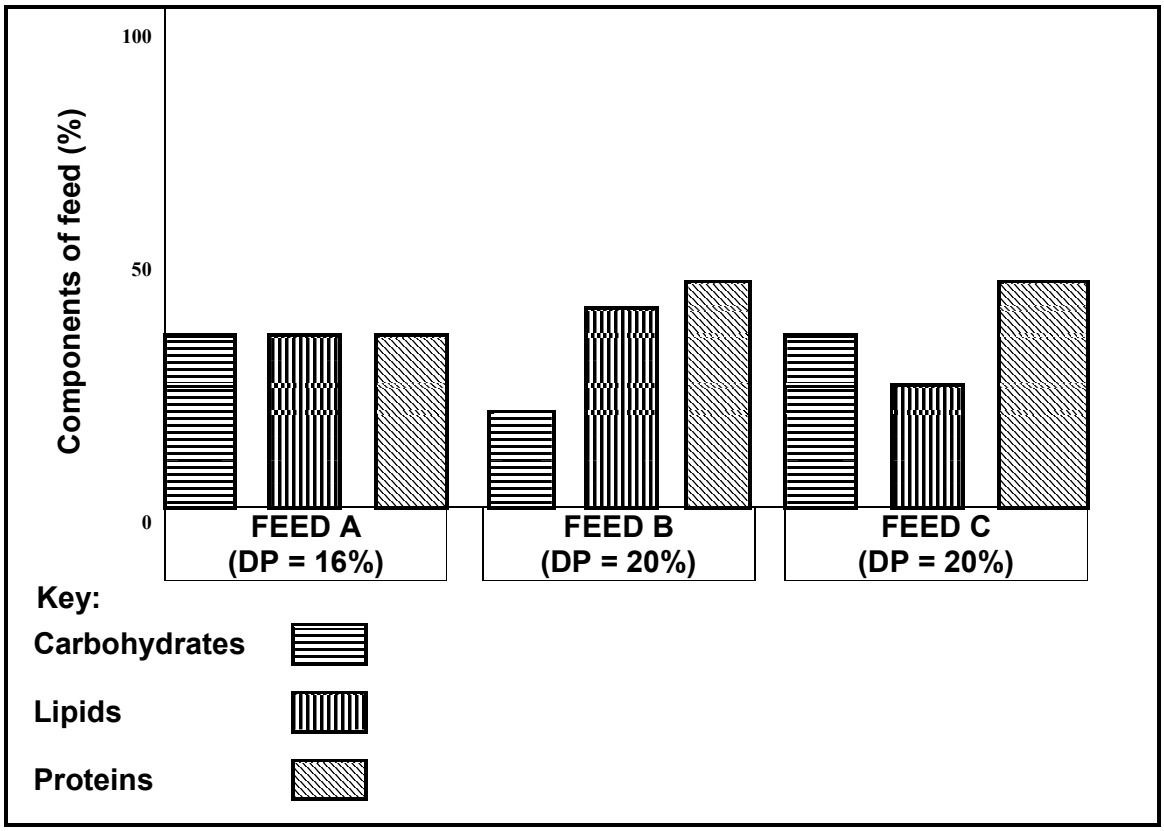


3.1.1 Identify the TWO main types of proteins based on their origin, as illustrated above. (2)

3.1.2 Name the smaller chemical units (monomers) from which proteins are built up. (1)

3.1.3 Indicate the most expensive source of protein from the sources supplied above and give a reason to support your answer. (2)

3.2 Three feeds, marked A, B and C, have been analysed for carbohydrate, lipid and protein content. A digestible protein (DP) value for each feed is also included.



3.2.1 Identify the feed from the ones above which would be most suitable for each of the following situations. Write down only the letter of the feed and give a reason to support your answer.

(a) A well balanced feed for horses in training (2)
(b) A high-energy feed for young growing piglets (2)
(c) A carbohydrate-rich feed for the fattening of old ewes (2)

3.2.2 The dairy farmer mixed FEED A (indicated above) by using maize meal and soya bean meal. The digestible protein content of maize meal is 9% and that of soya bean meal is 40%.

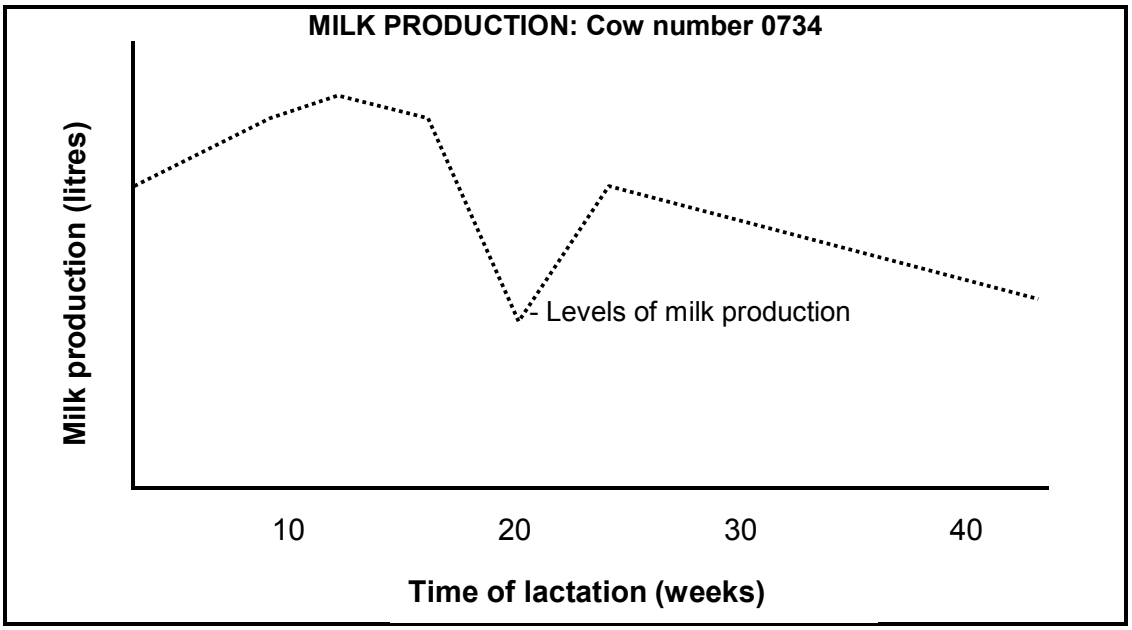
Calculate the ratio in which the maize meal and soya bean meal should be mixed to get to the nutritional value of FEED A. (4)

3.2.3 The following is a list of feeds used on a dairy farm:

Fish meal **Maize meal** **Lucerne** **Silage**

Choose the most appropriate source of carbohydrates from the list provided. Briefly motivate your answer. (2)

3.3 The graph below represents the lactation curve of a cow in a herd that suffered from a common bacterial disease.



3.3.1 The farmer studied the daily milk records of individual cows in the herd. The farmer realised that a cow was suffering from an illness. Explain this statement by referring to the milk record of this cow (0734) indicated above. (2)

3.3.2 Deduce the information from the graph that indicates that this cow was successfully treated. (1)

3.3.3 Briefly explain the effect of this illness on the production of this cow. (2)

3.4 The table below represents the heat production, water, space and ventilation requirements of different farm animals.

Farm animal	Lower critical temperature (˚C)	Optimum temperature range (˚C)	Heat produced (kJ/hour)	Water produced (litre/hour)	Space required (m^2)	Ventilation rates (m^3/min.)	
						Winter	Summer
Dairy cow	2	10 – 15	2 500	0,3	5,5	1,4	5,6
Young calf	10	15	200	–	1,9	0,2	0,6
Piglet	27	27	30	0,0008	–	–	–
Pig (fatteners)	18	15 – 25	400	0,03	0,5	0,1	1,2
Bacon pigs	15	15 – 25	800	0,07	0,5	–	–
Sows	10	10 – 15	1 200	0,1	2,75	0,4	1,7
Chickens (day-old)	21	30 – 35	6	–	–	–	–
Broilers (1 kg)	15	15 – 21	20	0,006	0,06	0,008	0,06
Laying hens	7	10 – 13	40	0,01	0,2	0,06	0,3

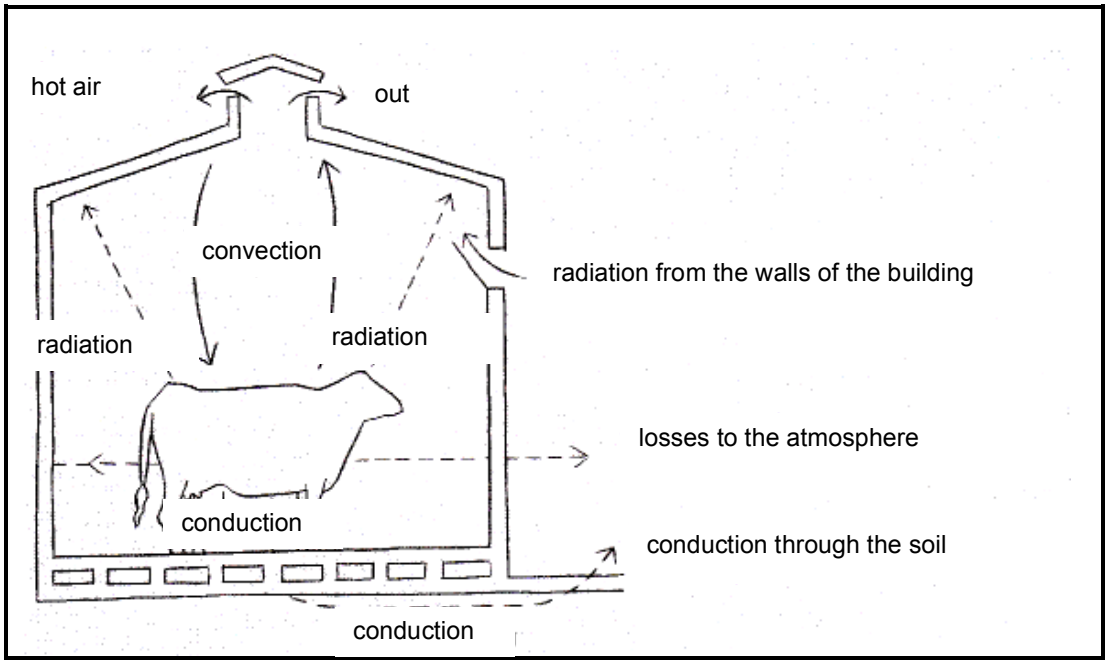
3.4.1 Briefly explain the meaning of the lower critical temperature mentioned in the table above. (2)

3.4.2 Identify the farm animal in the table above that you would describe as being raised most intensively. Give TWO reasons to support your answer. (3)

3.4.3 Deduce from the table above the farm animals that would fit the following descriptors:

(a) Farm animal with the highest critical temperature (1)
(b) Farm animal with the highest heat production per hour (1)
(c) Farm animal that would be the most economic to keep with no facilities (1)

3.5 The diagram below represents heat movement in an enclosure for cattle.



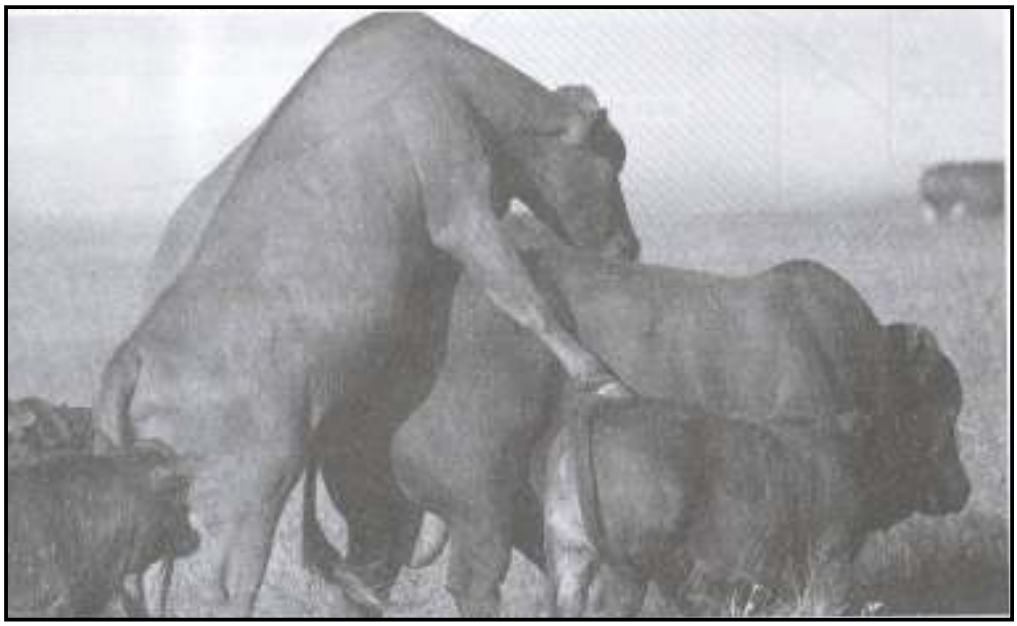
3.5.1 Name THREE processes by which the animal lost heat or gained heat from its body to the environment. (3)

3.5.2 Briefly explain the mechanisms of heat control in this enclosure. (2)
[35]

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

4.1 After a practical investigation of various reproductive organs of female animals in different stages of oestrus, a learner created the following picture in his mind to summarise some of his findings. This picture that the learner created represents a part of the reproductive process of the female animal.



4.1.1 Name a sign visible in the picture above indicating that this cow is on heat. (1)

4.1.2 Indicate the phase of the oestrus cycle illustrated by the picture above. (1)

4.1.3 Give the average number of days that the phase indicated in QUESTION 4.1.2 will repeat itself if the cow was not fertilised. (1)

4.1.4 Name the hormone responsible for the behaviour of the cow. (1)

4.1.5 State a process that occurs closely after oestrus to ensure the presence of the egg cell. (1)

4.1.6 You have observed the behaviour of the cow above. Predict the best time for inseminating this cow and give a reason for your answer. (2)

4.2 The case study below refers to the drying up and resting of cows.

> The ideal milk production system is to have a cow produce for ten months and then rest for two months. The cow is then served or artificially inseminated three months after calving. Milking of a cow is stopped two months prior to calving or when production is too low to be economical.
>
> The rest period allows a cow to restore her body reserves which were broken down during the lactation period. The cow has to be kept in a good condition during the resting period to maintain the restoration period, as well as for development of the foetus. The cow, however, must not become too fat, as it will hinder calving.

4.2.1 How long is the ideal rest period? (1)

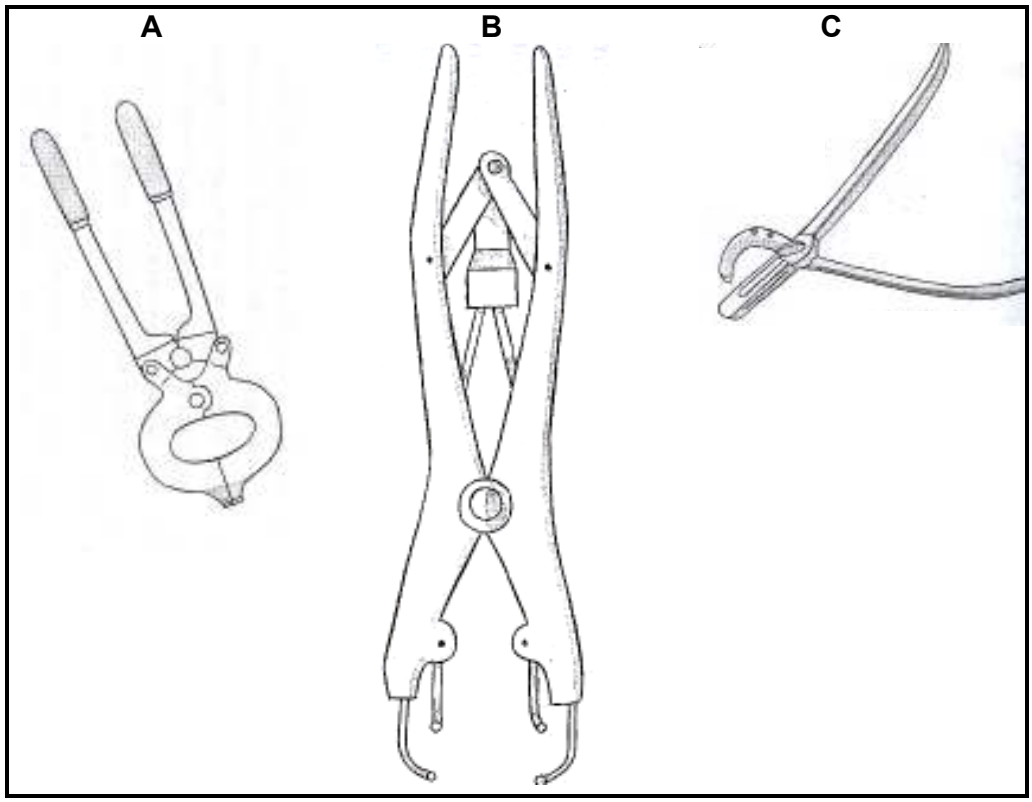
4.2.2 Briefly explain the necessity of the rest period. (2)

4.2.3 What beneficial effect will the rest period have on an unborn calf? (1)

4.2.4 Indicate a precautionary measure that the farmer should take during the resting period. (1)

4.2.5 State the main reason for a more rapid drop in milk production in pregnant cows. (1)

4.3 The pictures below represent the instruments that are used by a veterinarian for a specific purpose in animal breeding.



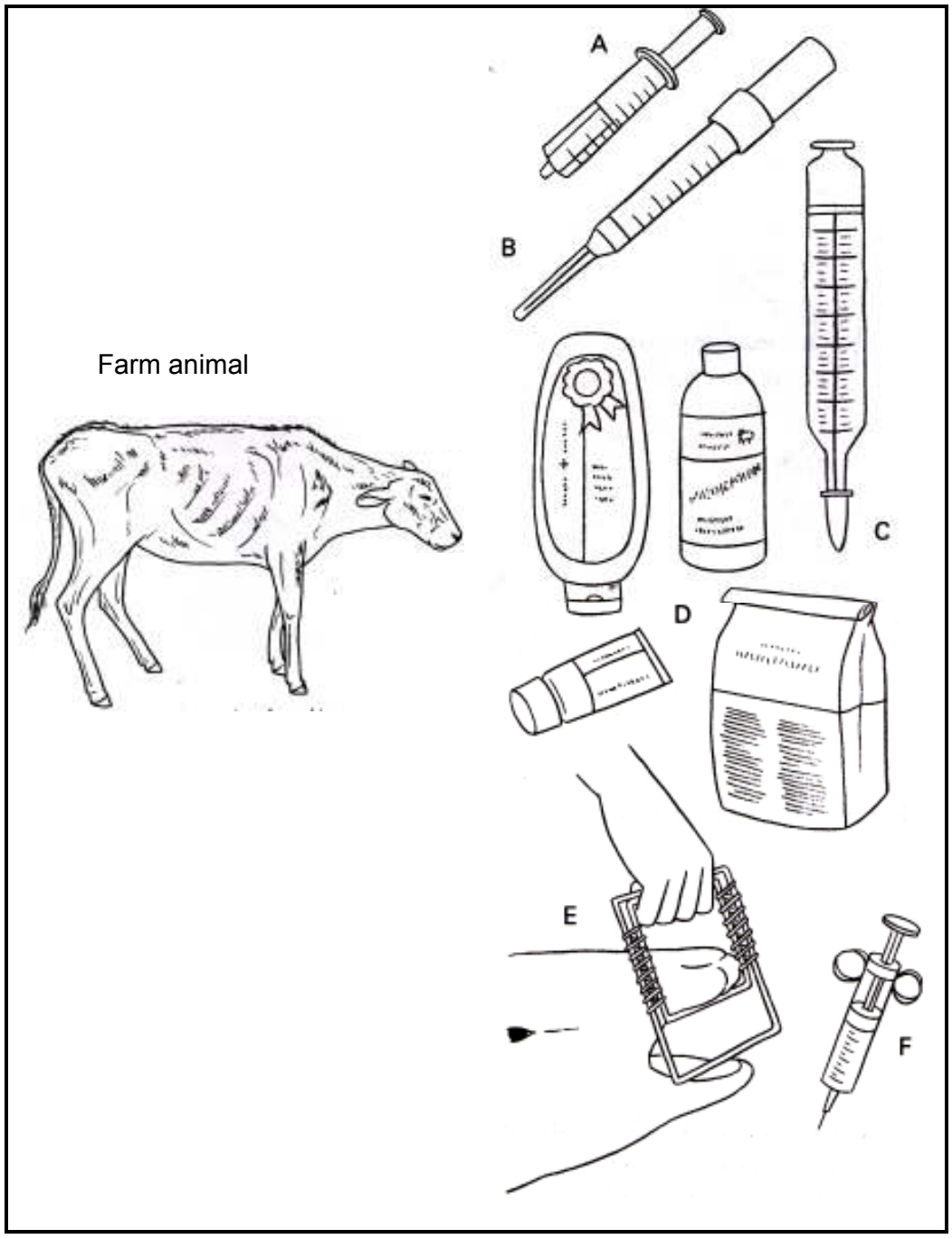
4.3.1 Identify each instrument, labelled A to C respectively. (3)

4.3.2 Explain the main use of these instruments in animal breeding. (1)

4.3.3 Justify, with TWO reasons, why veterinarians prefer to use instrument B rather than instrument A. (2)

4.3.4 Name TWO ways that will ensure that the instruments are sterilised before they can be used. (2)

4.4 The diagrams below represent a farm animal and some basic veterinary equipment.



4.4.1 Identify the state of the health of the farm animal in the diagram above. Motivate your answer by naming TWO signs of health visible in the diagram. (3)

4.4.2 Identify the equipment or medication in the diagrams (A to E) on the previous page that is associated with each of the following. Write down only the letter next to the question number.

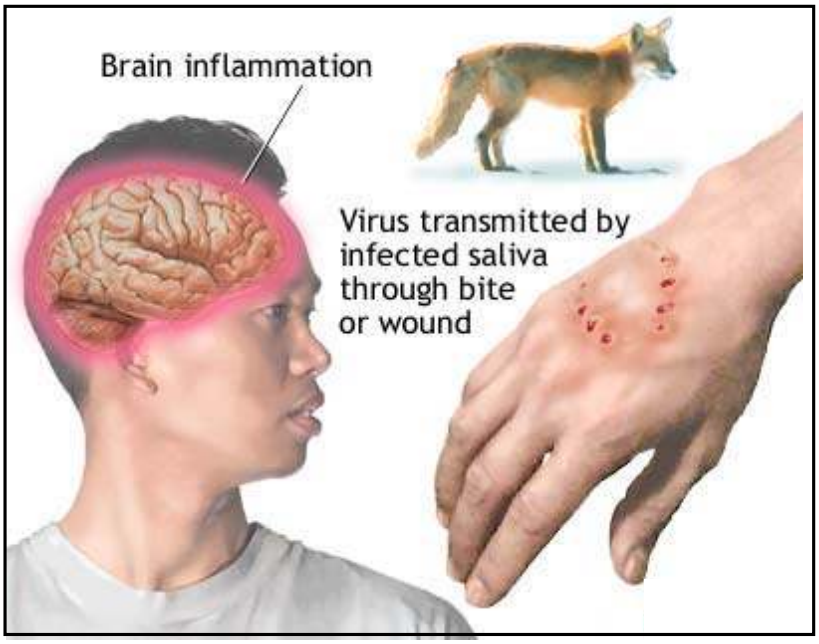
(a) An instrument used to assist the farmer when administering a spoonful of indigenous medication orally (by the mouth) (1)

(b) An instrument used to administer medication into the muscles of the farm animal, for example administering antibiotics (1)

(c) These items are controlled by the Animal Health Act and the Medication Act as it may contain harmful chemicals (1)

(d) An instrument that can be used to determine the state of health of the animal (1)

4.5 The diagram below represents a viral disease that affects farm animals and humans.



4.5.1 Identify the viral disease illustrated in the diagram above. (1)

4.5.2 Briefly describe TWO symptoms of this disease in animals. (2)

4.5.3 Briefly explain the treatment and control of this disease in farm animals. (2)

4.5.4 Discuss TWO health hazards of this disease in the communities. (2)
[35]

TOTAL SECTION B: 105

GRAND TOTAL: 150

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SECTION A

EXAMINATION: NUMBER													

QUESTION 1.1

1.1.1	A	B	C	D
1.1.2	A	B	C	D
1.1.3	A	B	C	D
1.1.4	A	B	C	D
1.1.5	A	B	C	D
1.1.6	A	B	C	D
1.1.7	A	B	C	D
1.1.8	A	B	C	D
1.1.9	A	B	C	D
1.1.10	A	B	C	D

(10 x 2) (20)

QUESTION 1.2

	Only A	**Only B**	**A & B**	**None**
1.2.1	**A**	**B**	**B**	**D**
1.2.2	**A**	**B**	**C**	**D**
1.2.3	**A**	**B**	**C**	**D**
1.2.4	**A**	**B**	**C**	**D**
1.2.5	**A**	**B**	**C**	**D**

QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(5 x 2) (10)

QUESTION 1.4

1.4.1 _____

1.4.2 _____

1.4.3 _____

1.4.4 _____

1.4.5 _____

(5 x 1) (5)

TOTAL SECTION A: 45

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