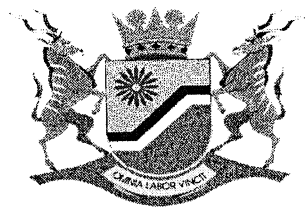


MPUMALANGA PROVINCIAL GOVERNMENT



DEPARTMENT OF EDUCATION

GRADE 12

AGRICULTURAL SCIENCES P1

PREPARATORY EXAMINATIONS 2009

MARKS: 150

TIME: 2½ hours

This question paper consists of 19 pages and an answer sheet.

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.

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.

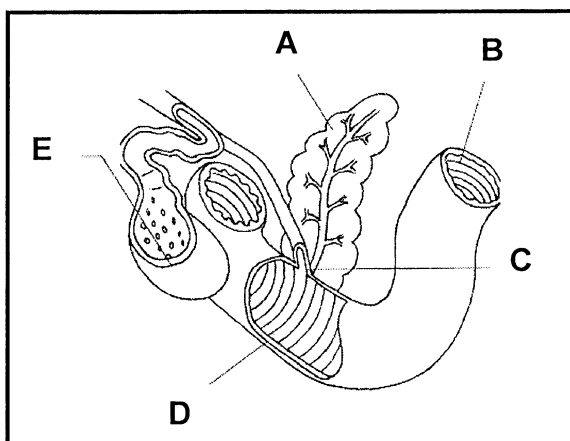
Example:

1.1.11	☒ A	B	C	D
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- 1.1.1 The finger-like outgrowths found in the small intestines are known ...

A proventriculus.
B protrusions.
C villi
D gizzard

- 1.1.2 The part labeled A secretes ...



A bile.
B pancreatic juice.
C gastric juice
D succus inericus.

- 1.1.3 The following parts of the ruminant stomach are underdeveloped in a newly born calf ...

A rumen reticulum and omasum
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 1:5 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 Animal behaviour refers to any action an animal performs in response to its environment. Identify some of the actions that may indicate abnormal behaviour.
- i. Aggressive movements
 - ii. Licking it's fur
 - iii. Feather or body pecking
 - iv. Head nodding or shaking
- A (i), (ii) and (iii).
 - B (i), (iii) and (iv).
 - C (ii), (iii) and (iv).
 - D (i), (iii) and (iv).

- 1.1.8 The secondary male sex organ of a bull is represented by...
- A penis.
 - B testis
 - C vas deferens
 - D epididymis.
- 1.1.9 The disease condition of the udder caused by bacteria and found in a producing dairy cow is called ...
- A brucellosis.
 - B milk fever.
 - C tetanus.
 - D mastitis.
- 1.1.10 One of the following methods can be used to control ticks as external parasites
- A dosage with calcium solution.
 - B dipping
 - 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	The true stomach of a cow
	B	Abomasum	
1.2.2	A	Curled-toe paralysis	Vitamin K deficiency disease
	B	Night-blindness	
1.2.3	A	Green fodder	An example of a juicy roughage
	B	Oats straw	
1.2.4	A	Oestrogen	The hormone(s) responsible for oestrus in mature cows
	B	FSH	
1.2.5	A	Blowfly	Can be controlled through dosing of infected animals
	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 largest compartment of the ruminant stomach
- 1.3.2 The ratio used to determine protein content in relation to other non nitrogen compounds of a feed
- 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 circular gland which is found around the urethra of a bull

(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 mouth of animals which splits the starch molecule into maltose called renin.

1.4.2 The condition whereby the cow goes about and attempt to eat bones is known as ostoemalacia

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

1.4.4 The apparatus used to deposit semen during artificial insemination is a penis

1.4.5 The condition whereby the testes are retained in the abdominal Cavity of a bull is known as spermatogenesis

(5)

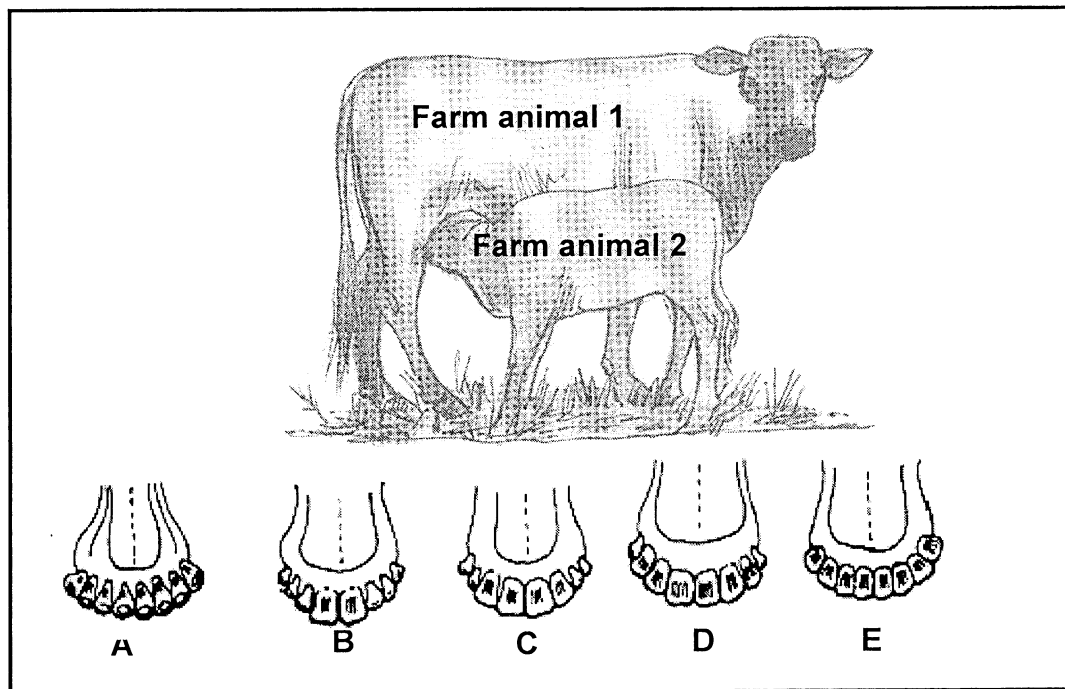
TOTAL SECTION A: 45

SECTION B

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

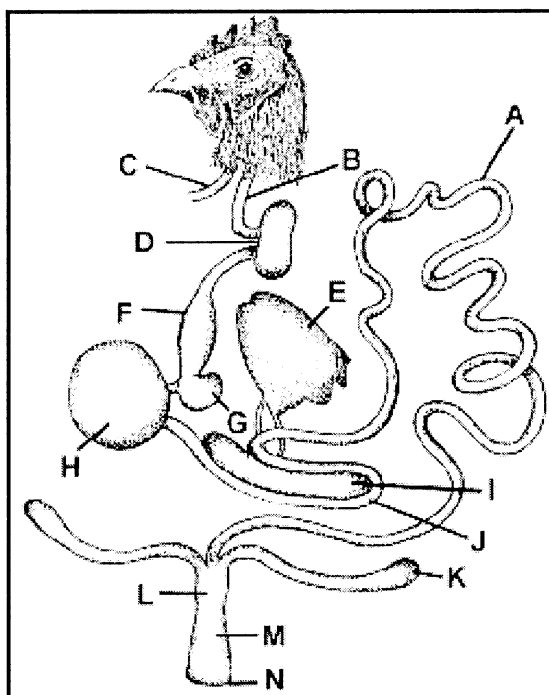
QUESTION 2: ANIMAL NUTRITION

- 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 A, E, I, H and N. (5)

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

2.2.4 Name the letter of a part that is not responsible for the process digestion (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)

- 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%.

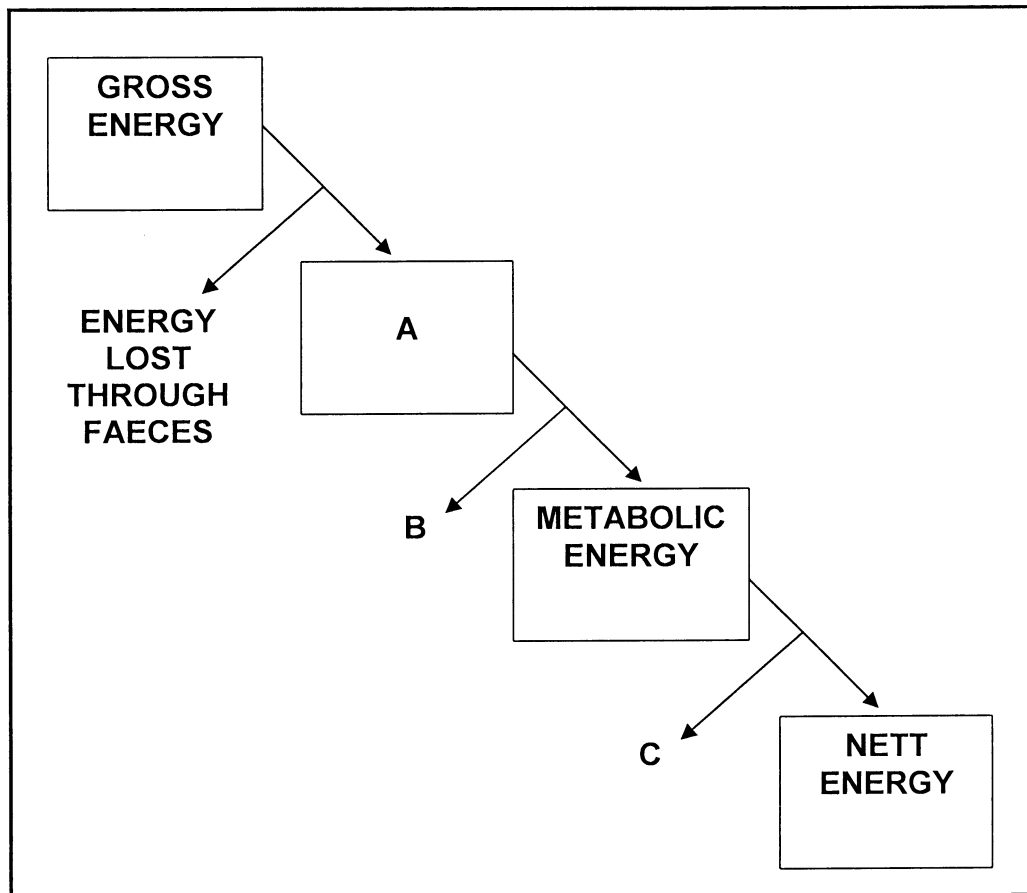
A goat consumed 5 kg of the lucerne hay and 2 kg (dry mass) is excreted in the manure.

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

Show ALL the calculations.

(5)

- 2.5 Below is a schematic presentation of energy values of a feed.



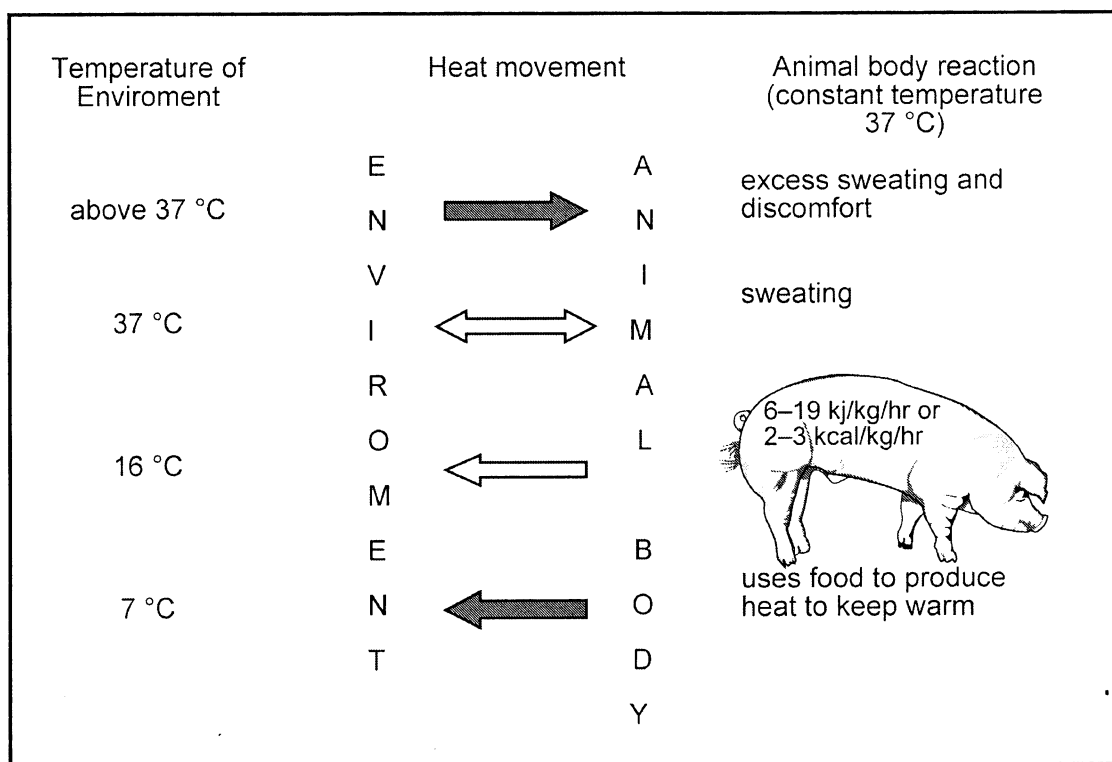
Discuss the utilization of energy in the ruminant body with specific reference to the factors represented by the symbols A, B and C.

(5)

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

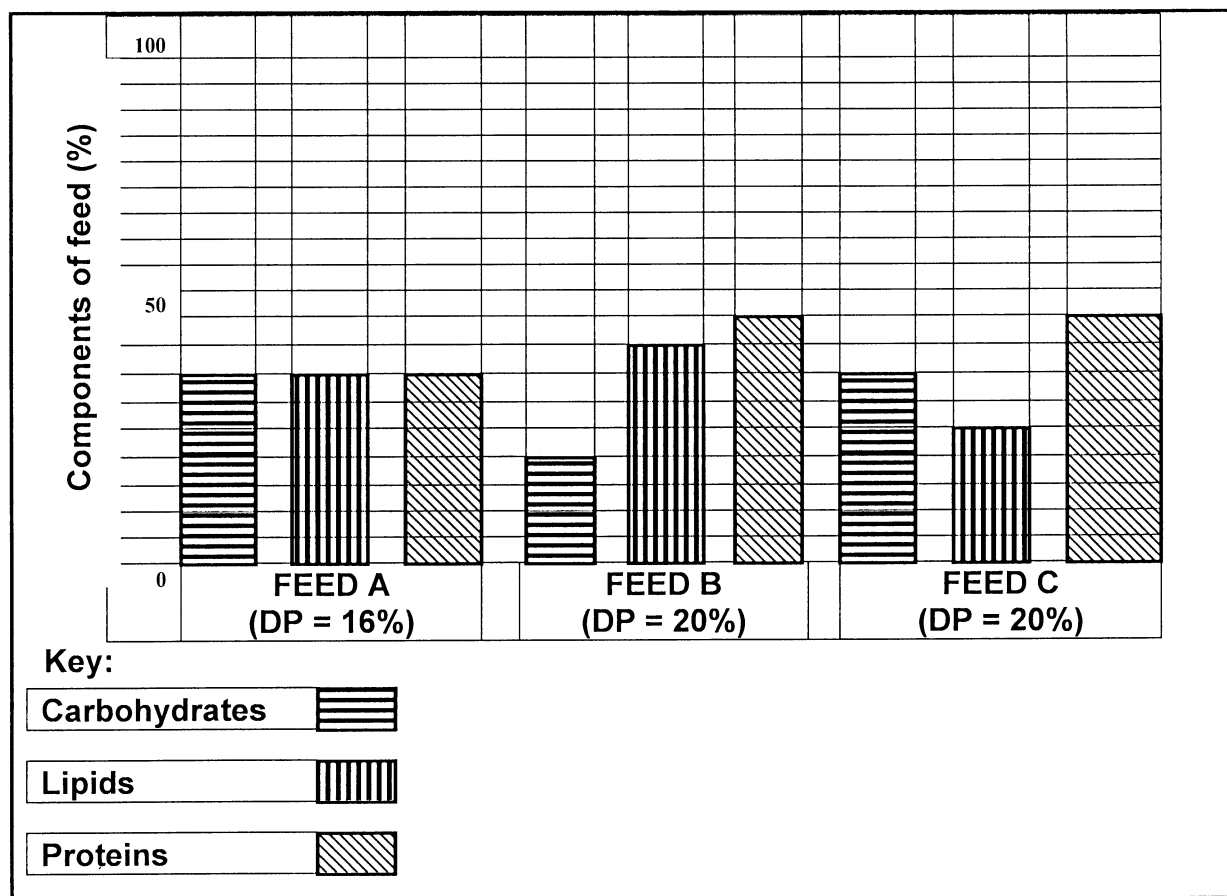
QUESTION 3: ANIMAL PRODUCTION

- 3.1 The diagram below indicates the movement of heat between an animal and its environment.



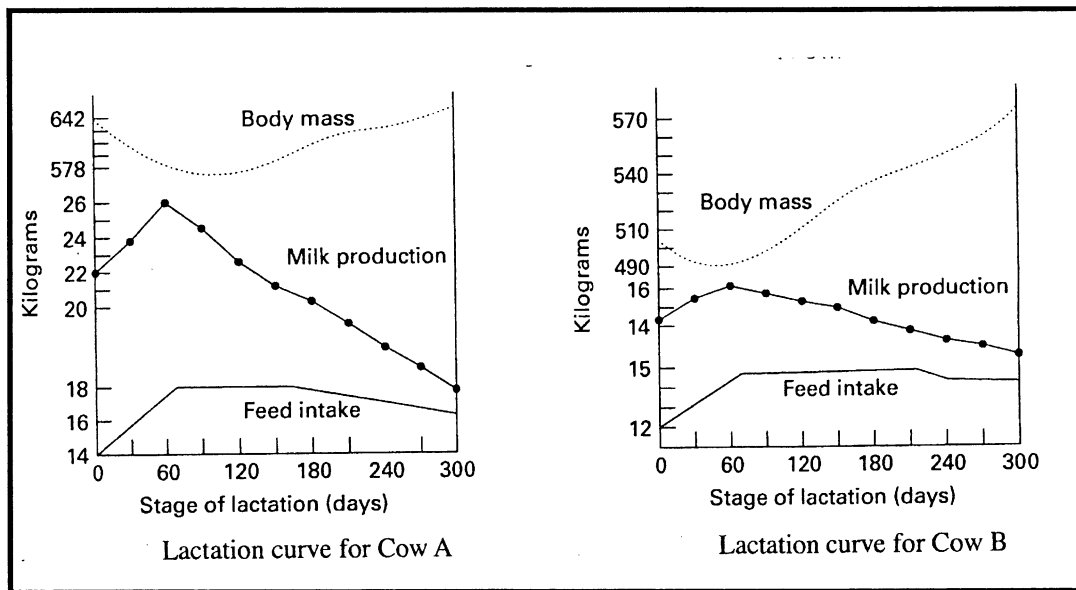
- 3.1.1 Indicate whether a pig is an exothermic or an endothermic animal? (1)
- 3.1.2 Name TWO ways in which a pig can lose heat to its environment. (2)
- 3.1.3 What feeding component is important in pig farming to make sure that pigs do not overheat? (1)
- 3.1.4 Indicate the type of feeding component would you feed a pig to prevent it from losing too much heat on cold days. Give a reason for your answer. (2)
- 3.1.5 Name the type of concentrate that is not ideal for fattening pigs? Give a reason for 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. (2)
- A well balanced feed for horses in training (2)
 - A high-energy feed for young growing piglets (2)
 - 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 Observe the following graphs which show the lactation curves for two cows (Cow A and Cow B):



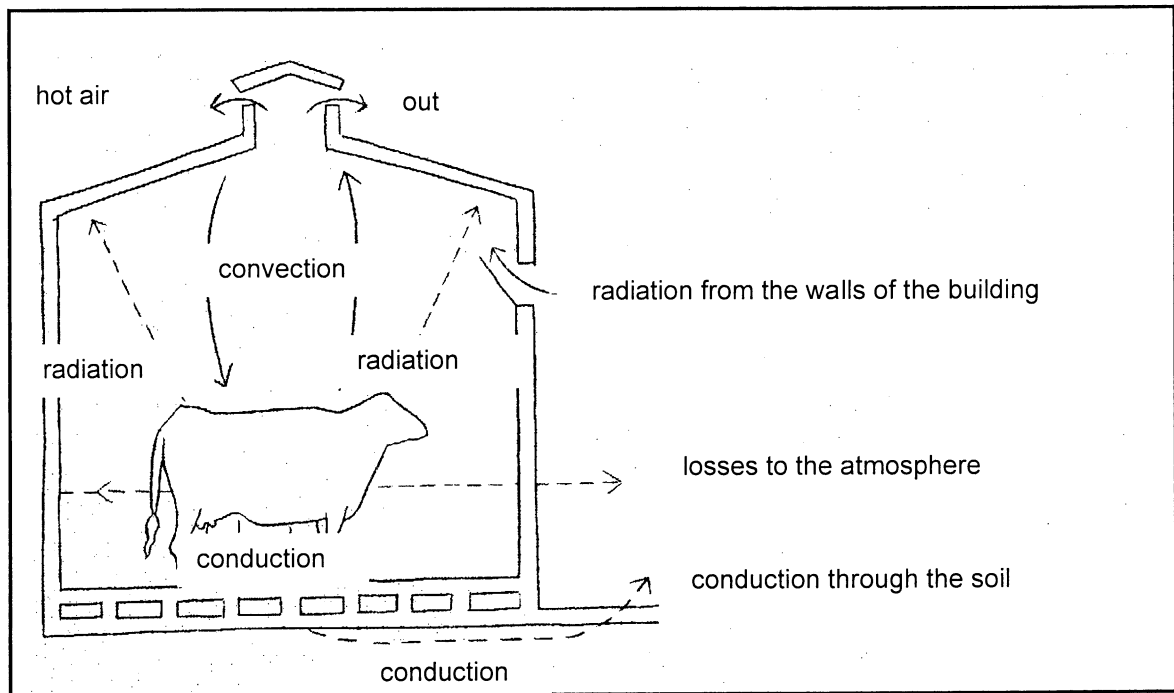
- 3.3.1 Which of the two graphs represents the data for the cow with the higher selection index? Give ONE reason for your answer. (2)
- 3.3.2 Which hormone is secreted by the gland in the brain and transported to the udder by the blood where it raises the pressure in the udder and forces the milk into the gland and teat cavities? (1)
- 3.3.3 "A cow must dry up before the next lactation period starts". Support this statement by briefly stating TWO reasons. (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)

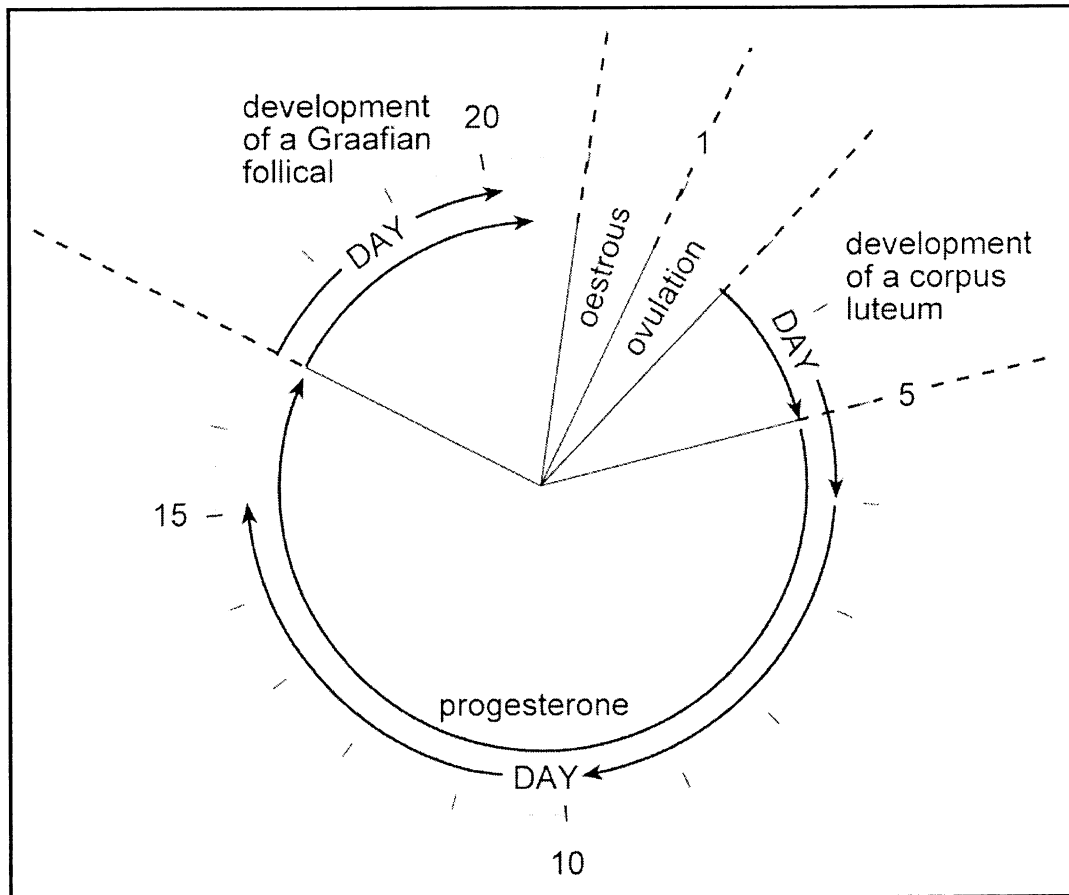
3.5.2 Briefly explain the mechanisms of heat control in this enclosure. (2)

[35]

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

QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

4.1 The diagram below illustrates the hormone cycle of a cow



- 4.1.1 How often does oestrus appear in cows? (1)
- 4.1.2 Explain briefly what ovulation is. (2)
- 4.1.3 Name the hormone that is secreted by the corpus luteum. (1)
- 4.1.4 Indicate what will happen if the corpus luteum does not disappear? (1)
- 4.1.5 What is the function of the hormone mentioned in 4.1.3? (1)
- 4.1.6 During a routine pregnancy inspection you identify a cow that has not fallen pregnant. How would you rectify this problem? (1)

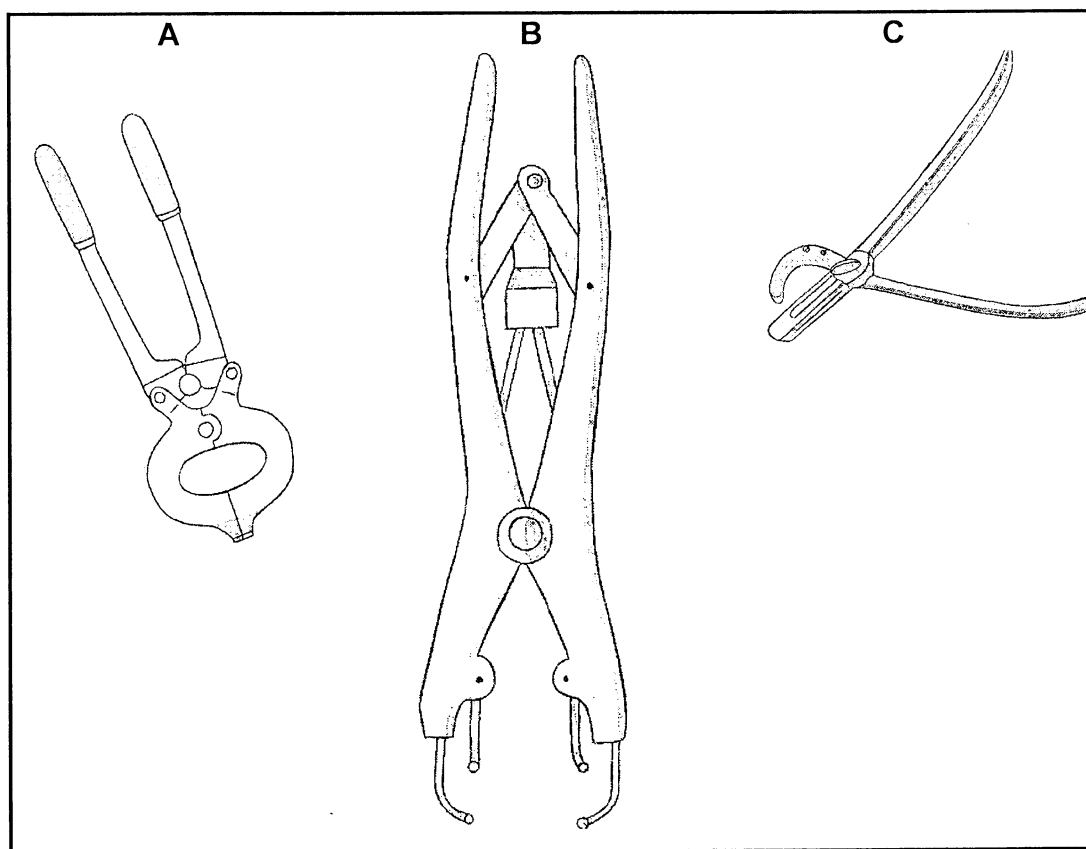
4.2 The case study below refers to the drying up and resting of cows.

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 table below is on reproductive diseases of farm animals.

Major infectious reproductive diseases			
Disease	Caused by	Signs	Prevention and control
Trichomoniasis	Protozoa	- Low-grade uterine infection with early abortion and pus accumulation - Temporary infertility	- Use A.I. with disease-free semen - No specific treatment for females – disease is self-eliminating - Bulls can be treated successfully
Brucellosis	Bacteria	- Abortion, usually after five months - Retained placentas - Infertility - Causes undulant fever in humans	- Can vaccinate calves - No cure – infected animals must be slaughtered
Bovine viral diarrhoea	Virus	- Abortion and abnormal calves - Weak calves and deaths among calves	- Vaccinate - Test for possible infections if BVD has been a herd problem - Use A.I. with disease-free semen - Test all herd additions

- 4.4.1 Describe what a protozoan organism is. (2)
- 4.4.2 Indicate visible symptoms of a protozoan infection in a cow. (2)
- 4.4.3 Explain how brucellosis can be prevented in calves? (1)
- 4.4.4 What common symptom is found in all three of the above-mentioned diseases? (2)
- 4.4.5 Name TWO diseases in the table that can be successfully controlled. (2)
- 4.4.6 How would you test for fever in the above-mentioned diseases? (2)
- 4.4.7 What is the body temperature of a healthy animal? (1)
- 4.4.8 Indicate the precautionary measures you would take when handling cattle with an unknown history of diseases? (2)

TOTAL SECTION B: 105

GRAND TOTAL: 150

SECTION A

EXAMINATION: NUMBER													
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or

NAME: _____

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