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Department:
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NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2017

MARKS: 150

TIME: 2½ hours

This question paper consists of 17 pages.

INSTRUCTIONS AND INFORMATION

1. This question paper consists of TWO sections, namely SECTION A and SECTION B.
2. Answer ALL the questions in the ANSWER BOOK.
3. Start EACH question on a NEW page.
4. Number the answers correctly according to the numbering system used in this question paper.
5. You may use a non-programmable calculator.
6. Show ALL the calculations, including formulae, where applicable.
7. Write neatly and legibly.

SECTION A**QUESTION 1**

- 1.1 Various options are provided as possible answers to the following questions. Choose the answer and write only the letter (A–D) next to the question number (1.1.1–1.1.10) in the ANSWER BOOK, for example 1.1.11 D.

1.1.1 ONE of the following is a function of protein in farm animals:

- A Regulation of body temperature
- B Production of fat
- C Production of eggs
- D Formation of energy

1.1.2 Nutrients used by farm animals for the insulation of body heat:

- A Minerals
- B Vitamins
- C Proteins
- D Lipids

1.1.3 This combination is an example of the most important feeds in a production ration:

- (i) Maize, lucerne hay and groundnut oil-cake meal
- (ii) Maize stalk, teff hay and fish meal
- (iii) Lucerne hay, maize meal and lupin seed meal
- (iv) Lucerne hay, fish meal and cottonseed oil-cake meal

Choose the CORRECT combination:

- A (i), (iii) and (iv)
- B (ii), (iii) and (iv)
- C (i), (ii) and (iii)
- D (i), (ii) and (iv)

1.1.4 Essential amino acids ...

- A cannot be produced by ruminants.
- B can be produced by non-ruminants.
- C can be produced by pigs.
- D cannot be produced by pigs and fowls.

- 1.1.5 Which ONE of the following statements is NOT correct with regard to increased production in an intensive unit?
- A Providing feed of a high quality
 - B Insulation, ventilation and heating
 - C Providing feed with a low energy and biological value
 - D Purchasing approved adaptable breeding stock
- 1.1.6 Some of the signs below may indicate stress in farm animals.
- (i) Drooping head and ears
 - (ii) Slow movement
 - (iii) Lying down and reluctant to get up
 - (iv) Pawing
- Choose the CORRECT combination:
- A (i), (ii) and (iii)
 - B (i), (iii) and (iv)
 - C (ii), (iii) and (iv)
 - D (i), (ii) and (iv)
- 1.1.7 Which of the following are examples of contagious bacterial diseases?
- A Redwater and mastitis
 - B Anthrax and tuberculosis
 - C Anthrax and avian flu
 - D Newcastle disease and tuberculosis
- 1.1.8 ONE of the following is NOT a nervous symptom caused by plant poisoning:
- A Stargazing
 - B Restlessness
 - C Muscle contractions
 - D Nasal discharge
- 1.1.9 The scrotum encloses the primary male reproductive organ that ...
- A produces the spermatozoa and testosterone.
 - B produces the carrier fluid for spermatozoa.
 - C is the largest reproductive organ.
 - D secretes all the reproductive fluids.
- 1.1.10 The synthesis of milk occurs in the ... of the udder.
- A teat cistern
 - B milk lobes
 - C alveoli
 - D gland cistern
- (10 x 2) (20)

- 1.2 Indicate whether each of the descriptions in COLUMN B applies to **A ONLY**, **B ONLY**, **BOTH A AND B** or **NONE** of the items in COLUMN A. Write **A only**, **B only**, **both A and B** or **none** next to the question number (1.2.1–1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

COLUMN A			COLUMN B
1.2.1	A:	Vitamin E	The vitamin responsible for blood clotting in fowls
	B:	Vitamin D	
1.2.2	A:	Looks at the lowest cost of feeding	Feed flow programme for a group of farm animals
	B:	Pays attention to feed requirement of the herd	
1.2.3	A:	Less protective of their lambs	Animal behaviour applicable to younger ewes lambing for the first time
	B:	More protective of their lambs	
1.2.4	A:	Halter	The most appropriate tool to handle pigs
	B:	Plywood board	
1.2.5	A:	Endoderm	The development of the respiratory and digestive system during the embryonic stage
	B:	Ectoderm	

(5 x 2) (10)

- 1.3 Give ONE term for each of the following descriptions. Write only the term next to the question number (1.3.1–1.3.5) in the ANSWER BOOK.

1.3.1 The process of improving the digestibility of grains by dry heating, causing them to expand

1.3.2 When a farm animal maintains a constant body temperature

1.3.3 The phenomenon where a superior cow is treated with hormones to produce many ova

1.3.4 The substance used to control the pH in the dilution of semen

1.3.5 The hormone responsible for the delayed secretion of FSH and oestrogen

(5 x 2) (10)

1.4 Change the UNDERLINED WORD in each of the following statements to make them TRUE. Write only the answer next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 A pyloric sphincter is a ring of smooth muscle that controls the movement of food to the stomach.

1.4.2 A bont tick is an example of a one-host tick that transmits redwater and anaplasmosis.

1.4.3 The condition where the reproductive organ in a female farm animal is underdeveloped, is known as hymen.

1.4.4 Water breaks during parturition due to the rupture of the allantois membrane.

1.4.5 The pistolette is a minute polyvinyl piece of equipment in which semen is stored for future use.

(5 x 1)

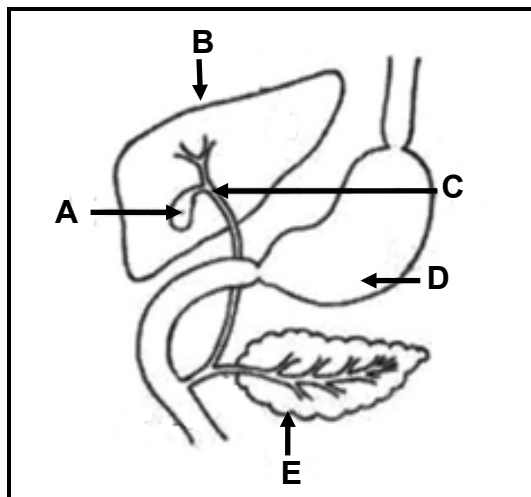
(5)

TOTAL SECTION A: 45

SECTION B**QUESTION 2: ANIMAL NUTRITION**

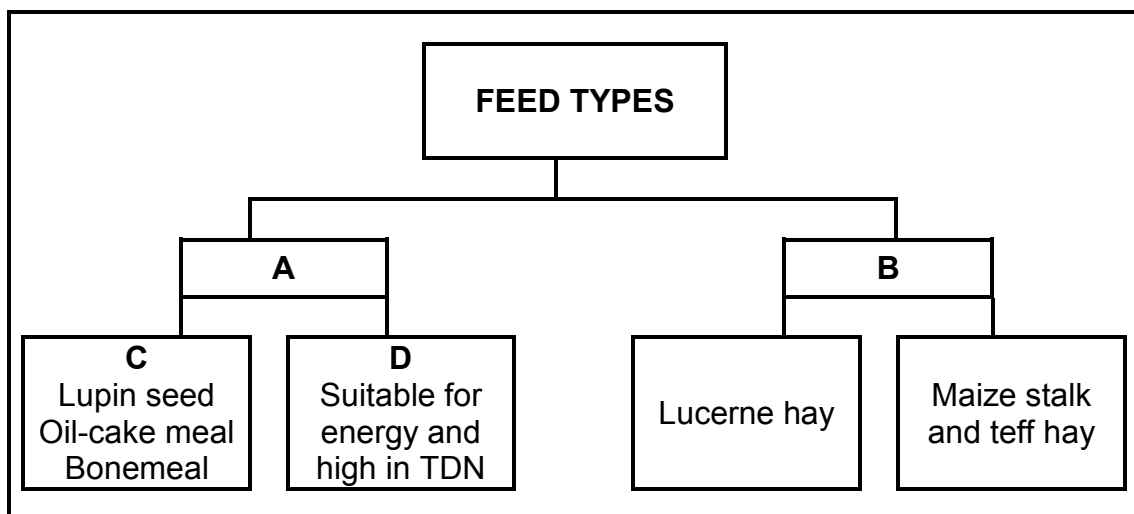
Start this question on a NEW page.

2.1 The diagram below shows a section of the alimentary canal of a farm animal.



- 2.1.1 Indicate whether the farm animal in the diagram above is a ruminant or a non-ruminant. (1)
- 2.1.2 Give a reason for the answer to QUESTION 2.1.1. (1)
- 2.1.3 State TWO functions of the digestive juice in **A**. (2)
- 2.1.4 Name a fat-digesting enzyme in the digestive juice secreted by **E**. (1)

- 2.2 Below is a schematic representation of feed types used in the feeding of farm animals.



- 2.2.1 Classify feed types **A** and **B**. (2)
- 2.2.2 Identify the subdivision of feed type **C**. (1)
- 2.2.3 Give TWO examples of the subdivision of feed type **D**. (2)
- 2.2.4 Feed type **B** is mainly fed to ruminant animals. Give TWO reasons to justify this statement. (2)

- 2.3 The table below shows the nutritional composition of two feeds.

COMPONENT	FEED A	FEED B
Digestible fat	32%	24%
Digestible carbohydrates	38%	28%
Digestible protein	10%	12%
Nutritive ratio	1 : 7	1 : 4

- 2.3.1 Identify the feed (**A** or **B**) that is the most suitable for growing young farm animals. (1)
- 2.3.2 Give a reason for the answer to QUESTION 2.3.1. (1)
- 2.3.3 Calculate the percentage (%) of digestible non-nitrogen nutrients in feed **A**. (2)

- 2.4 Hay was fed to farm animals in a feed trial. After a week the results of the digestible coefficient was 45%.

- 2.4.1 Comment, with a reason, on the suitability of this hay for feeding high-producing milk cows. (2)
- 2.4.2 Suggest TWO measures the farmer can take to increase the digestibility of this hay. (2)

2.5

A dairy farmer is keeping 100 cows on a pasture that supplies a total of 450 000 kg dry matter (DM) during the rainy season and 216 000 kg DM in the dry season. The requirement for these animals is 360 000 kg DM in the wet season and increases to 390 000 kg DM in the dry months due to pregnancy and lactation. Each cow consumes 21 kg DM on average a day.

- 2.5.1 Refer to the scenario above and identify TWO problems that the farmer might encounter in the dry season. (2)
- 2.5.2 Suggest ONE precautionary measure that the farmer needs to take to prevent the problem. (1)
- 2.5.3 Calculate, in tons, the amount of feed required by the cows per month. Show ALL calculations. (3)

2.6

Animal feeds contain different nutrients, such as carbohydrates, proteins and fats, with different energy levels. It is important that the animals get the correct amount of each nutrient to fulfil their nutritional requirements.

- 2.6.1 Refer to the passage above and identify the feed nutrient that provides the most energy to farm animals. (1)
- 2.6.2 Indicate the unit in which the total energy of an animal is measured. (1)
- 2.6.3 It is important that the farmer calculates the energy value of the feeds. Give TWO reasons to support this statement. (2)

2.7

The table below shows minerals and vitamins and their deficiency symptoms.

MINERAL/VITAMIN	DEFICIENCY SYMPTOM
A	Rough, thick skin and hair loss, especially in pigs
Selenium	B , deficiency in pregnant cows
Vitamin E	C , deficiency in lambs

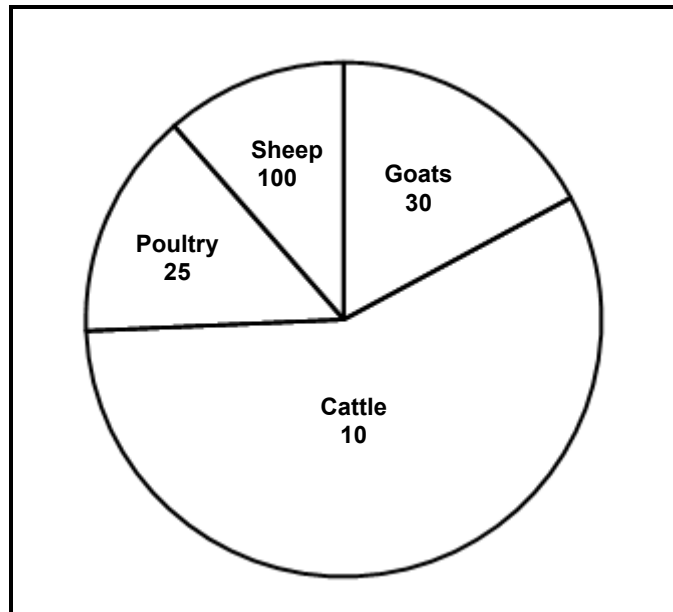
- 2.7.1 Refer to the table above and write down the missing information at **A**, **B** and **C**. (3)
- 2.7.2 Identify the method of supplementing EACH of the following:
- (a) Vitamin A (1)
- (b) Soluble minerals (1)

[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

- 3.1 The pie chart below shows the number and type of farm animals, including the size of the area where they are kept.



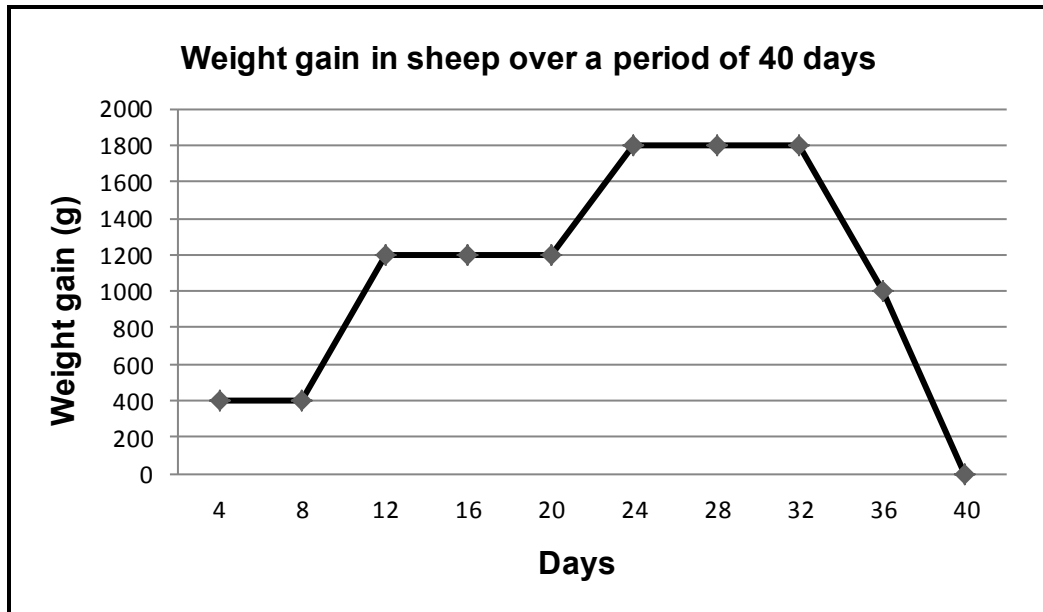
- 3.1.1 Refer to the pie chart above and identify the farm animals that are kept under intensive production conditions. (1)
- 3.1.2 Give a reason for the answer to QUESTION 3.1.1. (1)
- 3.1.3 Refer to the pie chart above and identify the farm animals that use EACH of the following facilities: (1)
- (a) Laying batteries (1)
 - (b) Milking parlour (1)
 - (c) Shearing shed (1)
- 3.1.4 Calculate the percentage (%) of sheep from the total number of farm animals on this farm. (3)

- 3.2 The table below shows diseases that affect farm animals and the role of the state in controlling the spread of diseases.

DISEASE	AGENT OF TRANSMISSION	KEY IDENTIFIABLE SYMPTOM	PREVENTION METHOD
A	Spores	Bloody discharge from the nose, mouth and rectum	B
Rift Valley fever	C	D	Control vector/ Vaccination
Redwater	Blue tick	E	Vaccination

- 3.2.1 Refer to the table above and identify **A**, **B**, **C**, **D** and **E**. (5)
- 3.2.2 Refer to the table above and identify the role of the state in controlling the spread of diseases. (1)
- 3.2.3 Suggest TWO duties of stock owners to prevent the spread of deadly diseases, such as the one in **A**. (2)
- 3.3 Which measures have been introduced by the state to address EACH of the following cases?
- 3.3.1 To ensure that meat is not contaminated during the slaughtering process (1)
- 3.3.2 To prevent the introduction of diseases from other countries (1)
- 3.3.3 To prevent the outbreak and further spread of a notifiable disease (1)

3.4 The graph below shows data that was captured during a trial with lambs.



3.4.1 Deduce from the graph the range of days it took the lambs to gain 1,8 kg of weight. (1)

3.4.2 Tabulate the data presented in the graph above. (6)

3.5 Name the structure, apparatus or appliance used in EACH of the following situations to manage farm animals:

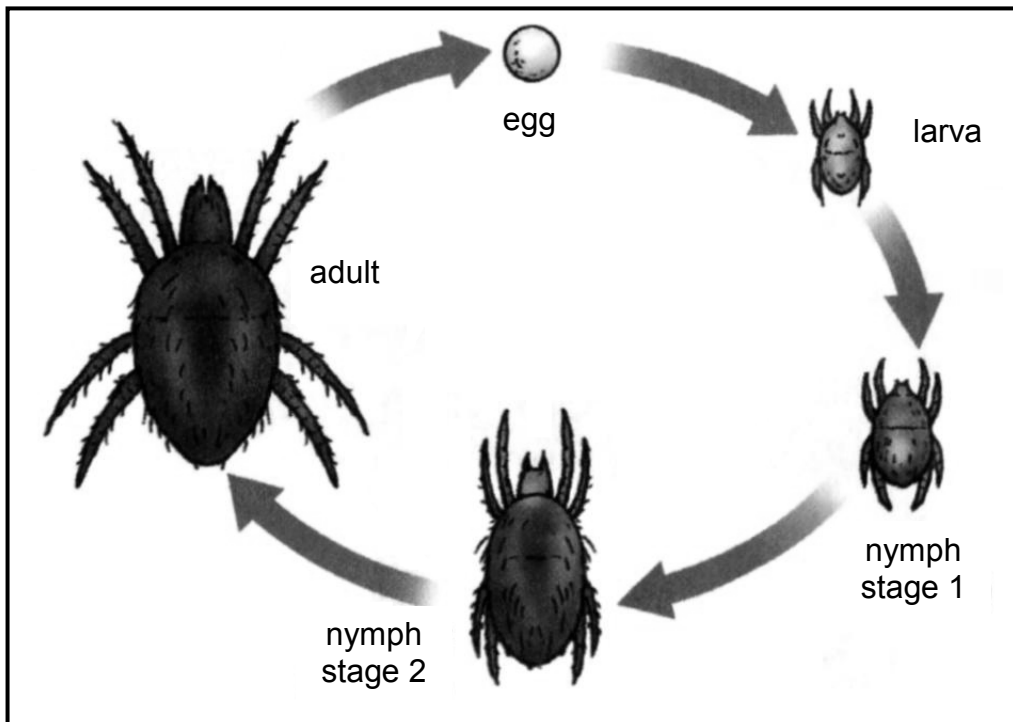
3.5.1 A permanent structure next to a provincial road to restrain farm animals (1)

3.5.2 An appliance used to restrict the movement of a farm animal (1)

3.5.3 Apparatus used to castrate young rams (1)

3.5.4 The structure used to protect sheep and cattle against adverse weather conditions (1)

- 3.6 The picture below represents the life cycle of a microscopic external parasite that is found mainly in sheep.

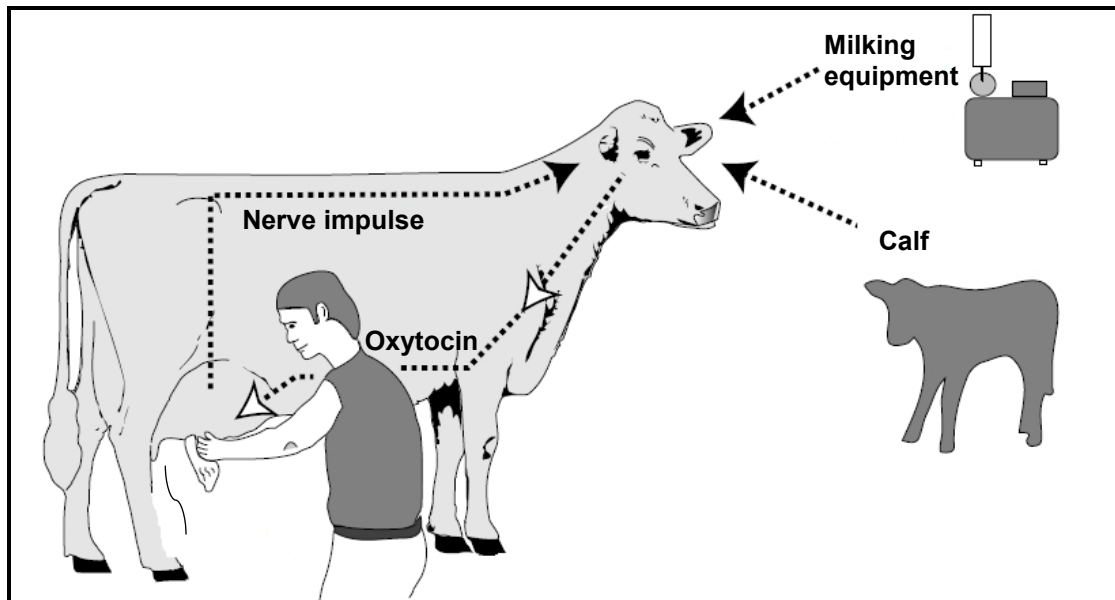


- 3.6.1 Identify the external parasite in the life cycle above. (1)
- 3.6.2 Give the term used to describe the symptom of a severe infestation by this parasite in sheep. (1)
- 3.6.3 Indicate a visible sign of the symptom in QUESTION 3.6.2. (1)
- 3.6.4 State TWO economic implications of this parasite. (2)
- [35]**

QUESTION 4: ANIMAL REPRODUCTION

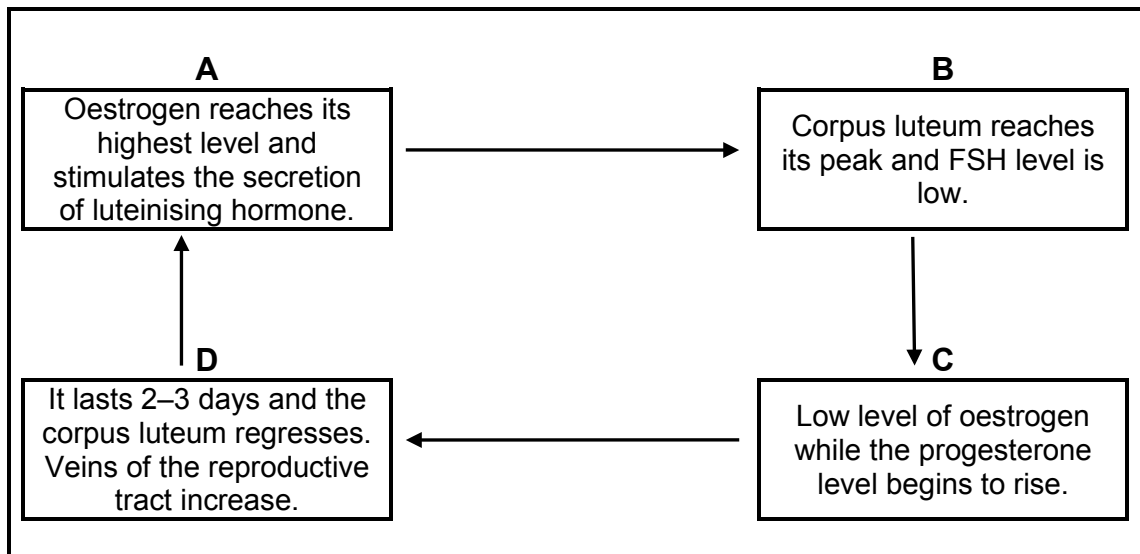
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4.1 The picture below represents a process that takes place in cows.



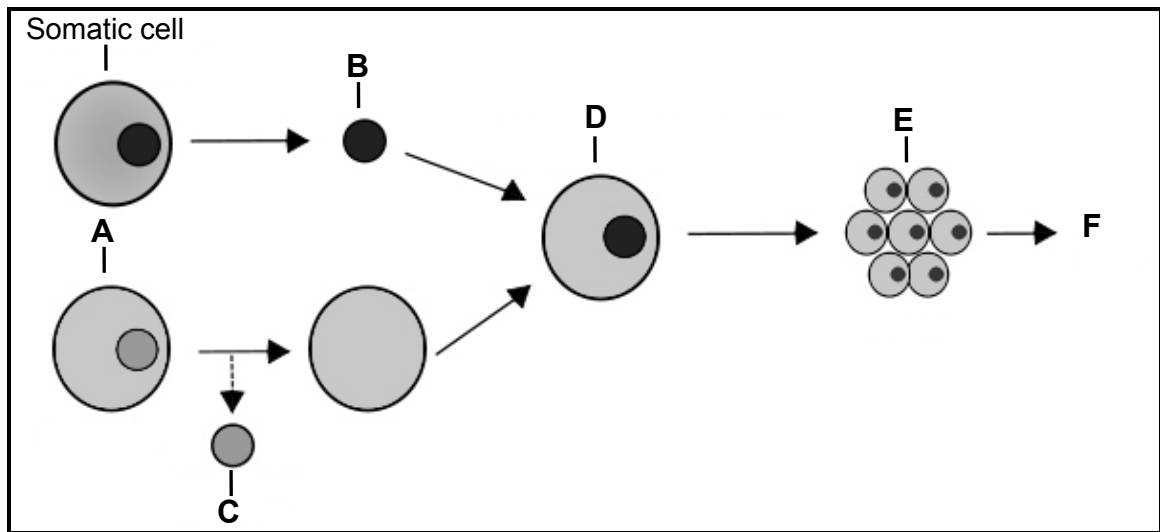
- 4.1.1 Identify the process in the picture above. (1)
- 4.1.2 Identify THREE visible stimuli in the picture above that activate the process in QUESTION 4.1.1. (3)
- 4.1.3 Name the hormone responsible for the contractions of the glandular cavity in the process above. (1)
- 4.1.4 Name the reproductive process which lasts 282 days in cattle and which precedes the process shown above. (1)

- 4.2 In female animals, hormonal and reproductive changes occur from one heat period to the next. This occurs in stages, which are marked by distinctive characteristics. Below are the characteristics applicable to each stage.



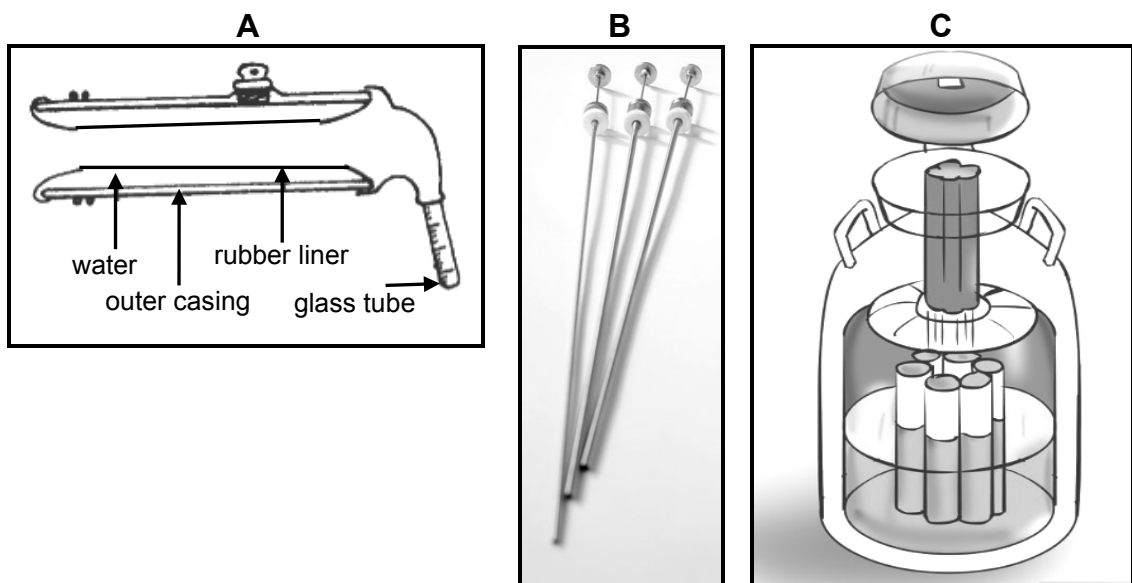
- 4.2.1 Match characteristics **A**, **B**, **C** and **D** with the stages of the oestrus cycle. (4)
- 4.2.2 Write down the letter that represents the stage where EACH of the following occurs:
- (a) Graafian follicle ruptures to release the ovum (1)
 - (b) Ovum enters the Fallopian tube for fertilisation and the ruptured follicle forms a corpus luteum (1)

- 4.3 The diagram below shows a process generally used in the reproduction of farm animals.



- 4.3.1 Identify the process illustrated in the diagram above. (1)
- 4.3.2 Identify **A**, **B** and **D** in the diagram above. (3)
- 4.3.3 Name the TWO different types of processes in the diagram above. (2)

- 4.4 The diagrams below show different apparatus that are used in the process of artificial insemination (AI).



- 4.4.1 Identify apparatus **A**, **B** and **C** above. (3)
- 4.4.2 State the main function of apparatus **A**, **B** and **C**. (3)
- 4.4.3 Name TWO basic requirements for the collection of semen from bulls. (2)

4.5 The representation below shows a process used in female farm animals.

Scheduled process:

- Day 1–14: melengestrol acetate (MGA in feed)
- Day 33: inject with prostaglandin

**1–2–3–4–5–6–7–8–9–10–11–12–13–14–15–16–17–18–19–20–21–22–
23–24–25–26–27–28–29–30–31–32–33–34–35–36–37–38–39–40**
(days of the schedule)

4.5.1 Identify the process above. (1)

4.5.2 State TWO disadvantages of the process in QUESTION 4.5.1. (2)

4.5.3 Name TWO other techniques not mentioned in the schedule above, that can also be used in female animals. (2)

4.5.4 Assuming that the above-mentioned schedule is properly followed, identify the day on which the cows will be inseminated. (1)

4.6 Name THREE causes of the lack of libido in male farm animals. (3)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150