



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES

COMMON TEST

JUNE 2014

MARKS: 150

TIME: 2½ hours

This question paper consists of 16 pages.



INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions in the ANSWER BOOK that is provided.
2. Start EACH question in SECTION B on a NEW page.
3. Read ALL the questions carefully and answer only what is asked.
4. Number the answers correctly according to the numbering system used in this question paper.
5. Non-programmable calculators may be used.
6. 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 in the answer book, for example 1.1.11 B.

1.1.1 The inner surface of the small intestines is lined with ... and covered by millions of small projections called villi.

- A amoebial fluid
- B hydrochloric acid
- C epithelium
- D ectoplasmic membrane

1.1.2 One of the following feeds is a product of animal feed preparation:

- A Sugarcane plantation
- B Silage
- C Whole maize
- D Osmatic feeds

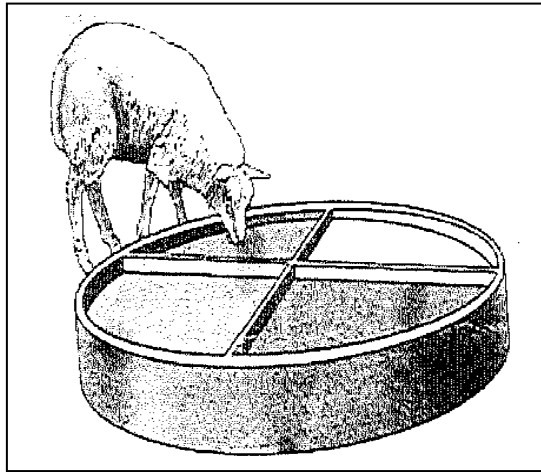
1.1.3 The structure found in the stomach of a young ruminant that transports milk directly to the abomasum.

- A Rumen
- B Pancreatic groove
- C Oesophageal groove
- D Simple stomach

1.1.4 In ... animals are kept in low densities with few inputs on large areas of land.

- A extensive farming
- B intensive farming
- C supervised farming
- D commercial farming

1.1.5 Which method of mineral supplementation in animals can best be associated with this diagram?



- A Injection
- B Cafeteria style
- C Restricted mineral lick
- D Feedlot

1.1.6 An instrument made of rubber cylinder with a semen receiving cone used to collect semen from a bull is ...

- A artificial vagina.
- B electro-jaculator.
- C semen tube.
- D automise.

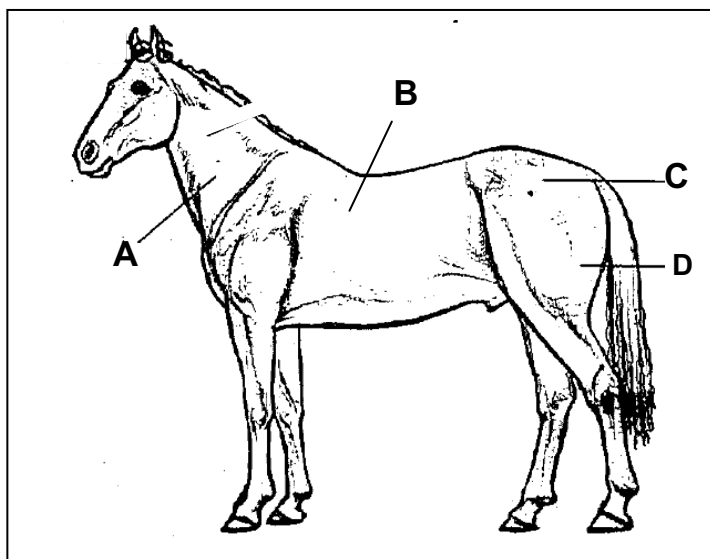
1.1.7 This is ONE of the advantages of outcrossing:

- A Uniformity in the herd
- B Individuals with recessive genes are introduced to the herd
- C Improved growth and fertility
- D Decrease in vigour

1.1.8 Newcastle disease symptoms are mostly manifested in one of the following animal species:

- A Pigs
- B Mules
- C Cattle
- D Poultry

- 1.1.9 The picture below indicates the site of injection for medicines intended for different purposes. Which letter represents the site which will make medicine to work faster compared to other sites?



- A Intravenous injection
B Interuminal injection
C Intramuscular injection
D subcutaneous injection

- 1.1.10 Mechanism of inheritance in which a genetic characteristic is controlled by many pairs of genes.

- A Polygenic inheritance
B Co-dominance
C Atavism
D Incomplete dominance

(10 x 2) (20)

- 1.2 Indicate whether each of the statements 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 D only.

		COLUMN A	COLUMN B
1.2.1	A	A Zinc	Deficiency causes osteomalacia
	B	B Iron	
1.2.2	A	Enzymes	Aids in chemical digestion
	B	Tapeworms	
1.2.3	A	Oxidative energy	Amount of energy absorbed by an animal
	B	Digestive energy	
1.2.4	A	Pheromones	Arouse(s) bulls
	B	Clitoris	
1.2.5	A	Radiation	Ways in which animals lose heat.
	B	Excretion	

(5 x 2) (10)

1.3 Give ONE WORD/TERM for each of the following description. Write only the word/term next to the question number (1.3.1 – 1.3.5) in your answer book.

1.3.1 Feeds that contain a large volume per unit mass and a low percentage of digestible nutrients.

1.3.2 Useful tool to determine the temperature of an animal.

1.3.3 Housing structure that keeps many ruminant animals in intensive farming.

1.3.4 The process where one single organism that has superior traits is manipulated to produce offspring, that are genetically identical to the original organism.

1.3.5 Diagram used to work out how gametes combine in genetic cross.

(5 x 2) (10)

1.4 Change the underlined word(s) in each of the following statements to make them true. Write the appropriate word(s) next to the question number (1.4.1–1.4.5) on the answer book.

1.4.1 Reticulum has many leaf-like folds that absorb water.

1.4.2 Proportion of digestible protein to digestible non-nitrogenous nutrients is called mixed ration.

1.4.3 Dry period is when a cow has prolonged and difficult birth.

1.4.4 Cardiac arrest is a number of heartbeats in one minute.

1.4.5 Epistaxis is a known phenomenon where testes stay inside the abdominal cavity and do not move down into the scrotum.

(5 x 1) (5)

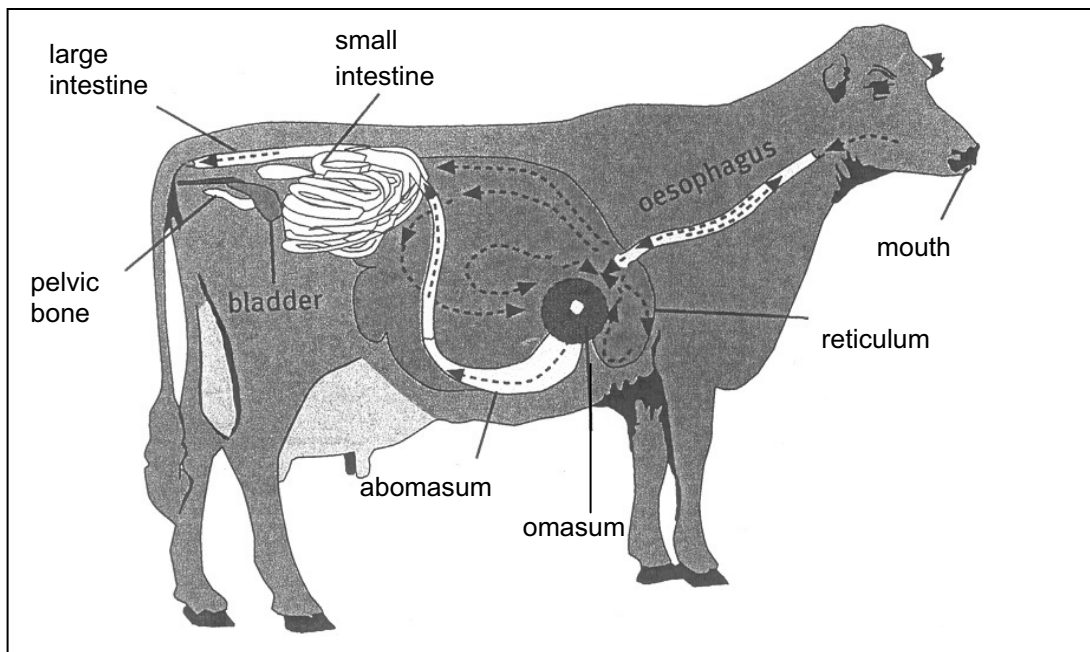
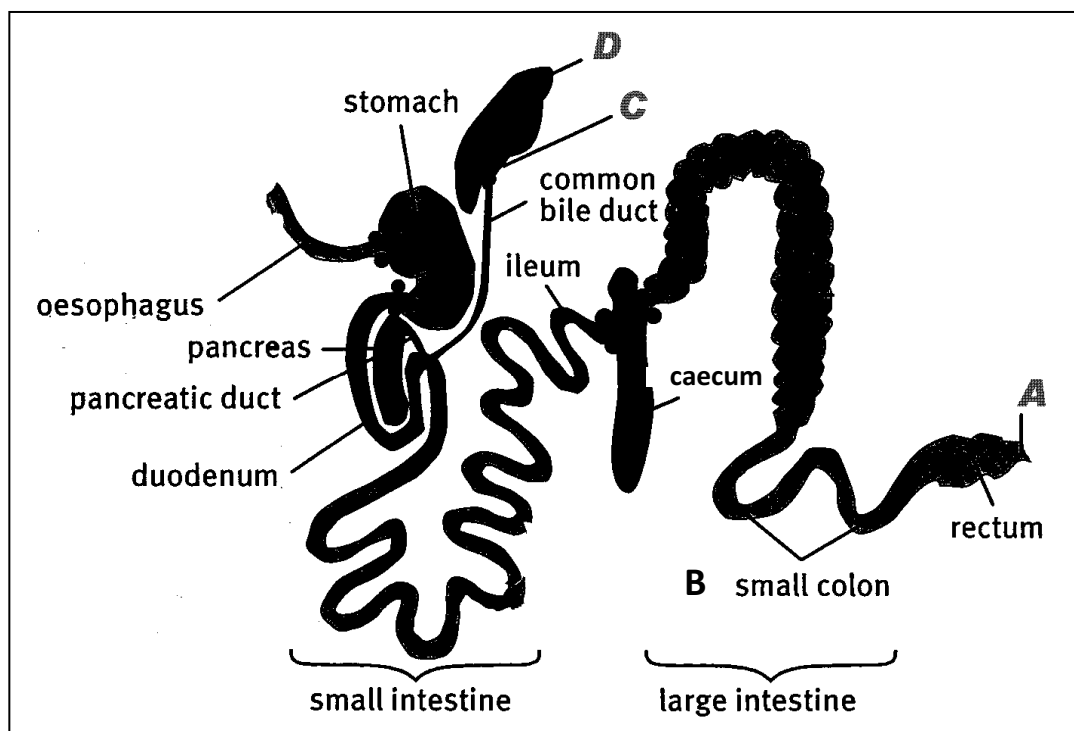
TOTAL SECTION A: 45

SECTION B

Answer this question on a NEW page.

QUESTION 2: ANIMAL NUTRITION AND NUTRITION

- 2.1 The following structures represent the alimentary canals of the non-ruminant and ruminant.

FIGURE 1**FIGURE 2**

- 2.1.1 Compare the stomachs of FIGURE 1 and FIGURE 2 in terms of their adaptations and functions. (2)

- 2.1.2 List TWO functions of the structure labelled **D** in FIGURE 2. (2)

2.1.3 Describe THREE functions of the small intestines in a non-ruminant. (3)

2.2 Macro elements, micro elements and vitamins are important in the functioning of the body and health of a farm animal. Answer the following questions by filling in the table below:

Name of the nutrient	Function	Deficiency symptom
A	Effective formation and functioning of the muscle.	Muscle disease
Vitamin B ₁₂	B	C

(3)

2.3 Digestibility is important in the utilisation of the feed taken by the farm animal to supply the animal with the nutrients and energy.

2.3.1 Define *digestibility co-efficient*. (2)

2.3.2 Give TWO factors that affect digestibility of a feed (2)

2.3.3 You are the owner of the farm. You are required to compile a ration for your dairy cows. Feed A=14% DP. Feed B=21% DP. The Required DP is 16%. Calculate the parts of the two feeds in the ration using the Pearson square. (5)

2.3.4 A cow was given a feed with the Total Digestible Nutrients of 75% and 20% of Digestible Protein (DP). Use the formula to calculate the nutritive ratio of the feed. (3)

2.3.5 For what purpose can this feed be given to animals? (1)

2.4 Thousands of Boer goats died in the cold and wet conditions in Dundee in July. The new born animals could not withstand the bitter cold, strong winds and rain.

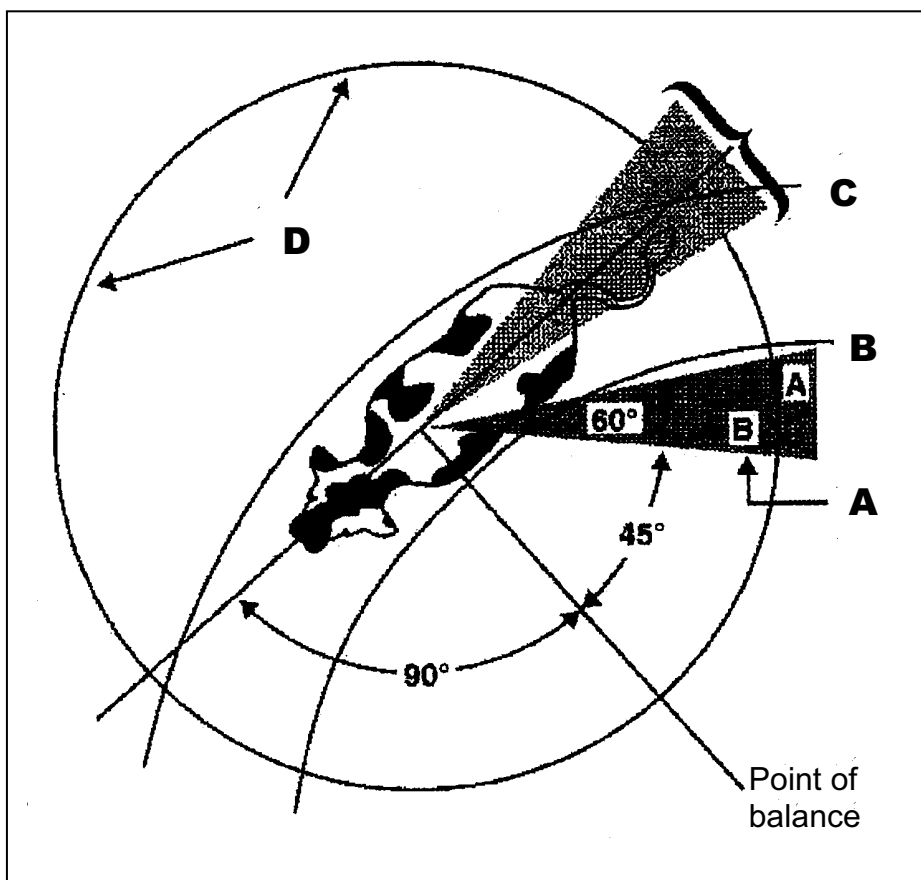
With the assistance of the agricultural extension officer, the farmers were subsidised to build shelters that had a special insulation material, foldable walls and heaters.

2.4.1 Indicate the production system that was practised by the farmers before July. (1)

2.4.2 Justify your answer in QUESTION 2.4.1. (1)

2.4.3. Give a reason for the addition of a special insulation material and heaters to the shelters. (2)

- 2.5 Refer to the diagram below of different spots one should consider when approaching the farm animals. Use letters indicating the different spots to answer the following questions.



2.5.1 Which letter represents the position not recommended when approaching the farm animal? (1)

2.5.2 Identify the position from where the handler can initiate the movement of an animal. (1)

- 2.6 The table below represents the body fat concentration of a mutton sheep breed as measured by a commercial livestock breeder.

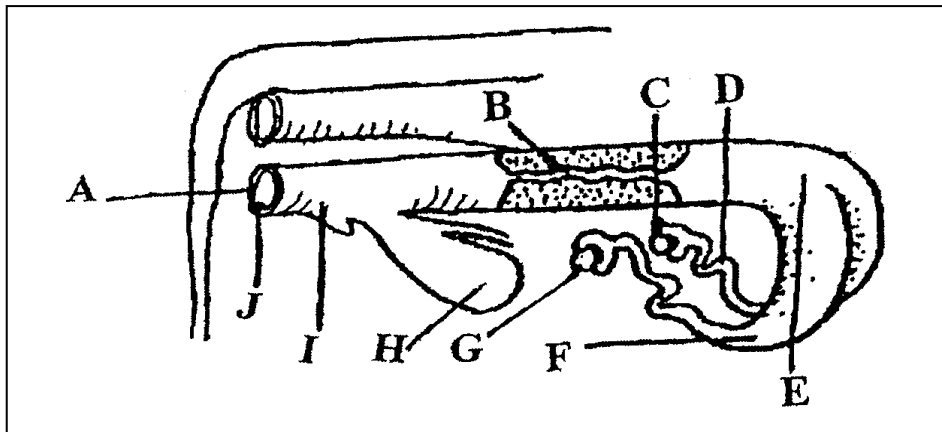
YEARS	BODY FAT CONCENTRATION
1960	30
1970	25
1980	20
1990	15
2000	10
2010	5

2.6.1 Draw a line graph showing the trend of fat distribution in mutton sheep. (6)
[35]

QUESTION 3: ANIMAL REPRODUCTION

Answer this question on a NEW page.

- 3.1 Answer the following questions based on the reproductive organs of a cow below.



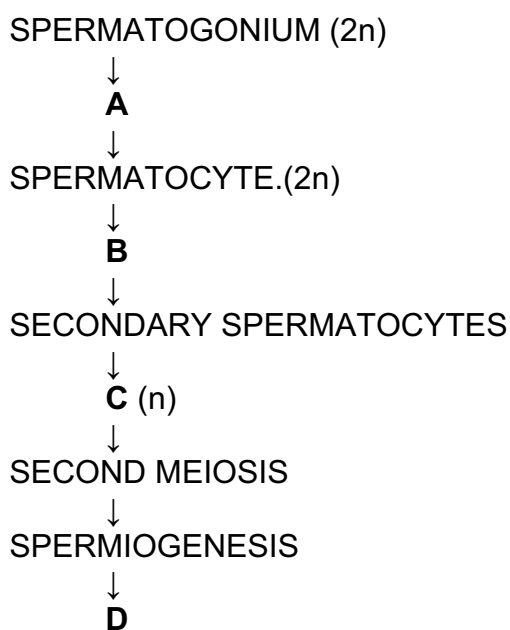
- 3.1.1 State the letter in the diagram that representing the part of the description below:

- (i) Corpus luteum produces progesterone;
- (ii) Cervix
- (iii) Birth canal
- (iv) Bladder

(4)

- 3.2 Spermatogenesis is essential for the production of healthy sperm cells.

- 3.2.1 Show your understanding of the process of spermatogenesis by indicating what the letters in the schematic representation (mind-map) stand for, for example F prepuce.

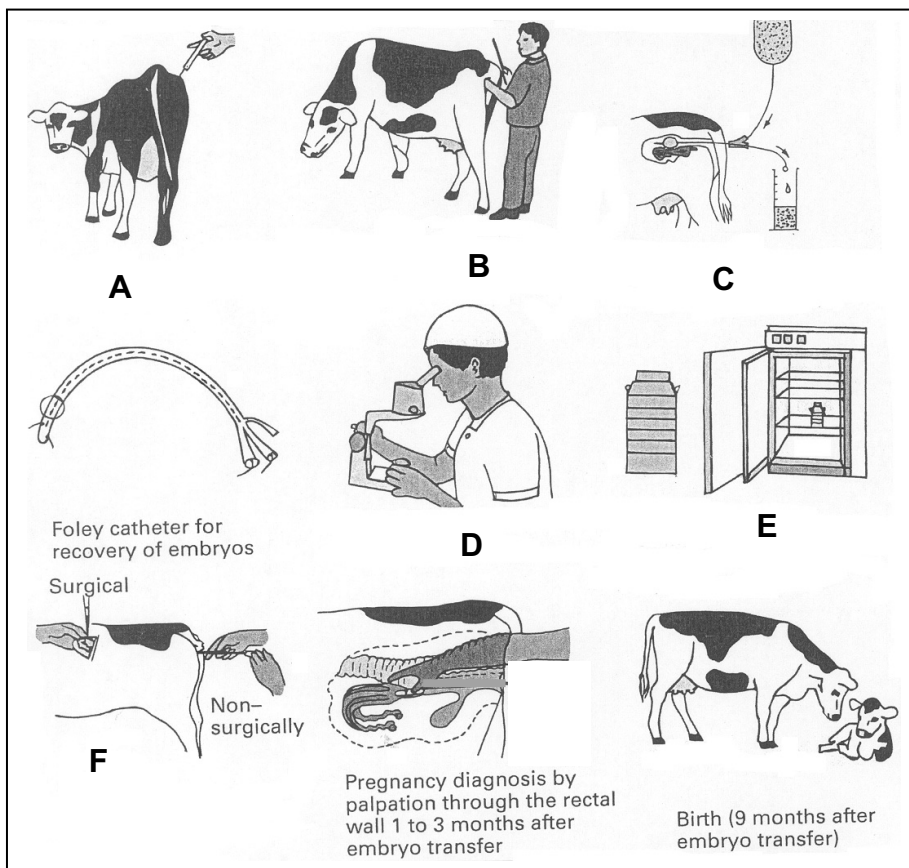


(4)

3.2.2 Is the number of chromosomes, haploid or diploid in the primary spermatocytes?

(1)

3.3 Analyse the following diagram and match the description (steps) with the pictures shown below. Write only the letter of the picture next to the number of the question for example 3.3.7 F.



3.3.1 Storage of the embryo.

(1)

3.3.2 Transfer of embryo's.

(1)

3.3.3 Isolation and classification of embryo's.

(1)

3.3.4 Non-surgical recovery of embryo's.

(1)

3.3.5 Super ovulation of the donor.

(1)

3.3.6 Artificial Insemination.

(1)

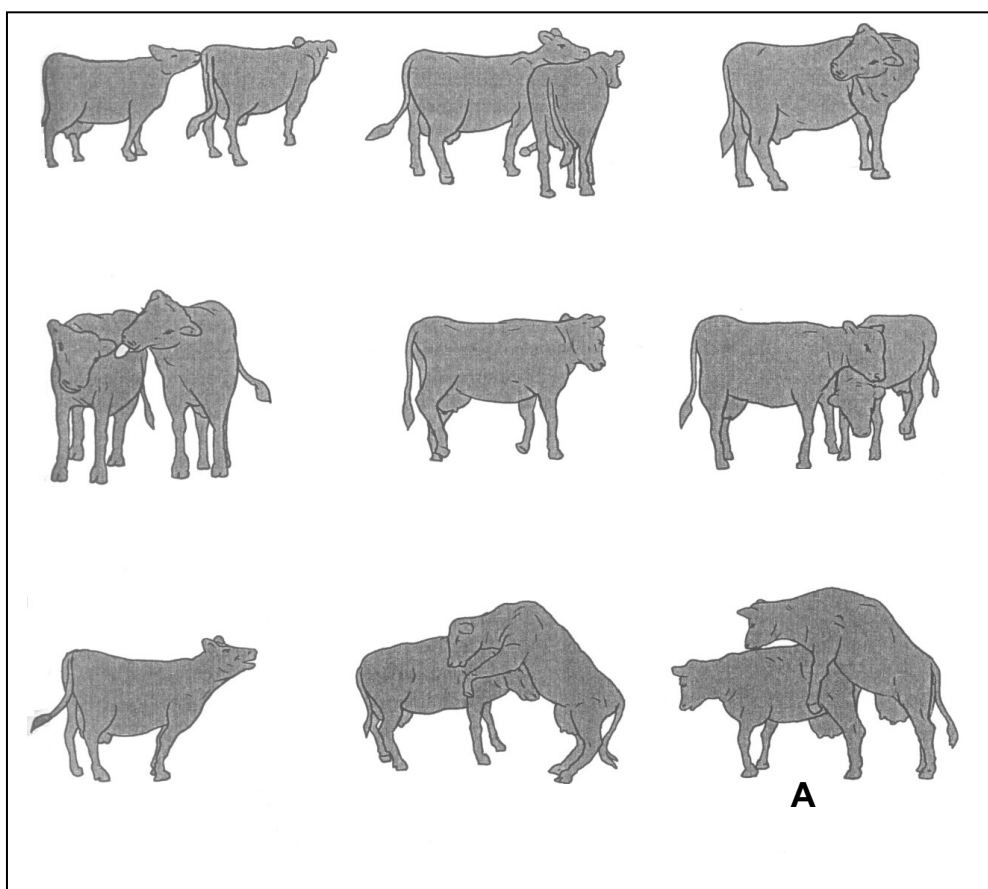
3.4 Animal reproduction plays an important role in commercial farming.

3.4.1 Explain the process *oogenesis*. (2)

3.4.2 Supply the functions of the following hormones:

- | | | |
|---|-------------------------------|-----|
| A | Testosterone. | (1) |
| B | Relaxin. | (1) |
| C | Follicle stimulating hormone. | (1) |
| D | Luteotropic hormone. | (1) |

3.5 Refer to the diagrams below and answer the questions.



3.5.1 Deduce the stage oestrous cycle that is depicted by the picture labelled **A**. (1)

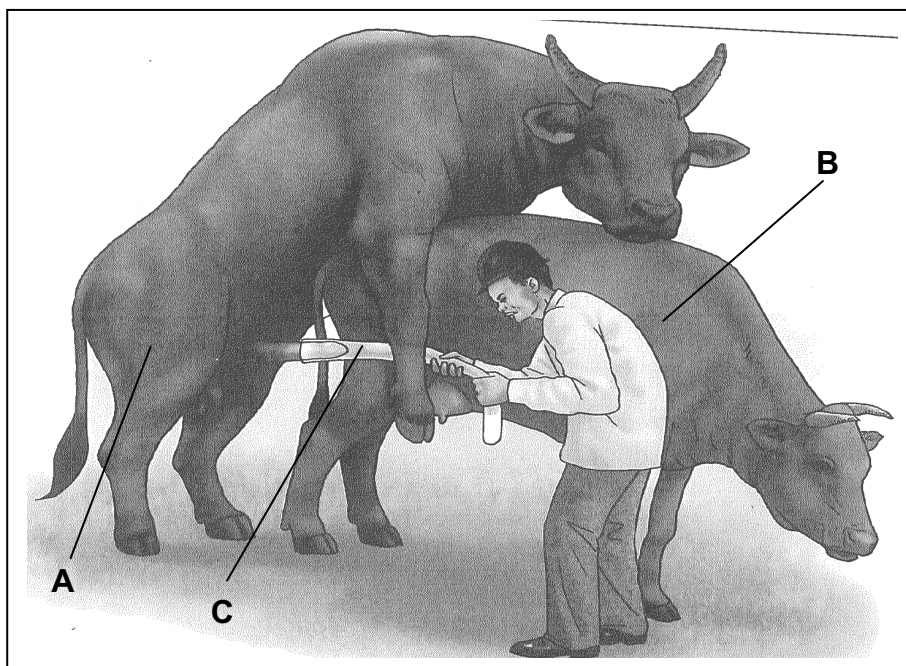
3.5.2 List THREE other signs that can be shown by the animal in QUESTION 3.5.1. (3)

- 3.6 There are several reasons for anoestrous. Some of the most important reasons include feed issues, contagious diseases and infections of the reproductive system. Producers will probably cull more cattle with extended heat intervals

Treatment options include normal and other management adjustments. Hormonal treatments such as increased levels of progesterone will lead to visible heat periods in cows. A treatment used today is to place progesterone drenched apparatus into the cows' genital tract.

[Source: Adapted from *Stock Farm magazine*: April 2014]

- 3.6.1 Describe anoestrous. (2)
- 3.6.2 Which hormone can be administered to the cow to treat anoestrous? (1)
- 3.6.3 Give ONE factor that causes anoestrous. (1)
- 3.7 The picture below represents one of the procedures of artificial insemination.

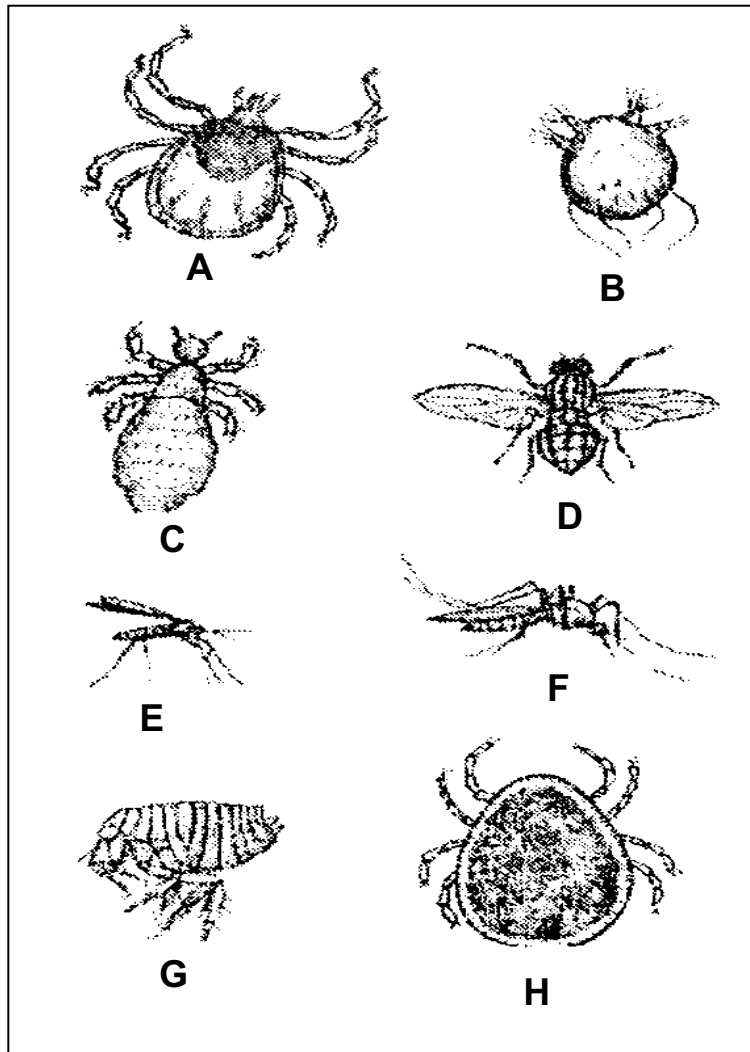


- 3.7.1 Name the activity happening in this diagram. (1)
- 3.7.2 Indicate the instrument that is used to collect semen. (1)
- 3.7.3 Give the term that is used to describe Animal **B**. (1)
- 3.7.4 Identify the correct time for artificial insemination. (1)
- 3.7.5 Discuss TWO characteristics of good quality semen. (2)

[35]

QUESTION 4: ANIMAL PROTECTION AND CONTROL AND GENETICS

4.1 Refer to the diagram below and answer questions that follow.

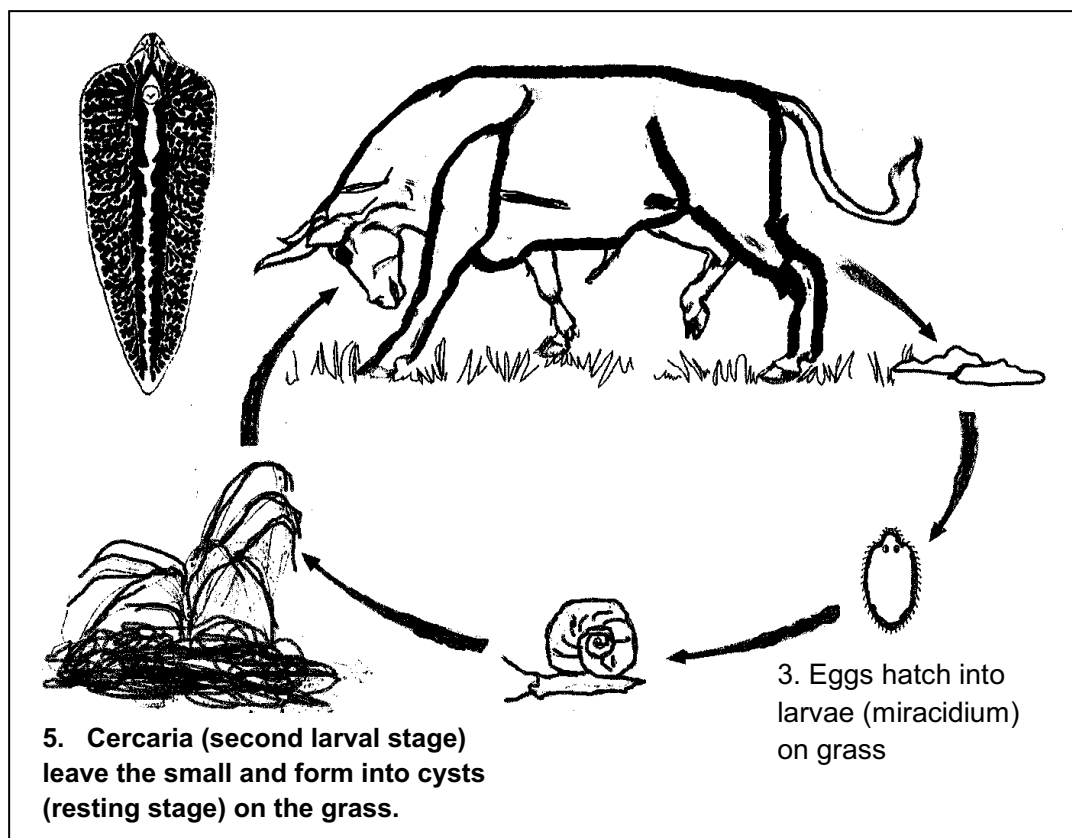


4.1.1 Identify the organisms labelled as **A**, **D**, **F** and **G**. (4)

4.1.2 Classify these organisms. (1)

4.1.3 What disease does the organism indicated by **A** cause? (1)

4.2



4.2.1 Give the internal parasite whose life cycle is indicated by the diagram above. (1)

4.2.2 Mention TWO internal parasites that attack animals, other than the one mentioned in QUESTION 4.2.1. (2)

4.3 By law certain diseases have to be covered by the immunisation programme, such as the immunisation of cattle against anthrax. Every farmer must draw a list of diseases in his/her region according to which animals should be immunised

[Source: Adapted from *Stock Farm*, April 2014]

4.3.1 Identify ONE activity in the passage which is the responsibility of the state towards the health of animals. (1)

4.3.2 Suggest ONE disease in the passage that attack cattle. (1)

4.3.3 Classify the disease in QUESTION 4.3.2 to the group of animal diseases where it belongs. (1)

4.3.4 Give ONE symptom of the disease mentioned in QUESTION 4.3.2. (1)

4.3.5 How can the problem of QUESTION 4.3.2 be solved using chemicals? (1)

- 4.4 Mr Zungu has been a farmer for 30 years in stock farming. He started by farming with Nguni breeds that were from the same family. In terms of selection he was convinced that only strong bulls would mate with the cows in the herd. He later changed to breeding animals related to a particular ancestor. He realised later all of this was not working. He then changed to the mating of purebred superior animals of the same species. Now he depends on genetic modification in improving the quality of the herd.

- 4.4.1 Identify the different breeding methods that were used by Mr Zungu in their sequence. (3)
- 4.4.2 Suggest TWO advantages of the method of breeding that he initially used. (2)
- 4.4.3 List TWO advantages of genetic modification. (2)
- 4.4.4 Mention the THREE techniques that can be used in genetic modification. (3)
- 4.5 A brown male goat is mated with a white female goat. Brown coat colour (B) is a dominant characteristic and white coat colour is a recessive characteristic. The ewes produced in the F₁-generation were a brown kid and the white kid.
- 4.5.1 Mention the genotypes parents. (2)
- 4.5.2 Identify the genotypes of the first crossing by means of a Punnet square. (6)
- 4.5.3 What type of dominance is evident in this scenario? (1)
- 4.6 Mutation and variation are important in farming. Compare these two terms. (2)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150