



Province of the
EASTERN CAPE
EDUCATION

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

SEPTEMBER 2015

AGRICULTURAL SCIENCES P1

MARKS: 150

TIME: 2½ hours



This question paper consists of 17 pages.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions in the ANSWER BOOK.
2. Start EACH question on a NEW page.
3. Read ALL the questions correctly and answer only what is asked.
4. Number the answers correctly according to the numbering system used in this question paper.
5. A non-programmable calculator may be used.
6. Show ALL your calculations, including units and formula, where applicable.
7. Write neatly and legibly.

SECTION A**QUESTION 1**

1.1 Various options are given 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 B.

1.1.1 The type of protein with the highest biological value is ...

- A fish protein.
- B egg protein.
- C milk protein.
- D soya beans protein.

1.1.2 In a feedlot, an animal consumed 5,2 kg and gained 1,6 kg. The Feed Conversion Ratio of this animal is ...

- A 2,72.
- B 3,48.
- C 3,25.
- D 1,85.

1.1.3 In a feed flow programme the feed requirements will guide the quantities and composition of rations supplied to farm animals. The feed requirements of animals depend on the following:

- (i) The production status of the animal
- (ii) The size of the animal
- (iii) The value of the product being produced
- (iv) The season of the year

Choose the correct combination:

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

1.1.4 Environmental temperatures play a prominent role in animal production. When it is cold, the following occurs:

- (i) Feed is utilised efficiently.
- (ii) Animals eat much more food to maintain body temperature.
- (iii) Shelter is needed to prevent unnecessary loss of heat.
- (iv) Metabolism and heat production increases.

Choose the correct combination.

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

1.1.5 Urea poisoning is caused by an excessive amount of ... in the blood.

- A sodium
- B potassium
- C magnesium
- D ammonia

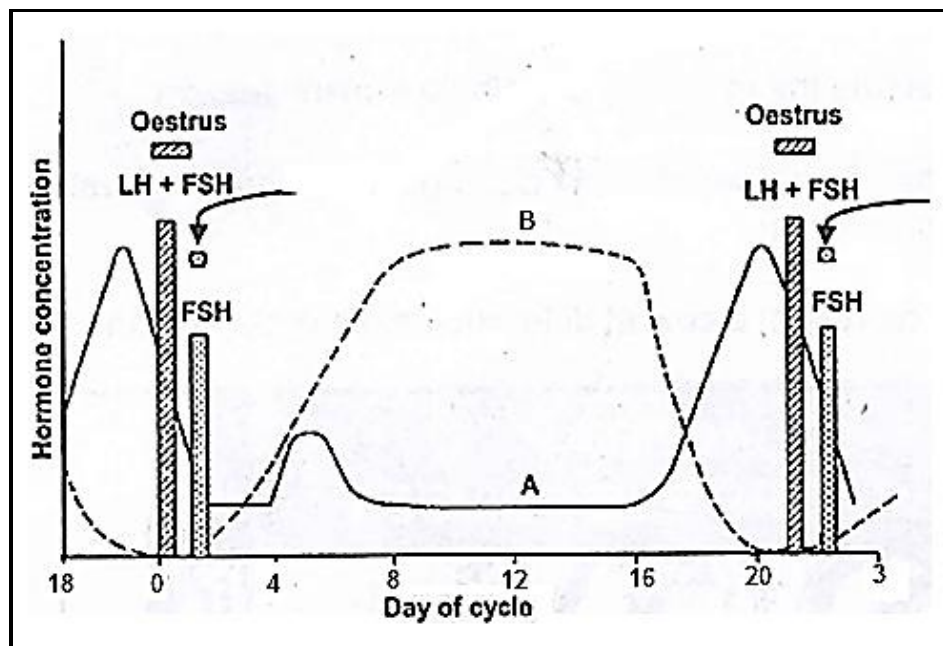
1.1.6 An equipment used to administer medication in a liquid form:

- A Balling gun
- B Drenching gun
- C Cannula gun
- D Rectal gun

1.1.7 The following statement is NOT true about milk production.

- A High crude fibre content produces milk with higher butterfat content.
- B When more acetic acid is absorbed, more butterfat is produced in milk.
- C Low crude fibre content lead to the high butterfat content in milk.
- D When milk production is at its highest, butterfat content is at its lowest.

- 1.1.8 The graph below represents the levels of hormones at different stages in the oestrus cycle of a cow.



When hormone labelled B during day 12 of the cycle is at its highest, the following occurs:

- A Uterus milk is secreted to nourish the embryo.
 - B FSH is secreted from the pituitary gland.
 - C The graafian follicle develops and grows bigger.
 - D Lining of the uterus wall is thinning.
- 1.1.9 The membranes that surround the embryo from the inside to the outside are ...
- A chorion, allantois, amnion.
 - B chorion, amnion, allantois.
 - C amnion, allantois, chorion.
 - D amnion, chorion, allantois.
- 1.1.10 The temperature of the testis is regulated by the ...
- A scrotum.
 - B epididymis.
 - C testicles.
 - D vas deferens.

(10 x 2) (20)

- 1.2 Indicate whether each of the following 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 **A ONLY**.

COLUMN A		COLUMN B
1.2.1	A Active absorption	Movement of molecules against concentration gradient
	B Passive absorption	
1.2.2	A Wasting disease	Deficiency symptom caused by lack of iron in the animal body
	B Goitre	
1.2.3	A Halter	Technique for handling pigs
	B Plywood board	
1.2.4	A Brown ear tick	Example(s) of three host tick(s) where each life cycle stage is carried out on a different animal
	B Bont tick	
1.2.5	A Leydig cells	Produce the seminal fluid for the lubrication of the urethra
	B Seminiferous tubules	

(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) in the ANSWER BOOK.

- 1.3.1 The amino acids that determines the biological value of a protein
- 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 administration of a vaccine into an animal's body using a needle
- 1.3.4 The intensive farming enterprise where cattle are kept in small area and fed for maximum production output
- 1.3.5 The main reason for using a chin ball marker for a herd of dairy cattle

(5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) 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 Fermentation of waste products in a cow occurs in the abomasum.

1.4.2 An elastator is used to castrate large male cattle by only clipping the seminal cord, without damaging the scrotum.

1.4.3 Luteotrophic is the hormone in dairy cows that is secreted by the structure that develops on the ovary after the graafian follicle bursts.

1.4.4 The epididymis is a tube of muscular tissue and is the common excretory canal for urine and semen.

1.4.5 The condition where soft parts of the foetus decay and only loose bones remains is known as dystocia. (5 x 1) (5)

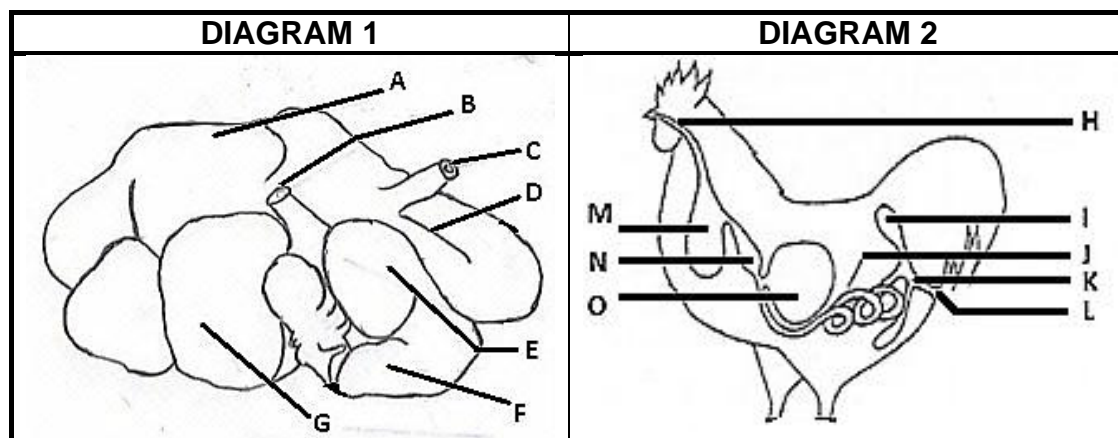
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: ANIMAL NUTRITION

- 2.1 DIAGRAM 1 below represents the stomach parts of the farm animal and DIAGRAM 2 represents the digestive system of a fowl.



- 2.1.1 Identify the type of farm animal represented by the stomach in DIAGRAM 1 above. (1)
- 2.1.2 Briefly describe the appearance and condition of food particles entering through positions labelled **C** and **B** respectively. (2)
- 2.1.3 Compare the part labelled **F** in DIAGRAM 1 and the part labelled **O** in DIAGRAM 2 with regard to the role they play in digestion. (2)
- 2.1.4 Indicate the letter in DIAGRAM 2 that represents the part where the absorption of food occurs. (1)
- 2.1.5 Describe TWO adaptations of the part mentioned in QUESTION 2.1.4 that ensures the maximum absorption of food. (2)
- 2.1.6 Explain the difference between the animal in DIAGRAM 1 and 2 with regard to the synthesis of essential amino acids. (2)

2.2 The table below represents the nutritional information of feeds.

Feed	Digestible protein (%)	Crude fibre (%)	Metabolised energy (MJ/kg)
Grass pasture	7,0	36,0	8,0
Lucerne hay	14,1	30,1	7,5
Milk powder	32,0	2,4	10,6
Peanut hay	9,2	25,1	8,7
Maize meal	9,0	2,0	12,0
Fish meal	60,9	0,0	11,3
Sorghum	11,0	2,7	12,2
Linseed oilcake	34,0	1,0	10,8

2.2.1 Identify TWO protein rich concentrate sources from the table above. Give a reason for the answer by referring to the table. (3)

2.2.2 Choose a feed from the table that is most suitable to be used for growing animals. Justify your choice. (2)

2.2.3 Suppose a farmer needs a balanced ration with 16% protein to prepare for his dairy cows. The farmer has maize meal and linseed oil cake meal available. Determine the ratio in which the available feeds could be mixed to get the required protein value for the cows. (4)

2.3 The digestible coefficient is a percentage expression of the part of a feed that is not excreted, but absorbed by the animal.

The moisture content of the lucerne hay is 12%.

A goat consumed 15 kg of the lucerne hay and excreted 6 kg dry manure.

Refer to the information above to calculate the digestible coefficient of this lucerne hay. Show all the calculations. (5)

2.4 Minerals play an important role in the health, growth and reproduction of farm animals and their deficiencies will have a negative effect on production.

Indicate the mineral deficient when an animal displays each of the following symptoms:

2.4.1 Chewing dry bones (1)

2.4.2 Pale mucous membrane (1)

2.4.3 Enlarged thyroid gland (1)

- 2.5 The farmer can plan and draw up a feed flow programme for a group of animals to ensure that feed is constantly available throughout the year. The information below is available for the farmer to calculate the feed requirement for a group of animals:

Number of lactating cows	=	50
Average mass	=	500 kg
Fodder requirement for each cow	=	10 kg DM/day
Fodder unit (FU)	=	225 FU

Calculate the total fodder requirement of DM per month and per year. Show all calculations.

(5)

- 2.6 Indicate the method of mineral supplementation suitable for each of the following conditions:

2.6.1 Animals are allowed to eat minerals according to their need (1)

2.6.2 Supplementing calcium to dairy cows with milk fever (1)

2.6.3 Mineral added to the concentrate feed (1)

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QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 Read the passage below and answer the questions that follow.

Farm animal	Lower critical temperature (°C)	Heat produced (kJ/hour)	Space required (m ²)
Dairy cows	2	2500	5,5
Piglets	27	30	1,9
Chickens (day old)	21	6	0,1
Laying hens	7	40	0,2

- 3.1.1 Identify the animal that can be kept extensively without a decrease in production. Give a reason for your answer. (2)
- 3.1.2 Explain why dairy cows have a high heat production (kJ/hour). (2)
- 3.1.3 Indicate TWO farm animals from the table that are raised most intensively. (2)
- 3.1.4 Supply TWO reasons to support the answer in QUESTION 3.1.3 above. (2)
- 3.1.5 Suggest the equipment that can be used to ensure that the temperature does not fall below 21 °C for day old chickens. (1)

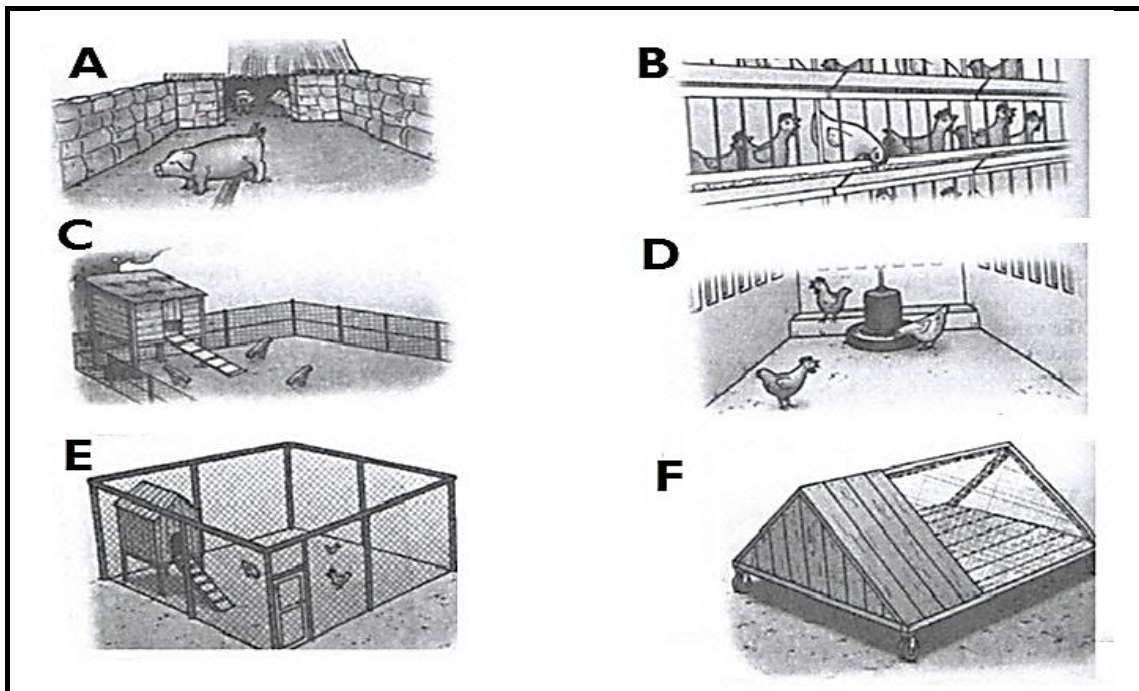
3.2 Animals lose body heat through various processes. Below is a list of processes through which animals lose heat.

Heat radiation; Conduction; Excretion; Convection

Link each of the statements below with the processes above.

- 3.2.1 Loss of heat when an animal body is in contact with a cold surface. (1)
- 3.2.2 Upward movement of warm air and downward movement of cold air. (1)
- 3.2.3 Loss of heat from a warm body to a colder surrounding atmosphere. (1)
- 3.2.4 Loss of body heat in urine and faeces. (1)

- 3.3 Analyse different structures below used for sheltering farm animals and answer the questions that follow.



Match the above techniques with each of the following descriptions:

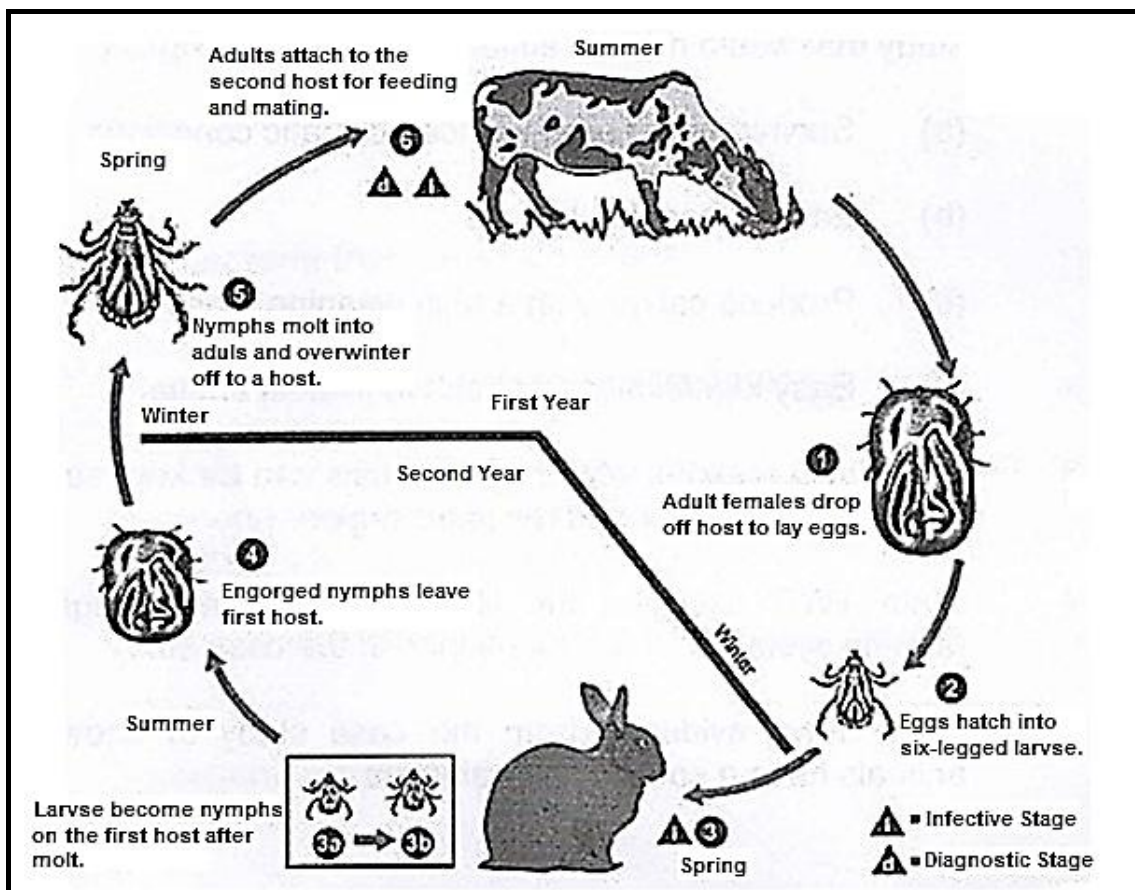
- 3.3.1 (a) Backyard system (1)
 (b) Free range system (1)
 (c) Deep litter house (1)
- 3.3.2 Indicate TWO letters of structures that are examples of intensive production systems. (2)

- 3.4 The illustrations below show the parasite that affect farm animals.

Foot-and-mouth disease (FMD) is a highly contagious disease that spreads rapidly. It is a notifiable disease and any suspicion must be reported immediately to the state veterinarian. Adult animals normally recover but the mortality rate is very high in young animals. FMD is epidemic in Africa especially where this disease causing agent persist and this make it difficult to eradicate. The pathogen causing the disease can be carried for up to 20 years.

- 3.4.1 State the pathogen that causes foot-and mouth disease (FMD). (1)
- 3.4.2 This disease (FMD) can infect large number of animals. Support this statement by referring to the case study above. (1)
- 3.4.3 List THREE symptoms of the disease mentioned above. (3)
- 3.4.4 Suggest TWO steps that can be taken to prevent the spread of this epidemic if there is an outbreak. (2)

3.5 The schematic representation below shows the life cycle of a parasite.



3.5.1 Identify the external parasite in the diagram above. (1)

3.5.2 Classify the parasite above based on its life cycle. (1)

3.5.3 From the diagram, identify THREE forms in which the parasite appears during its life cycle. (3)

3.5.4 State TWO economic losses that may be caused by this parasite. (2)

3.6 Plant poisoning is a serious problem that affect animals. Farmers need to be aware of the plants that may be poisonous to livestock and take measures to prevent such poisoning.

Explain the reason for each of the following measures when an animal have ingested poison:

3.6.1 Farmers in rural areas give animals strong tea (1)

3.6.2 Dosing animals with sugar or glucose (1)

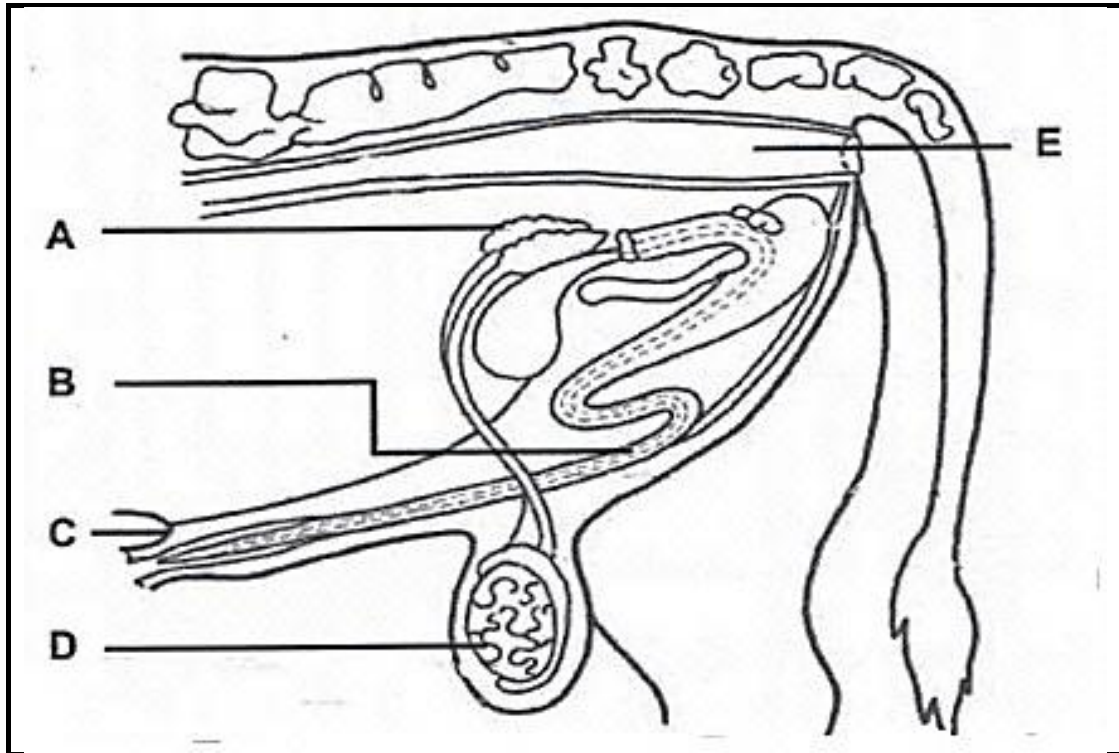
3.6.3 Providing large doses of purgative (1)

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Start this question on a NEW page.

QUESTION 4: ANIMAL REPRODUCTION

4.1 The diagram below illustrates the reproductive system of a bull.



4.1.1 Identify the reproductive organs labelled **A**, **B** and **D**. (3)

4.1.2 The bull may be sterile due to congenital defects in part numbered **D**. State TWO of these defects. (2)

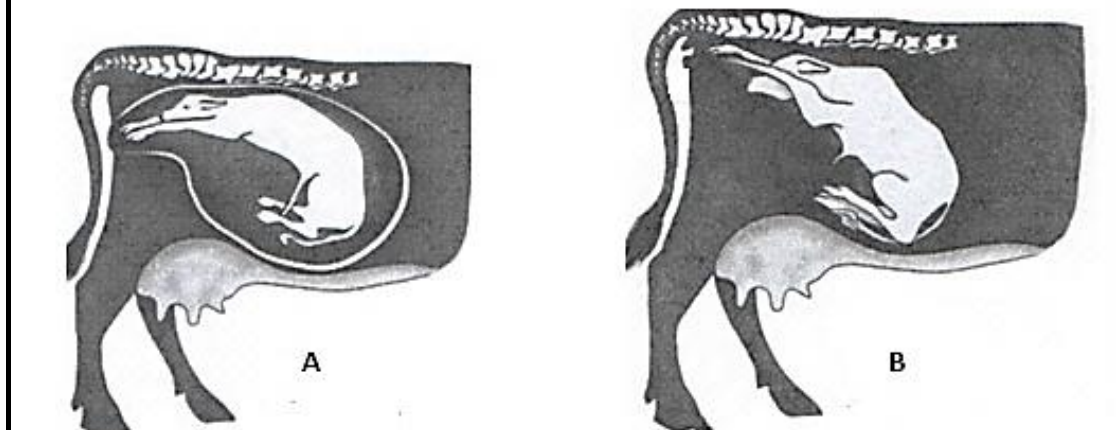
4.1.3 Briefly describe ONE function of the hormone secreted in the part labelled **D**. (1)

4.2 Animals are cloned for their genetic superiority. The main aim is to rapidly increase the number of their offspring that inherit the desirable characteristics.

4.2.1 Differentiate between *reproductive* and *therapeutic cloning*. (2)

4.2.2 Explain TWO disadvantages of cloning. (2)

- 4.3 The presentation of the foetus during parturition is of utmost importance and the incorrect position may cause serious problems which may result in injuries and even death. Refer to the illustrations of different foetal presentation below to answer the following questions.



4.3.1 Write down the letter that represent the following:

- (a) The abnormal foetal presentation (1)
- (b) The normal foetal presentation (1)

4.3.2 Describe TWO conditions that may result in the illustration marked **B**. (2)

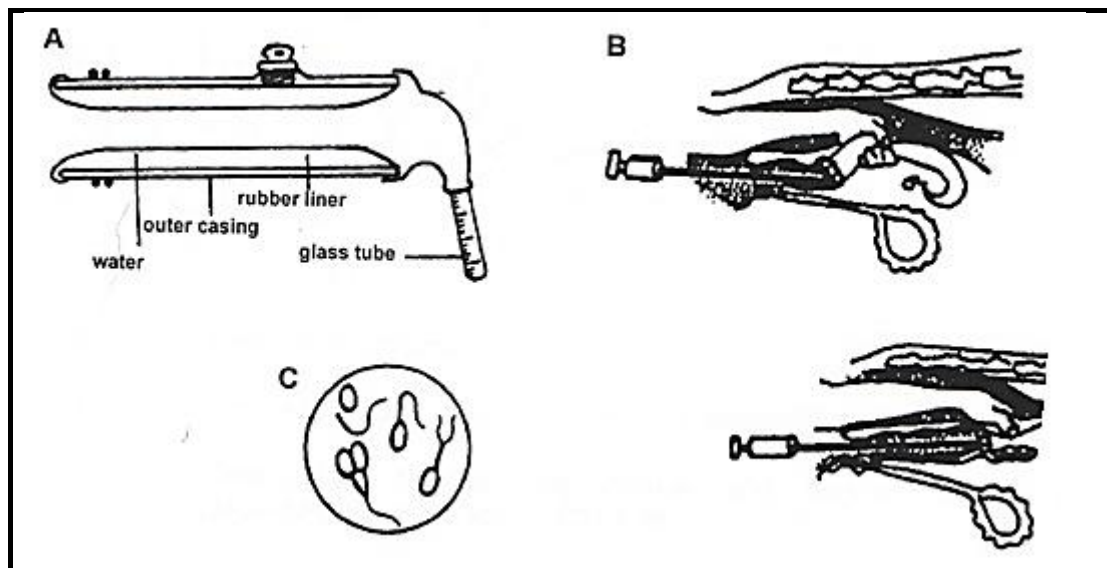
- 4.4 The table below shows the percentage of butterfat content, milk yield and crude fibre content of different dairy breeds.

Breed type	Butterfat content (%)	Milk yield (l)	Crude fibre content (index value)
Holstein	3,5	50	4
Ayrshire	3,9	40	6
Brown Swiss	4,0	30	8
Guernsey	4,6	25	10
Jersey	5,0	20	12

4.4.1 Draw a bar graph to compare milk yield, butterfat and crude fibre content of different dairy breeds. (6)

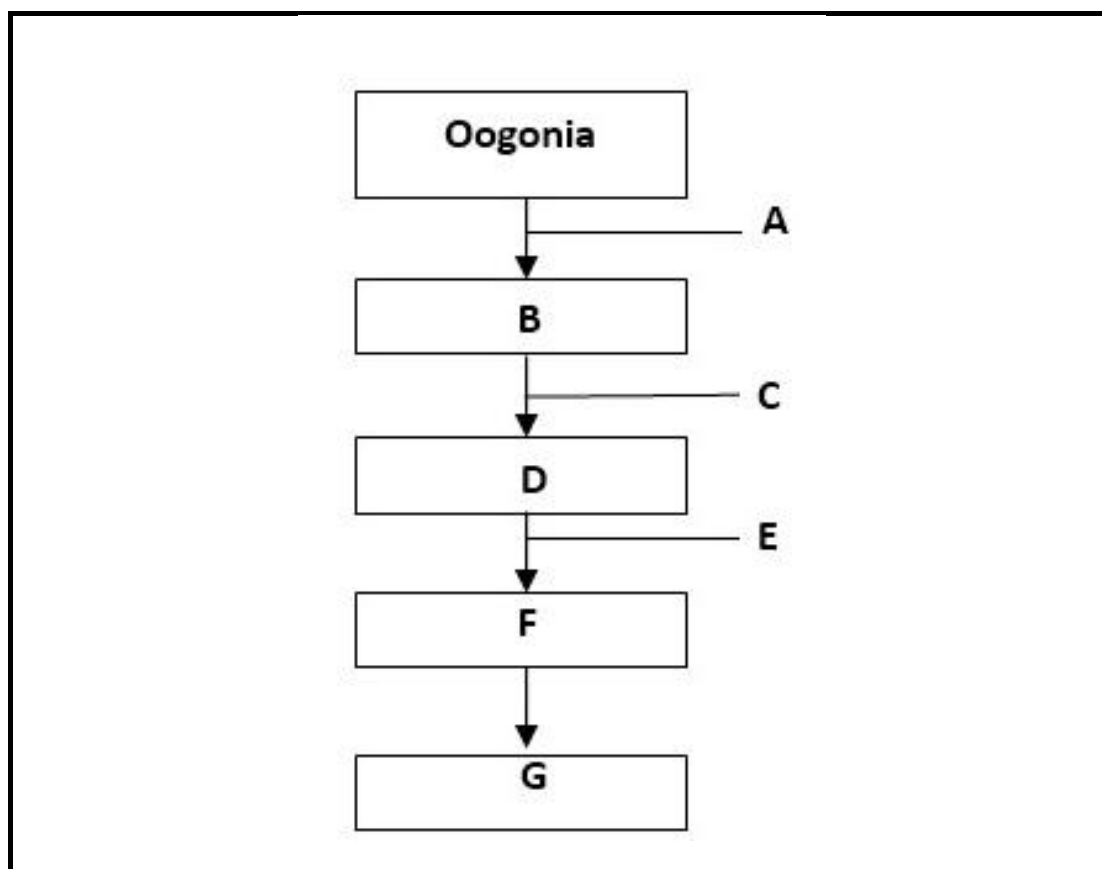
4.4.2 Identify a dairy breed from the graph that produces the highest milk yield. (1)

- 4.5 The following diagrams illustrate the equipment and techniques used in animal reproduction.



- 4.5.1 Name the instrument illustrated in DIAGRAM A. (1)
- 4.5.2 Identify the technique illustrated in DIAGRAM B. (1)
- 4.5.3 Indicate the correct time to do the technique mentioned in QUESTION 4.5.2 above. (1)
- 4.5.4 Mention the type of evaluation represented by DIAGRAM C. (1)
- 4.5.5 For successful implementation of Artificial Insemination (AI), the fluid carrying the cells visible in DIAGRAM C should fulfil particular characteristics. Justify this statement by indicating TWO of these characteristics. (2)

- 4.6 The schematic representation below illustrates the process taking place in female animals.



- 4.6.1 Identify the process illustrated above. (1)
- 4.6.2 Name the processes indicated by letters **A** and **E**. (2)
- 4.6.3 The stages of development illustrated above have haploid and diploid cells. Indicate the letter and the name representing the stage that is haploid. (2)
- 4.7 A superior female animal is treated with a hormone to make her superovulate. She is then fertilised and the embryos are removed and placed into the recipient female animals.
- 4.7.1 Identify the technique above. (1)
- 4.7.2 Describe TWO advantages of the technique in QUESTION 4.7.1 above for farmers. (2)

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TOTAL SECTION B: 105
GRAND TOTAL: 150

