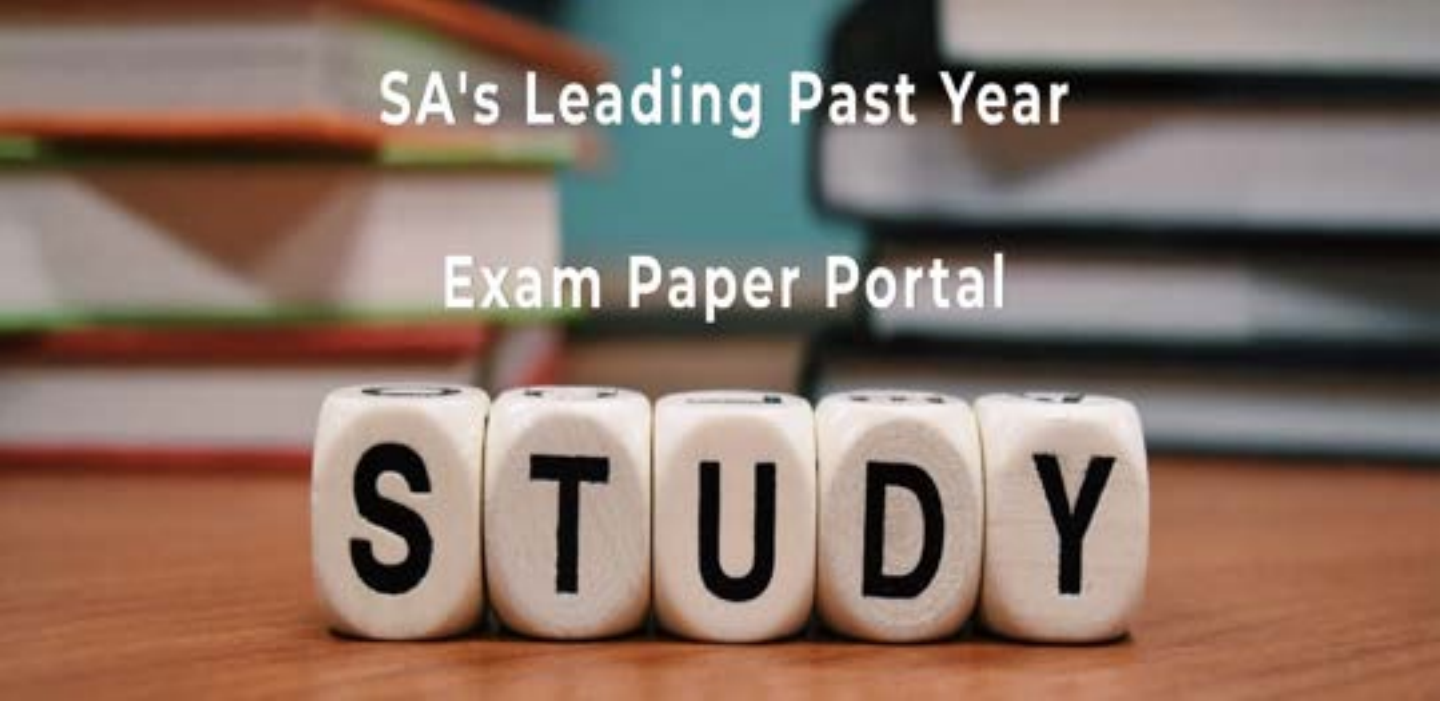

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GRADE 12

AGRICULTURAL SCIENCES P1

NOVEMBER 2014

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 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. Non-programmable calculators may be used.

6. Show ALL your calculations, including formula, 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 A.

1.1.1 The type of animals that feed primarily on roughage:

A Pigs
B Chickens
C Cattle
D Ducks

1.1.2 The metabolic energy value of a feed is equal to the gross energy of the feed minus the energy lost in the …

A manure, urine and body heat.
B gases, urine and body heat.
C manure, gases and body heat.
D manure, urine and gases.

1.1.3 Diffusion is the process that refers to the movement of molecules or particles ...

(i) from a higher to a lower concentration.
(ii) from a lower to a higher concentration.
(iii) along the concentration gradient.
(iv) against the concentration gradient.

Choose the correct combination:

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

1.1.4 Animals can obtain water from the following water sources:

A Converted water, drinking water and water from feeds
B Metabolic water, drinking water and water from feeds
C Essential water, converted water and drinking water
D Forced water, drinking water and water from feeds

1.1.5 ONE of the following combinations of diseases can be classified as bacterial diseases:

A Rabies and anthrax
B Red water and Newcastle disease
C Lumpy wool and Rift Valley fever
D Mastitis and tuberculosis (TB)

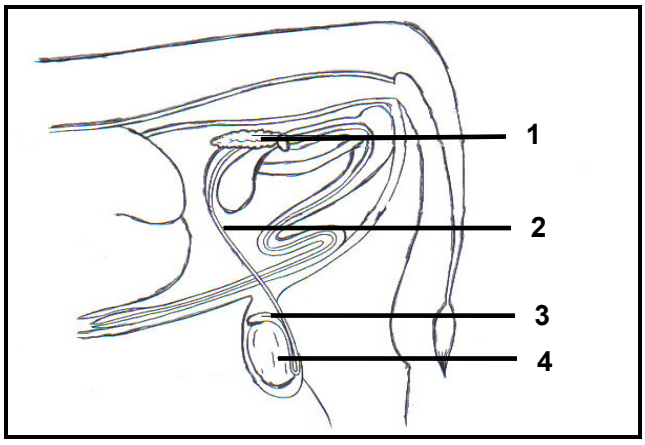
1.1.6 Incorrect handling of farm animals may lead to pale and exudative meat, poor grading of carcasses due to bruising as well as ... after slaughtering.

A yellow-coloured fat
B softening of the meat
C softer bones
D delayed rigor mortis

1.1.7 The cheapest and most sustainable way of increasing production output in organic animal production is to use …

A automated environmental control in a shelter.
B an effective breeding programme.
C growth stimulants.
D chemicals to prevent diseases.

1.1.8 The hormone responsible for the development of secondary masculine sexual characteristics is secreted by part ...



A 1.
B 2.
C 3.
D 4.

1.1.9 … refers to the attachment of the embryo to the endometrium of a sow.

A Gestation
B Synchronisation
C Implantation
D Copulation

1.1.10 The new-born calf or lamb is given colostrum to increase …

A resistance to diseases.
B milk production.
C contraction of voluntary muscles.
D hormonal function. (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.

Example: 1.2.6

COLUMN A		COLUMN B
A:	Maize meal	A feed with a high protein content
B:	Carcass meal	

Answer: 1.2.6 B only

COLUMN A			COLUMN B
1.2.1	A:	Vitamin A	A deficiency of this nutrient can cause parakeratosis
	B:	Vitamin D	
1.2.2	A:	Animals become tame	Consequence of the correct and frequent handling of animals
	B:	Aggressive temperament	
1.2.3	A:	Foot-and-mouth disease	Example of a viral disease
	B:	Rift Valley fever	
1.2.4	A:	90 days	The dry period of dairy cattle before their next parturition
	B:	60 days	
1.2.5	A:	Reproductive cloning	New organism is created
	B:	Therapeutic cloning	

(5 x 2) (10)

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

1.3.1 Strategic plan for livestock farmers to ensure that there is enough feed on the farm to meet all the requirements of animals for a period of one year

1.3.2 A permanent handling facility used to restrain a bull by its head

1.3.3 A pair of globular glands that look like a cluster of grapes and which are the largest secondary sex glands of a bull

1.3.4 The process that results in eggs or ova being formed

1.3.5 An inflammatory bacterial disease that could be acute or chronic and which attacks the udder of a cow (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 Mastication is a <u>chemical</u> form of digestion which increases the surface area of food for effective enzyme activity.

1.4.2 A feeding approach where animals have unlimited access to a supplement and can eat when and as much as they wish is called <u>fodder</u> feeding.

1.4.3 <u>Quarantine</u> involves the management practice and strategy that controls the introduction and spreading of diseases through contact.

1.4.4 Painting the teats of sows with <u>zinc</u> decreases the chances of anaemia in piglets.

1.4.5 <u>Transplantation</u> is a technique used on female animals to make them come into heat approximately at the same time. (5 x 1) (5)

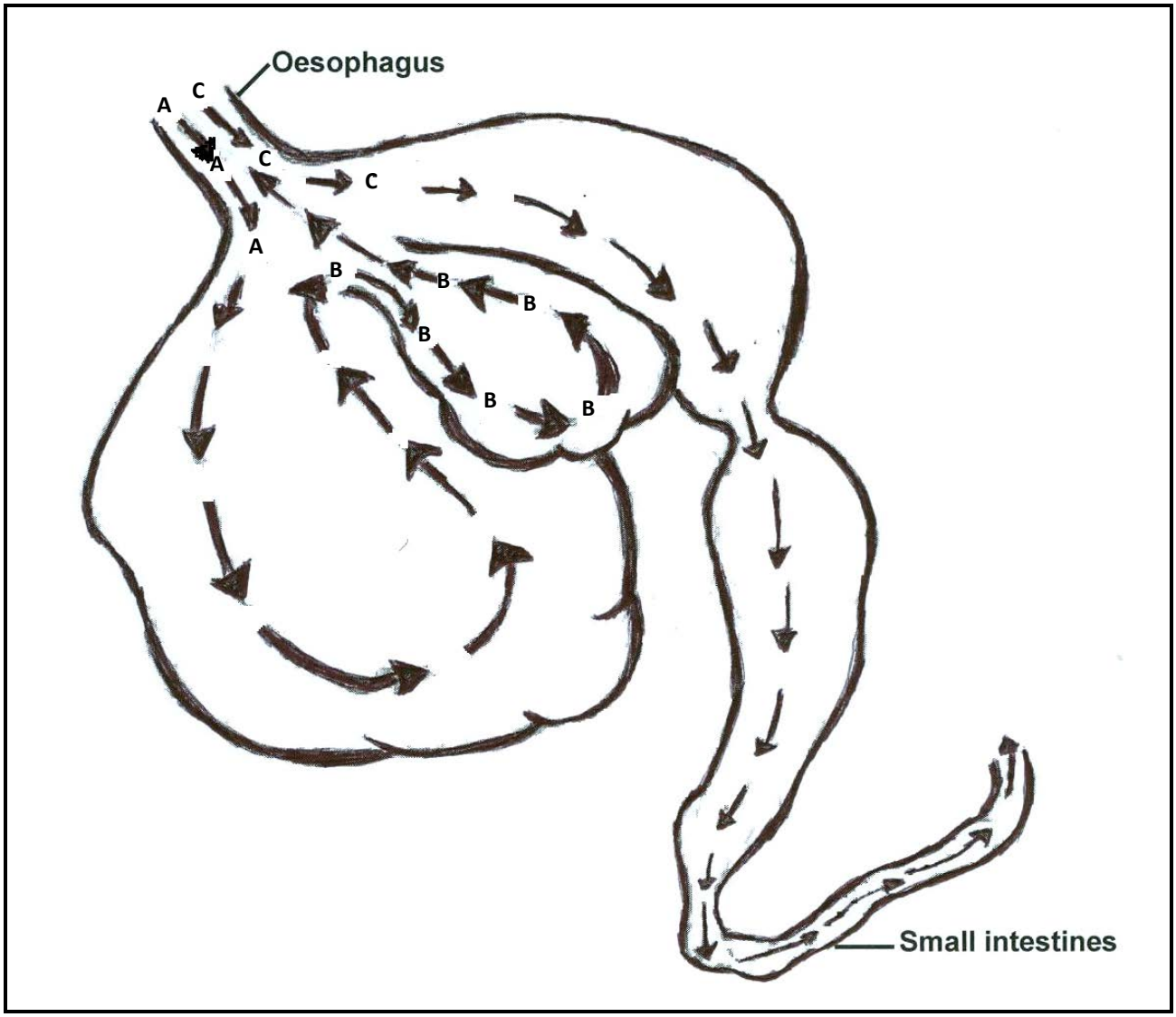
TOTAL SECTION A: 45

SECTION B

QUESTION 2: ANIMAL NUTRITION

Start this question on a NEW page.

2.1 The diagram below shows the path of food in the stomach of a farm animal.



2.1.1 Identify the type of animal that has the stomach shown in the diagram above. (1)

2.1.2 Identify the processes illustrated by arrows **A**, **B** and **C**. (3)

2.1.3 The process illustrated by arrow **B** has advantages for this farm animal. Justify this statement by stating THREE advantages. (3)

2.2 The table below indicates the quality of pastures and nutritional values over three seasons.

SEASON	PASTURE QUALITY	NUTRITIONAL VALUE
Summer	High	High protein and energy
Winter	Low	Low quality protein, dry pasture
Spring	Good (new growth)	Increased protein content

2.2.1 Briefly describe how the population size of the following micro-organisms in the reticulo-rumen of animals grazing on this pasture will differ with the seasons by referring to:

(a) Amylolytic bacteria in summer (2)

(b) Proteolytic bacteria in winter (2)

2.2.2 Describe the quality of a supplementary feed that will be supplied in these pastures during winter. (2)

2.2.3 Name the vitamin that is likely to be deficient in animals feeding on dry pasture. (1)

2.3 An animal consumes 24 kg of hay with a moisture content of 12%. It excretes 7,3 kg of dry manure.

2.3.1 Calculate the coefficient of digestibility of this hay. (5)

2.3.2 The hay mentioned above cannot be recommended for dairy cows as the only source of feed. Justify the statement. (2)

2.4 The table below indicates the composition of two animal feeds.

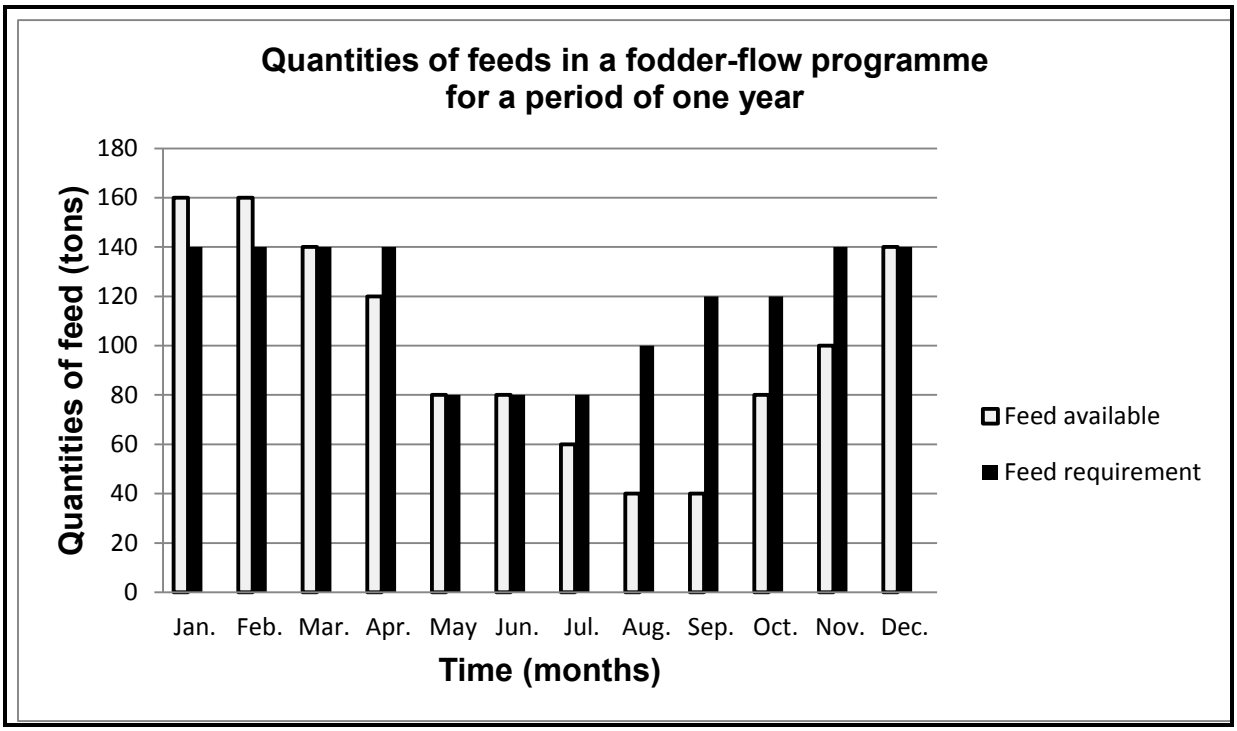
FEED A	FEED B
80% TDN	50% TDN
8% DP	4% DP
4 mg of calcium	2 mg of calcium
6% crude fibre	12% crude fibre

2.4.1 Identify the feed that will most likely be fed to non-ruminant animals. (1)

2.4.2 Motivate the answer to QUESTION 2.4.1. (2)

2.4.3 Calculate the nutritive ratio of FEED B. (3)

2.5 The graph below illustrates a fodder-flow programme. Answer the questions that follow.



2.5.1 Deduce, from the bar graph above, the number of months during which there will be more feed available than required by animals. (1)

2.5.2 Indicate a particular month during which the available feed will be most insufficient for the animals. (1)

2.5.3 Calculate the shortage of feed during October in kilograms (kg). (3)

2.5.4 Suggest THREE cost-effective measures for better utilisation of feed that could be applied in January and February. (3)
[35]

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The production system below is commonly used in rural communities on a small scale. Chickens are fed using leftover food from the house and grain crops from fields.

3.1.1 Identify the type of poultry production system above that is normally used by rural communities. (1)

3.1.2 Name THREE advantages of the system in QUESTION 3.1.1. (3)

3.1.3 State THREE problems that could be associated with this type of production system. (3)

3.2 The structures, apparatus and appliances below are used in the handling and management of farm animals in an animal production system.

- Barbed wire fence to divide areas of farmland
- A separate crush
- Red flags and warning signs
- Kraal made with branches and sticks
- A shed made with wooden poles and canvas

Indicate which of the above-mentioned structures, apparatus and appliances will be most suitable to use in each of the following situations:

3.2.1 The implementation of a rotational grazing system (1)

3.2.2 Subsistence farmers use this structure to house animals at night (1)

3.2.3 Protection of young lambs against cold and wind (1)

3.2.4 A herd of cattle crossing a public road (1)

3.3 The farmers below are involved in two different production systems.

FARMER A	FARMER B
Farming in a 4 800 ha semi-arid area with 2 workers. The farm has 1 farm shed, 8 wind pumps, 1 cattle-handling facility, 1 dipping station and 400 cattle kept on natural pasture.	Farming in a 400 ha wet area with 20 workers. The farm has 6 farm sheds, 25 feedlot camps, 3 cattle-handling facilities, 3 dipping stations and 3 500 cattle.

3.3.1 Identify the farming system practised by FARMER A. (1)

3.3.2 Give TWO reasons from the table that support the answer to QUESTION 3.3.1. (2)

3.3.3 Briefly distinguish between the feeding strategies followed by FARMER A and FARMER B. (2)

3.3.4 State TWO measures that FARMER A can take to increase production. (2)

3.4 Body temperature, the number of breaths per minute and the rate of the heartbeat of the animal are major indicators of the health of an animal.

3.4.1 Name the body part of a cow where the thermometer is inserted to take body temperature. (1)

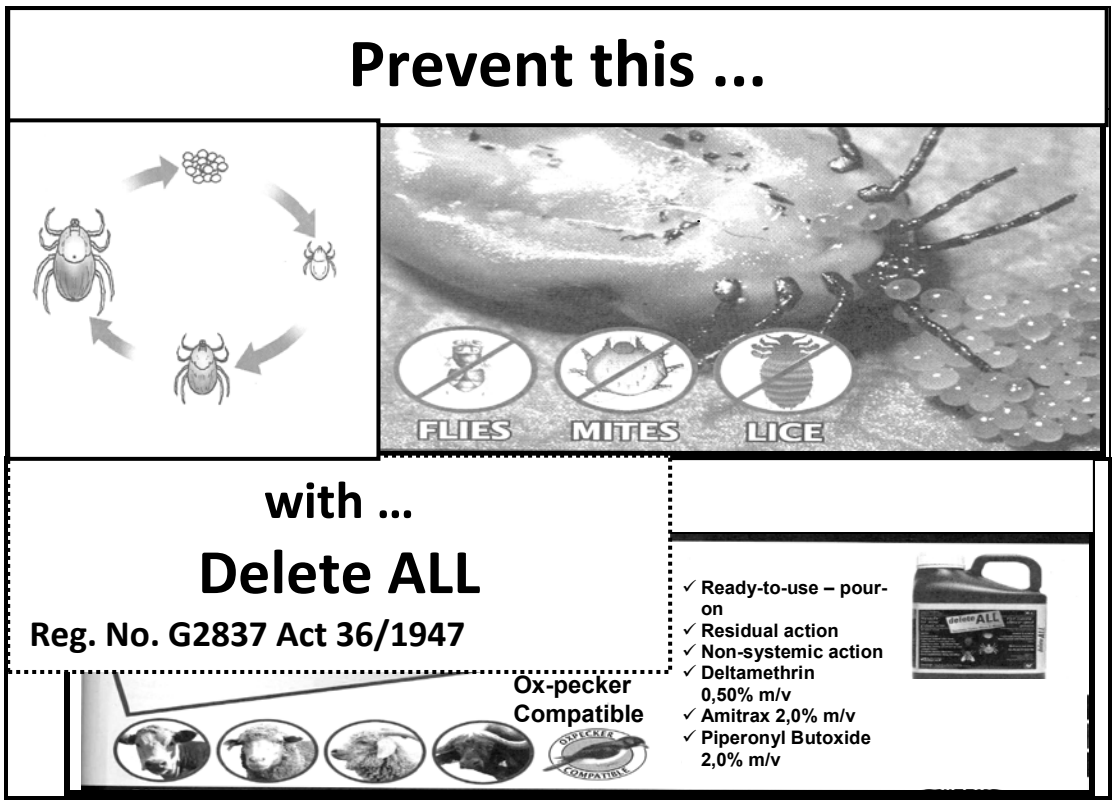
3.4.2 An animal has an acute illness. What will the status of the following health indicators of this animal be:

(a) Body temperature (1)

(b) Respiratory rate (1)

(c) Heart beat (1)

3.5 The picture below is based on the control of external parasites.



3.5.1 Identify the type and the name of the tick treated with this medication. (2)

3.5.2 Indicate ONE animal disease that is transmitted by the tick in QUESTION 3.5.1. (1)

3.5.3 The chemical above is considered to be eco-friendly. Justify this statement by giving TWO reasons from the data in the picture. (2)

3.5.4 Suggest an appropriate method of applying this chemical. (1)

3.5.5 The role of the state is to have control over medicines and remedies such as the one in the picture. Justify this statement by giving TWO aspects from the data above. (2)

3.6 Farmers need to be aware of plants that pose a danger to livestock because they are poisonous.

3.6.1 Name TWO plants that are normally found on natural pastures and could be poisonous to animals. (2)

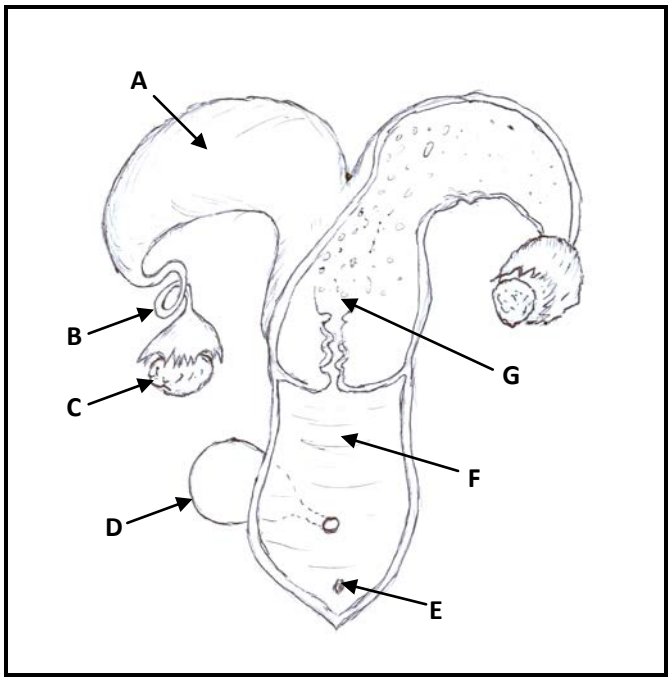
3.6.2 Indicate THREE measures the farmer can take to prevent plant poisoning. (3)

[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The diagram below represents the female reproductive system.



4.1.1 Identify parts **A**, **B**, **C** and **F**. (4)

4.1.2 Indicate the letter (A–G) and the name of the part that is usually plugged with alkaline mucus during pregnancy. (2)

4.2 The data below represents hormone levels during the oestrus cycle.

DAYS	PROGESTERONE LEVEL CONCENTRATION (mg/mℓ)	OESTROGEN LEVEL CONCENTRATION (mg/mℓ)
0	3	2
4	3	2
8	32	2
12	32	2
16	32	2
20	3	30
24	3	2

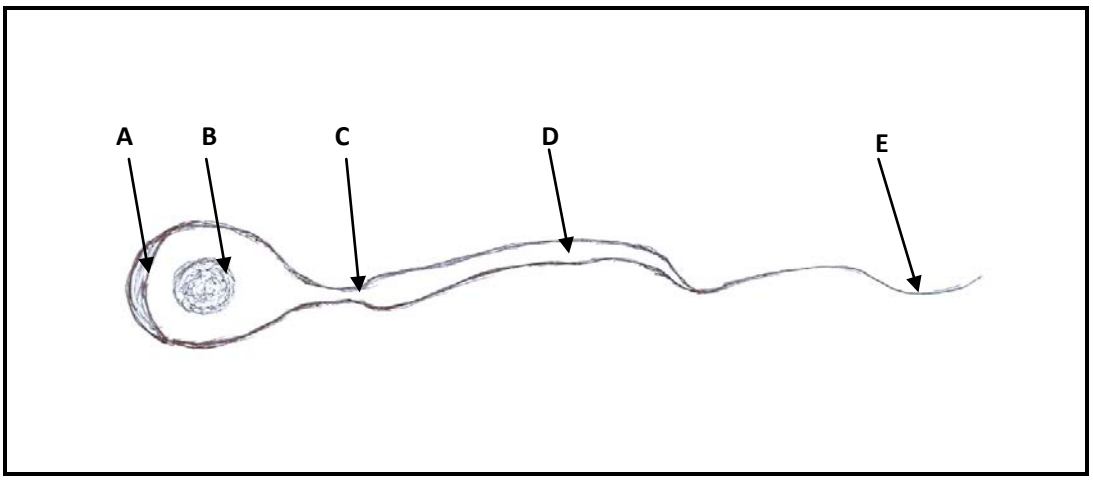
4.2.1 Draw a line graph to illustrate the levels of progesterone and oestrogen on different days during the oestrus cycle. (6)

4.2.2 Suggest the role of progesterone from day 8 to day 16. (1)

4.2.3 Deduce from the data above the day when the follicles will be fully developed. (1)

4.2.4 Motivate the answer to QUESTION 4.2.3 by referring to the graph. (1)

4.3 The diagram below illustrates a sperm cell.



4.3.1 Identify part **B**. (1)

4.3.2 Write down the letter of the part that represents the acrosome. (1)

4.3.3 Name ONE function of part **E**. (1)

4.3.4 Distinguish between a *sperm cell* and *semen*. (2)

4.3.5 Indicate TWO methods of collecting semen from bulls. (2)

4.4 Artificial Insemination (AI) makes it possible for farmers to impregnate most female animals on the farm. To get the expected results the farmer needs to observe the oestrus cycles of female animals in order to detect heat and readiness for insemination.

4.4.1 Define *artificial insemination*. (2)

4.4.2 State THREE main requirements for successful artificial insemination of farm animals. (3)

4.5 The statements below indicate the main stages of a reproductive technique conducted in cows:

A. Flushing the embryo from the donor cow
B. Artificial insemination of the donor cow
C. Super ovulation of the donor cow
D. Placement of the embryo in the recipient cow
E. Synchronisation of both donor and recipient cows

4.5.1 Identify the reproductive technique above. (1)

4.5.2 Re-arrange the above statements (A–E) in the correct order. (5)

4.5.3 State TWO benefits of this reproductive technique. (2)
[35]

TOTAL SECTION B: 105
GRAND TOTAL: 150