



Province of the  
**EASTERN CAPE**  
EDUCATION

**NATIONAL  
SENIOR CERTIFICATE**

**GRADE 12**

**SEPTEMBER 2010**

**AGRICULTURAL SCIENCES – PAPER 1**

**MARKS: 150**

**TIME: 2½ hours**



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This question paper consists of 14 pages.

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**INSTRUCTIONS AND INFORMATION**

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. Place your ANSWER SHEET for SECTION A (QUESTION 1) within your ANSWER BOOK.
4. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
5. Start each question from SECTION B on a NEW page.
6. Read ALL the questions carefully and make sure you answer what is asked.
7. Number the answers correctly according to the numbering system used in this question paper.
8. DO NOT SPLIT the answers to the questions.
9. Write neatly and legibly.

**SECTION A****QUESTION 1**

- 1.1 Various possible options are provided as answers to the following questions. Choose the correct answer and make a cross (X) in the block (A – D) next to the question number (1.1.1 – 1.1.10) on the attached ANSWER SHEET.

Example: 1.1.11 

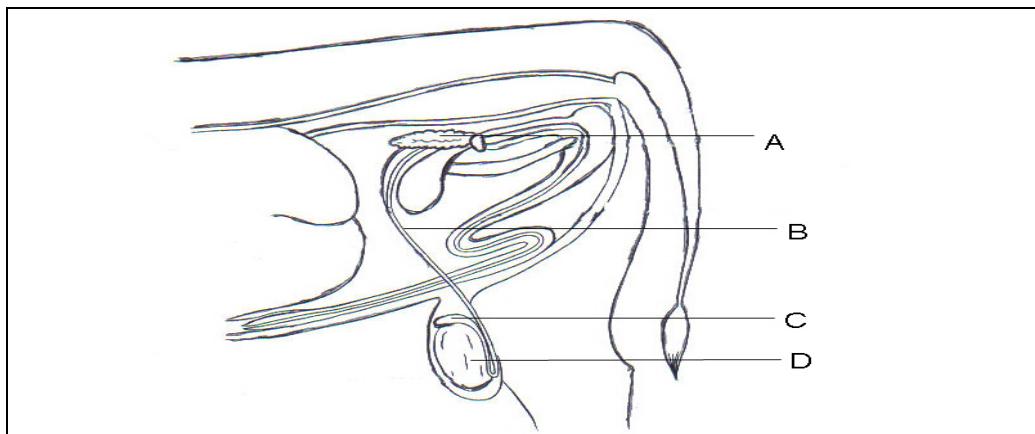
A	B	<del>C</del>	D
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- 1.1.1 Hydrolysis of nutrients in feeds is brought about through enzymatic action. Most of the end-products of this chemical digestion are absorbed by the ...
- A large intestine.
  - B abomasum.
  - C small intestine.
  - D caecum.
- 1.1.2 A process that takes place in the fallopian tube is ...
- A oogenesis.
  - B fertilisation.
  - C ovulation.
  - D spermatogenesis.
- 1.1.3 The inner walls of the omasum is adapted to ...
- A increasing the absorptive surface and preventing bacterial growth.
  - B squeezing water out of the feed and permitting very coarse feed to enter the abomasum.
  - C secreting enzymes and preventing coarse feed from entering the abomasum.
  - D grinding and drying the feed.
- 1.1.4 Oral administration of medicines in sick animals may be done by the use of ...
- A drenching guns.
  - B hypodermic syringes.
  - C catheters.
  - D dipping tanks.
- 1.1.5 Which of the following are classified as endoparasites?
- i. Mites, flukes, roundworms
  - ii. Fluke, wireworm, tapeworm
  - iii. Roundworms, ticks, blowflies
  - iv. Nodular worm, tapeworm, fluke
- A ii only
  - B ii and iv
  - C i and iii
  - D iv only

1.1.6 A concentrate feed was analysed and found to have a nutritive ratio of 1:9. This feed ...

- A has a narrow nutritive ratio.
- B would be suitable for growth.
- C would be ideal for fattening.
- D has a high protein content.

1.1.7 Some of the functions of the organ labelled D in the diagram below include the production of gametes and testosterone. It also contains Sertoli cells which provide:



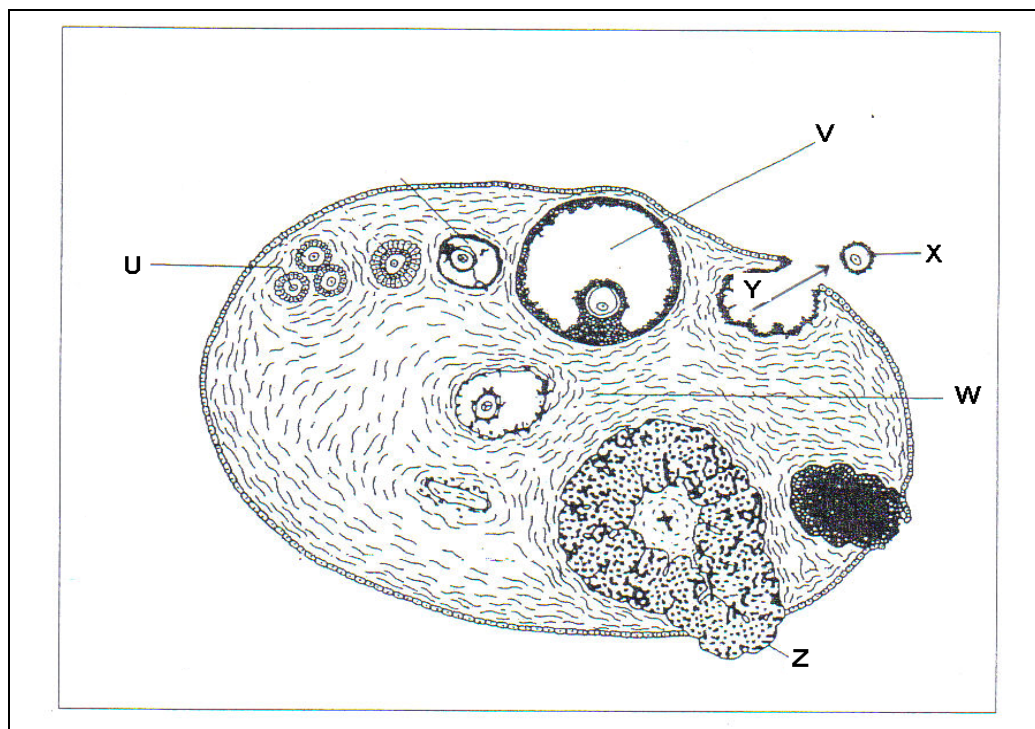
- A Nutrients for the gametes
- B Testosterone
- C Spermatozoa
- D Male hormones and enzymes

1.1.8 Two of the following may be used mostly in indigenous farming.

- i. Walls built by stacking stones
- ii. Movable electrical fencing
- iii. Wire fence dividing grazing areas
- iv. Kraal made up of sticks

- A i and ii
- B ii and iii
- C iii and iv
- D i and iv

- 1.1.9 The oestrus cycle is a physiological process which is controlled by a number of hormones. The hormones responsible for the process Y and produced by the structure Z. Y and Z are respectively....



- A progesterone and oestrogen.  
 B luteinizing hormone and progesterone.  
 C prolactin and progesterone.  
 D luteinizing hormone and follicle stimulating hormone.
- 1.1.10 A reason why a cow must dry up before the next lactation period starts is to ...
- A ensure that the cow becomes pregnant early.  
 B reduce problems during parturition.  
 C allow recovery of tissues and glandular material.  
 D shorten the gestation period.
- (10 x 2) (20)

- 1.2 In the table below a statement with 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 (X) in the appropriate block (A – D) next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET.

Example:

COLUMN A		COLUMN B
A:	Lucerne hay	Protein-rich dry roughage
B:	Green fodder	

Answer:

The statement refers to:			
Only A	Only B	A and B	None
<del>A</del>	B	C	D

		COLUMN A	COLUMN B
1.2.1	A:	Polyneuritis	Thiamine deficiency disease
	B:	Night-blindness	
1.2.2	A:	Reticulum	Glands of Lieberkhun
	B:	Duodenum	
1.2.3	A:	Silage	Carbohydrate-rich concentrate
	B:	Fish meal	
1.2.4	A:	Anthrax	Fungal diseases
	B:	Rabies	
1.2.5	A:	Silage	An example of a juicy roughage
	B:	Green fodder	

(5 x 2) (10)

- 1.3 Give ONE term/phrase for each of the following descriptions. Write only the term/phrase next to the question number (1.3.1 – 1.3.5) on the attached ANSWER SHEET.

1.3.1 A heifer calf born twin to a bull.

1.3.2 The modified, enlarged part of a fowl's oesophagus.

1.3.3 The breaking-up of lipids by bile into fine droplets.

1.3.4 Chickens that are raised and fed to be sold for meat.

1.3.5 Underdevelopment of the reproductive organs such as the testes and ovaries.

(5 x 2) (10)

- 1.4 Change the **UNDERLINED WORDS** in the following statements to make them TRUE. Write the appropriate word or term next to the question number (1.4.1 – 1.4.5) on the attached ANSWER SHEET.
- 1.4.1 Bailing wire, nails or glass which may be swallowed by cattle will collect in the omasum.
- 1.4.2 Spermatogonia, which develop into adult sperms, occur in the vas deferens.
- 1.4.3 Nutritive value indicates the quality of a protein.
- 1.4.4 The nucleus of a sperm fuses with that of an ovum to produce a haploid zygote.
- 1.4.5 Calcium deficiency causes anaemia in farm animals. (5 x 1) (5)

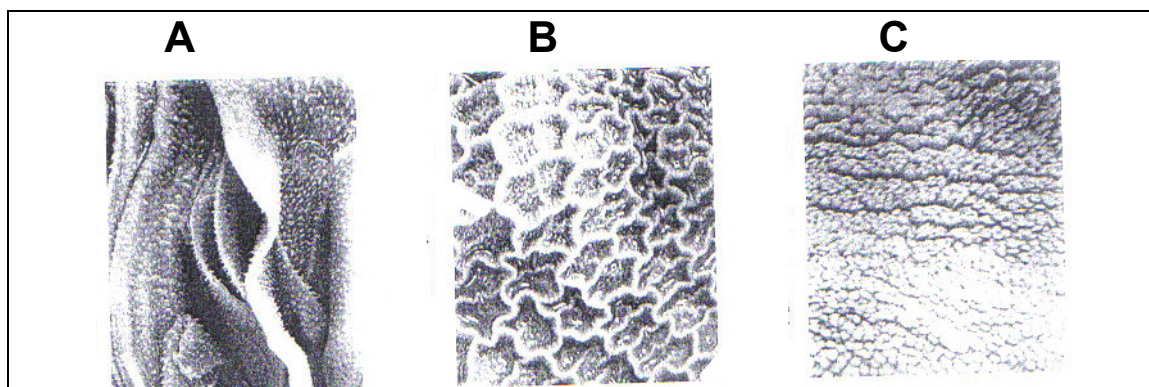
**TOTAL SECTION A: 45**

**SECTION B**

**START THIS QUESTION ON A NEW PAGE IN THE ANSWER BOOK PROVIDED.**

**QUESTION 2**

- 2.1 The stomach of ruminants is divided into four compartments. The photographs below show the internal structure of three of the four compartments.



- 2.1.1 Supply names of the parts labelled, A, B and C. (3)
- 2.1.2 Deduce the compartment which is not shown in the photographs. (1)
- 2.1.3 Relate (supplying the LETTER and NAME) the structure in the photographs (marked A, B and C) that best represents each of the following descriptions:
- i The smallest of the four compartments (2)
  - ii The part where finely-chewed cud will directly enter after swallowing (2)
- 2.2 The suitability of a feed for fattening, maintenance or growth purposes could be evaluated by determining the nutritive ratio of the feed.

The percentage TDN and DP values of two feeds were analysed and the results tabulated as shown below:

Feed	% TDN	% DP
X	57,0	9,5
Y	96,0	12,0

- 2.2.1 Indicate the meaning of TDN. (1)
- 2.2.2 Determine the nutritive ratio for each of feeds X and Y.  
(Show ALL calculations) (8)
- 2.2.3 From your calculations, deduce the feed (X or Y) that would be most suitable for young, growing animals. Give a reason for your answer. (3)



- 2.3 A group of farmers from the Tro-tro municipality approached the agricultural extension officer in the area with challenges they were facing in raising sheep within the municipality.

Investigation by the extension officer revealed the following:

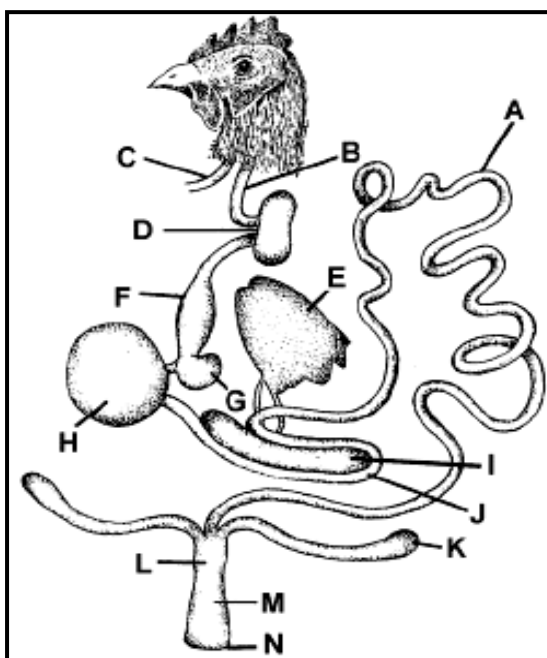
- Inadequate grazing during the dry winter months
- No supplements given to the sheep
- Lower fertility and poor resistance against bacterial eye infections

- 2.3.1 With reference to the deficiency symptoms mentioned above, suggest ONE vitamin which was deficient in the sheep. (1)

- 2.3.2 Indicate TWO functions of the vitamin mentioned in QUESTION 2.3.1. (2)

- 2.4 State FOUR ways in which minerals may be supplemented in farm animals. (4)

- 2.5 The diagram below represents the gastro-intestinal tract of a fowl.



- 2.5.1 Indicate the LETTER and NAME of the part where hydrochloric acid may be secreted. (2)

- 2.5.2 Identify the parts labelled E and H. (2)

- 2.5.3 Name the part where both an amylase and a proteolytic enzyme may be produced. (1)

- 2.6 Consider the following feeds A and B which could be used in feeding pigs.

<b>A:</b> Groundnut oil-cake meal	<b>B:</b> Lucerne hay
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- 2.6.1 Classify feed A. (1)

- 2.6.2 Indicate the important polymer which is common in the two feeds and state the general term of the monomers which make up this polymer. (2)

**START THIS QUESTION ON A NEW PAGE.****QUESTION 3**

3.1 Read the following scenario and answer the questions below:

Animals, especially cattle, are being changed from natural herbivores to carnivores by being fed parts of other animals. Dried blood, crushed bone and meat meal, or other feed that includes ground-up intestines, brains and other internal organs such as trachea, pancreas and kidneys are routinely used in an effort to conserve resources, increase profitability and stimulate animal growth.

3.1.1 From the scenario above, give TWO reasons why animal products are used in feeding other animals. (2)

3.1.2 Deduce TWO major nutrients that may be derived from feeding cattle with crushed bone. (2)

3.1.3 Briefly explain the underlined phrase in the scenario above and suggest THREE substances (not mentioned in the scenario) that could be used to achieve the same purpose. (4)

3.2 Using the Kjeldahl method and the proximate analysis of feeds, the digestible protein (DP), lipid and carbohydrate contents of three feedstuffs were determined and tabulated as shown below:

FEEDSTUFF	% DP	% CARBOHYDRATE	% LIPID
Soya bean meal	35,2	28,7	19,1
Maize meal	7,2	67,5	6,4
Fish meal	48,5	5,8	10,0

3.2.1 Which component of a feed is determined by using the Kjeldahl method? (1)

3.2.2 From the figures given in the table, determine the percentage total digestible nutrients (TDN) in maize meal. (2)

3.2.3 A farmer wanted to prepare feed having a DP of 14,2% for piglets, using a mixture of maize meal and soya bean meal. What proportion of soya should be mixed with maize meal to obtain the desired percentage DP for the piglets? (Show ALL calculations) (4)

3.3 A variety of equipment is used in handling animals. The type of equipment used is usually determined by the size, age and in some instances the sex of the animal. Nose pliers, strong ropes and strong pens are some of the tools used in animal handling.

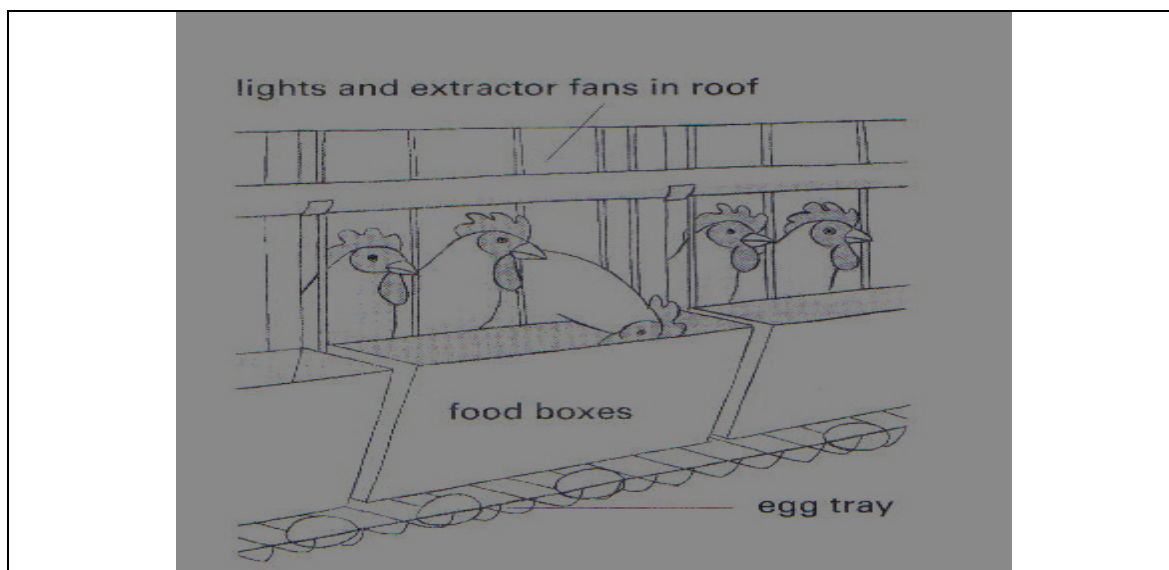
Whilst they may be handled in groups, animals could also be handled singly for specific purposes such as docking, dehorning and castration.

3.3.1 Apart from those stated above, mention FOUR other reasons why animals are handled. (4)

3.3.2 Re-write the underlined words and briefly describe what each of them involves. (4)

3.3.3 Suggest TWO tools which are used in handling animals besides the ones mentioned in QUESTION 3.3. (3)

3.4 Below is a diagram illustrating one form of intensive poultry farming.

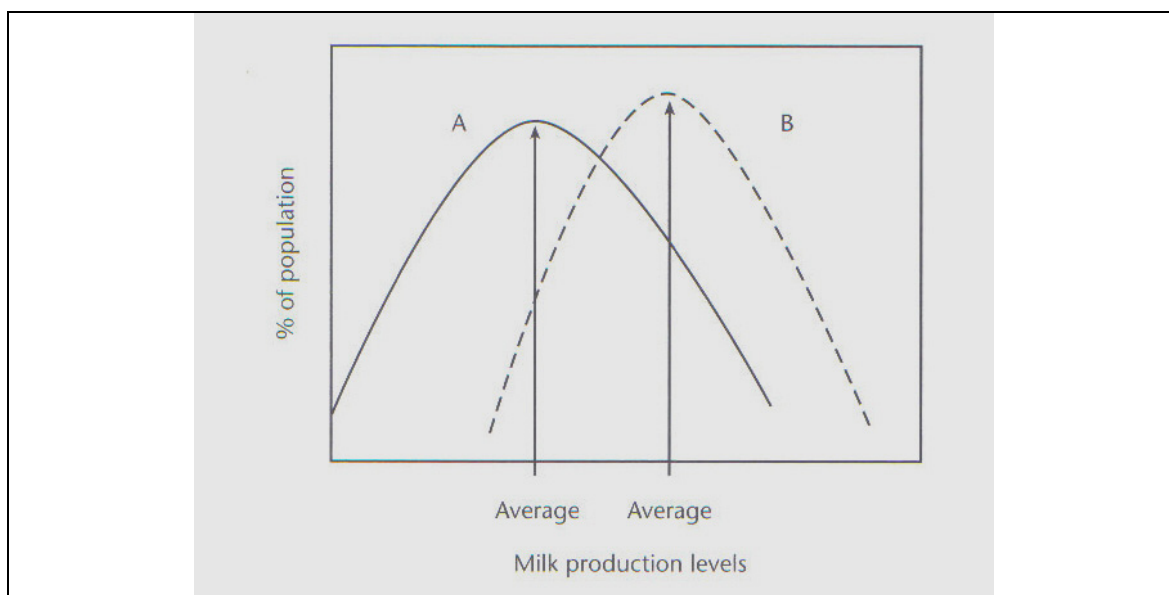


3.4.1 Suggest a suitable caption for this type of poultry farming. (1)

3.4.2 State THREE advantages of this system of intensive poultry farming. (3)

3.5 Deduce FOUR adverse consequences the complete lack of shelter would have in an extensive farming enterprise. (4)

3.6 The graphs below represent the milk production of a dairy herd. Graph A (solid line) is for the parental stock and Graph B (dotted line) for selected offspring of the same herd.



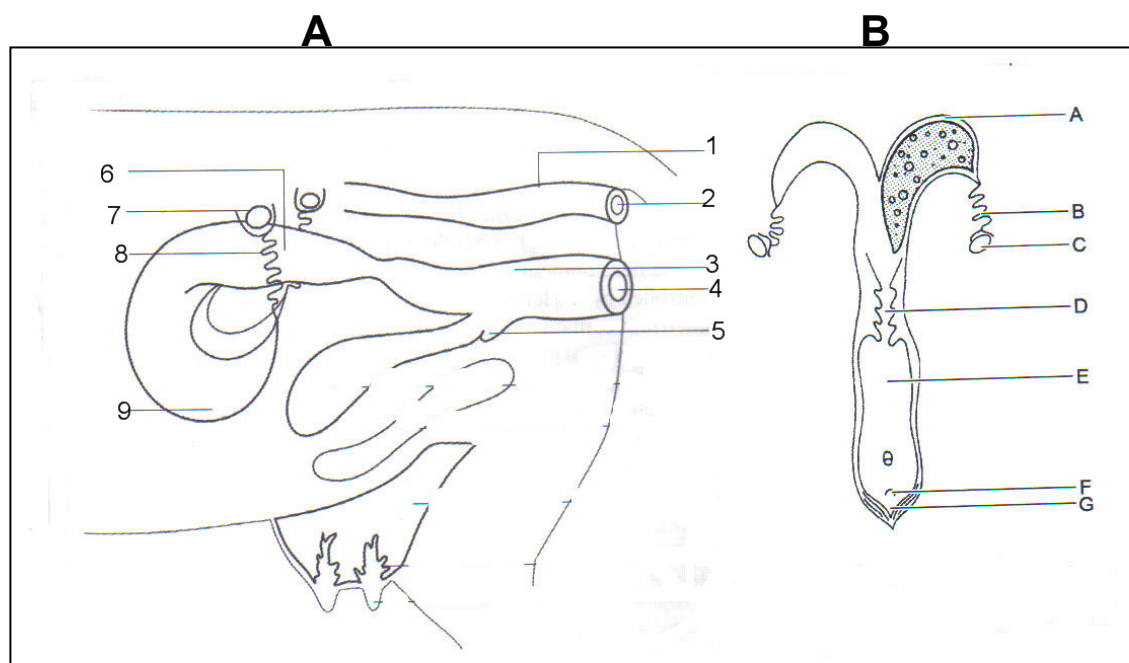
3.6.1 Give ONE reason why these graphs are bell-shaped with the average in the middle. (1)

3.6.2 Why is the average milk production level in graph B higher than that of graph A? (1)

**START THIS QUESTION ON A NEW PAGE.**

**QUESTION 4**

4.1 The diagrams below, A and B, represent the reproductive system of a cow.



4.1.1 Fill in the blank spaces in the table below by matching the part (number) in diagram A with the part (letter) in diagram B which corresponds to the description indicated.

	DESCRIPTION	NUMBER IN DIAGRAM A	LETTER IN DIAGRAM B
1	Production of oestrogen		
2	Fertilization takes place		
3	Vagina		
4	Secretion of progesterone		

(8)

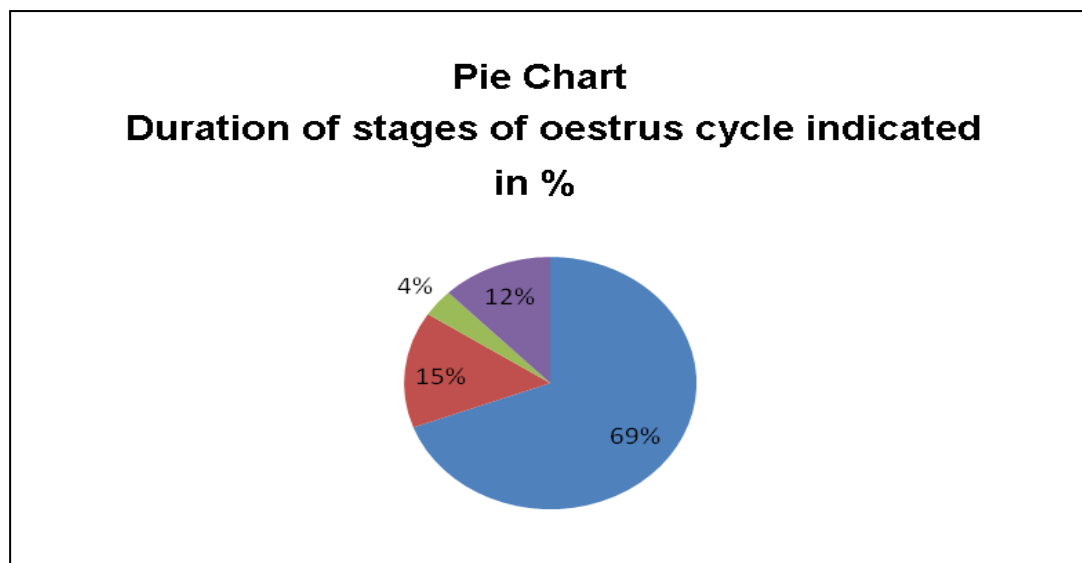
4.1.2 Predict ONE major consequence that will be brought about as a result of the complete blockage of the part labelled D in diagram B.

(2)

4.1.3 What would be the economic implications for a farmer if 30 % of the cows amongst the herd suffer from the condition described in QUESTION 4.1.2?

(2)

4.2 The pie chart below is a representation of the 21-day oestrus cycle in cows.



4.2.1 Distinguish the FOUR stages of oestrus by the percentages indicated in the pie chart. (4)

4.2.2 During which stage does the cow allow mating? State the percentage only. (1)

4.3 The major steps in carrying out embryo transfer are as follows:

- A. Synchronising oestrus in recipient and donors cows
- B. Treating donor cows to superovulate
- C. Artificial insemination of donor cows with semen from superior bulls
- D. Removal of fertilised ova from donor cows
- E. Implantation of embryos into the uteri of recipient cows

4.3.1 State TWO methods by which oestrus may be controlled artificially. (2)

4.3.2 At step C, semen collected from superior bulls would first be examined and, if fit for insemination, diluted. Indicate TWO reasons why the semen is diluted. (2)

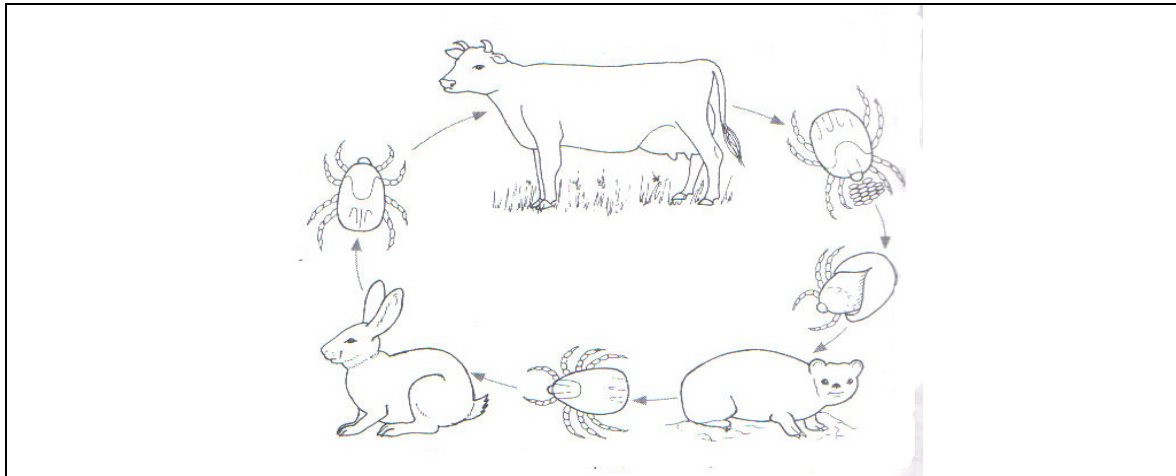
4.3.3 Identify the economic benefits a farmer may gain from this artificial insemination. (2)

4.4 Hormones play an enormous role in animal physiology. The urge to mate (libido), movement of sperms along the reproductive system of the cow, maintenance of pregnancy and parturition are all controlled by hormones. These “chemical messengers” are also involved in the development of the mammary gland as well as the release of milk from it.

4.4.1 Which hormone is involved with the development of the mammary gland? (1)

4.4.2 State THREE effects of oxytocin in a cow. (3)

- 4.5 Metabolic diseases in an animal could be prevented by ensuring that all the required minerals and vitamins are adequately supplied to the animal. Indicate THREE ways through which pathogenic diseases could be prevented. (3)
- 4.6 The diagrams below show the life-cycle of a parasite.



- 4.6.1 What type of parasite is illustrated in the diagram above? (1)
- 4.6.2 How many hosts does this parasite need in order to complete its life-cycle? (1)
- 4.7 Control of animal diseases is usually undertaken by the government through the enactment of Laws or Acts. Indicate any THREE of such Acts. (3)

**[35]****TOTAL SECTION B: 105****GRAND TOTAL: 150**



