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Department:  
Basic Education  
**REPUBLIC OF SOUTH AFRICA**

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**NOVEMBER 2013**

**MARKS: 150**

**TIME: 2½ hours**

**This question paper consists of 14 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 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. Show ALL your calculations, including a formula, where applicable.
7. Write neatly and legibly.

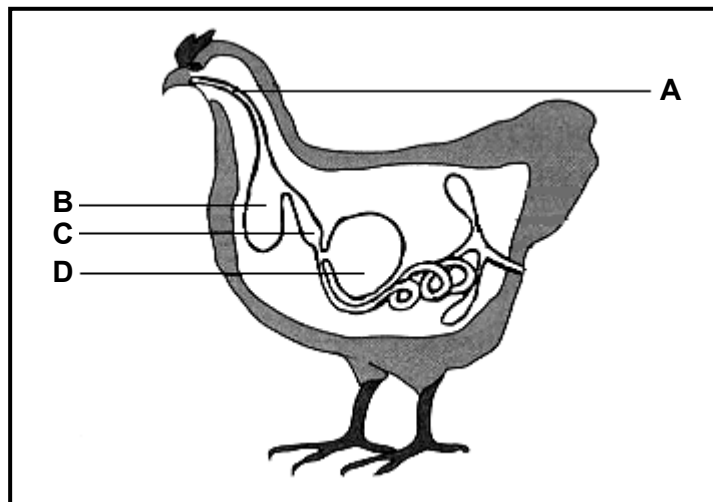
**SECTION A****QUESTION 1**

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 A.

1.1.1 The stomach of the pig secretes gastric juices containing hydrochloric acid, which is responsible for changing ...

- A fats to fatty acid and glycerol.
- B pepsin into pepsinogen.
- C soluble caseinogen into casein.
- D sucrose to glucose and fructose.

1.1.2 The part of the digestive system of the fowl responsible for grinding feed with the aid of small stones is represented by the following letter:



- A A
- B D
- C C
- D B

1.1.3 In ruminant animals the required protein value for a ration is supplemented by adding ... to make the feed mixture more cost-effective.

- A carcass meal
- B blood meal
- C fish meal
- D urea

1.1.4 Which of the following substances are released when roughages are digested by micro-organisms in the rumen?

- (i) Fatty acids
- (ii) Methane
- (iii) Oxygen
- (iv) Cellulose

Choose the correct combination.

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

1.1.5 Using knowledge passed down from older generations, a livestock farmer mills ashes from a poisonous plant and mixes it with a feed ration to prevent animals from being poisoned. This practice is based on the ... method.

- A conventional
- B biological
- C indigenous
- D scientific

1.1.6 When animals are transported in a truck, the following aspect is important to prevent bruising:

- A The number of animals and the size of the loading area
- B The strength of the sides of the truck
- C Cattle and sheep are mixed
- D Engine capacity and the strength of the truck

1.1.7 Which of the following are part of an intensive animal production unit?

- (i) Large amounts of money invested
- (ii) A large area of land with a low production output
- (iii) Environmental control and management
- (iv) Mechanisation

Choose the correct combination.

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

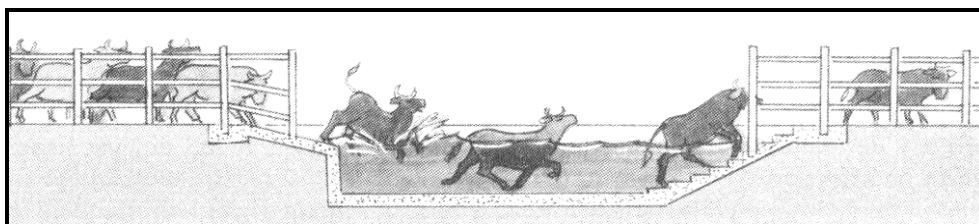
1.1.8 ONE of the following is used to keep a large ox still for individual treatment:

- A Prodder
- B Neck clamp
- C Halter
- D Tags

1.1.9 The head is the only part of the sperm cell (spermatozoon) that needs to enter the ovum for fertilisation, because ...

- A it is the first part of the spermatozoon.
- B it contains mitochondria.
- C it contains genetic material.
- D it penetrates with ease.

1.1.10 The facility used to control ticks in the illustration below can best be described as a ...



- A spray dip.
- B plunge dip.
- C foot dip.
- D pour-on dip.

(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 B only.

COLUMN A			COLUMN B
1.2.1	A	Maize meal	Protein-rich concentrate
	B	Carcass meal	
1.2.2	A	Commercial farming	A farming unit mainly used to generate food for the family
	B	Subsistence farming	
1.2.3	A	Di-oestrus	The phase of rest in the oestrus cycle
	B	Pro-oestrus	
1.2.4	A	Prostate gland	Male accessory gland for secretion of hormones needed in sexual activity
	B	Seminal gland	
1.2.5	A	Viral diseases	Has the greatest economic effect on livestock farming
	B	Fungal diseases	

(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 part of the digestive system of a pig where the most absorption of digested nutrients takes place
- 1.3.2 The component of a feed that serves as the most important source of heat and energy for an animal
- 1.3.3 A traditional African custom where a man pays the father of the bride-to-be with cattle
- 1.3.4 The process through which a Graafian follicle of an ovary bursts to release the ovum
- 1.3.5 The service rendered by the State where animals are kept in isolation for a particular period while being tested for diseases  
(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 Proteins are broken down into glucose during digestion.
- 1.4.2 Ectothermic animals maintain a constant body temperature even though the environmental temperature may vary.
- 1.4.3 The Drakensberger is more adapted to local environmental conditions because it is an exotic breed.
- 1.4.4 The intensive farming enterprise where cattle are kept in a small area and fed for maximum production output is called a free-range system.
- 1.4.5 Midges form maggots and cause serious wounds on the wet skin around the tail of a wool sheep.  
(5 x 1) (5)

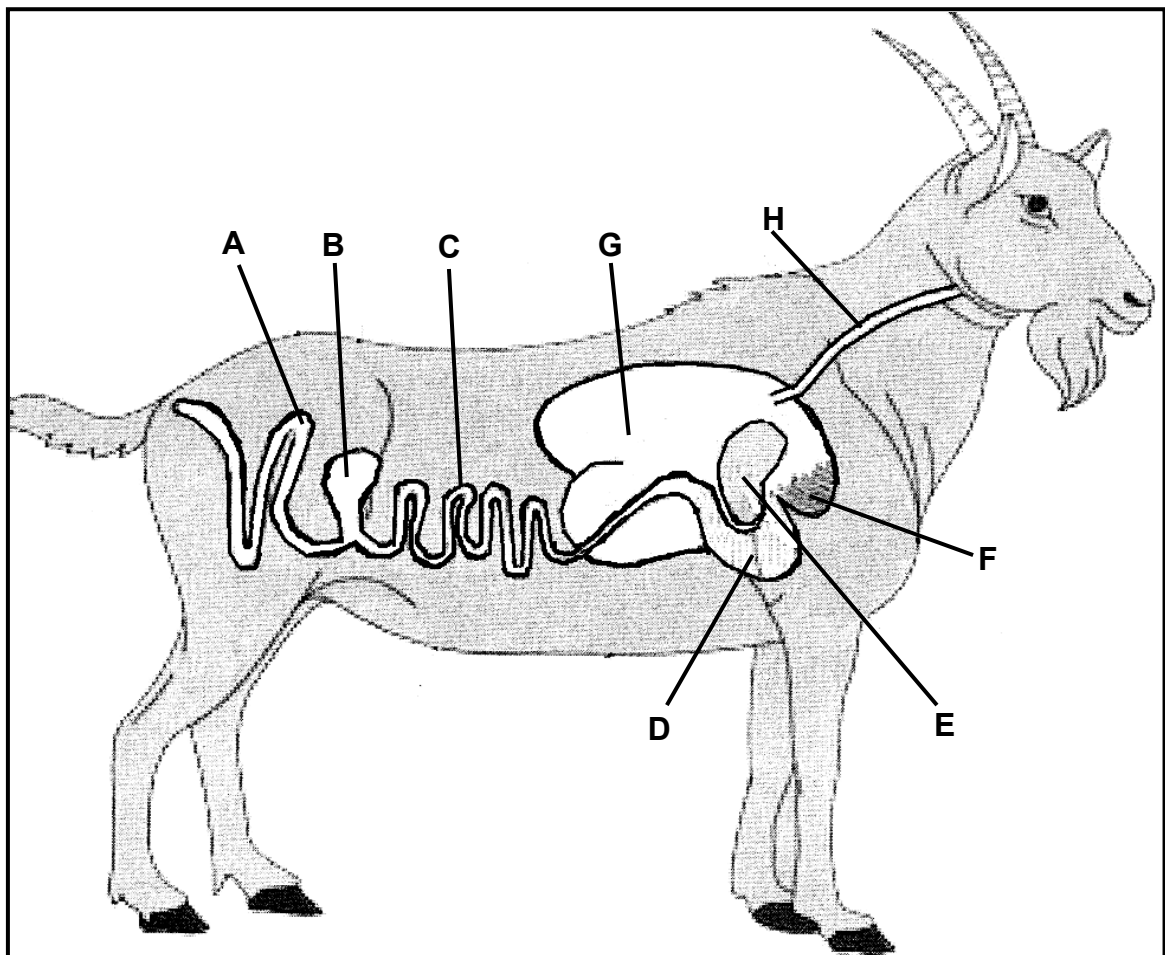
**TOTAL SECTION A: 45**

**SECTION B**

Start this question on a NEW page.

**QUESTION 2: ANIMAL NUTRITION**

2.1 The diagram below shows the digestive system of a farm animal.



2.1.1 Select a letter (A–H) that represents a part of the digestive system in the diagram above that corresponds with each of the following descriptions:

- (a) Secretion of hydrochloric acid (1)
- (b) Most volatile fatty acids are absorbed (1)
- (c) Pancreatic juice is secreted (1)

2.1.2 Describe THREE adaptations of part **C** for maximum absorption of digested food. (3)

2.1.3 Briefly explain the absorption of fat molecules in part **C**. (2)



- 2.2 The following information was used during a digestibility trial conducted on a group of ruminant farm animals:

Dry material content of the feed = 88%  
 Dry material content of the manure = 77%  
 Manure excreted = 3,5 kg  
 Average feed intake = 10 kg

2.2.1 Calculate the digestibility co-efficient of this feed. (5)

2.2.2 Explain the implication of the value calculated in QUESTION 2.2.1. (2)

- 2.3 Maize and sunflower oilcake meal were used to prepare a balanced ration for farm animals. These animals need 18% digestible protein in their ration. Maize has a digestible protein content of 9% and sunflower oilcake meal has 38%.

2.3.1 Use the Pearson square to calculate the ratio of maize to sunflower oilcake meal needed in the feed mixture. (4)

2.3.2 Calculate the percentage of maize that is included in this mixture. (3)

- 2.4 State the nutrient element deficiency associated with each of the following conditions observed in livestock.

2.4.1 Grazing animals chew dry bones and lick the soil (1)

2.4.2 Pale mucus membrane (1)

2.4.3 An enlarged thyroid gland (1)

- 2.5 The table below shows the composition of two feeds (**A** and **B**).

COMPONENT	FEED A	FEED B
Digestible protein (DP)	8%	12%
Carbohydrates	50%	40%
Fats	22%	5%
TDN	—	67%
NR	—	1 : 5

2.5.1 Calculate the nutritive ratio (NR) of feed **A**. (4)

2.5.2 Identify the feed (**A** or **B**) that is most suitable for fattening animals. Justify your answer. (3)

2.5.3 Indicate the feed (**A** or **B**) that is most suitable for young, growing animals. Motivate your answer. (3)

**[35]**

Start this question on a NEW page.

### QUESTION 3: ANIMAL PRODUCTION

- 3.1 Choose an explanation from the list below that matches each of the following descriptions of observed animal behaviour. Write only the letter (A–E) next to the question number (3.1.1–3.1.5) in the ANSWER BOOK.

- A Shades in the path or vision area of animals
- B Normal maternal behaviour
- C Animal is healthy
- D Animal might contract a disease
- E Normal reproductive behaviour

- 3.1.1 Female animals in the herd mount other females and allow females to mount them (1)
- 3.1.2 A flock of animals graze on natural pasture (1)
- 3.1.3 An animal has lost its appetite (1)
- 3.1.4 Animals do not want to enter a gate to a passage area (1)
- 3.1.5 Animal is aggressive after giving birth (1)

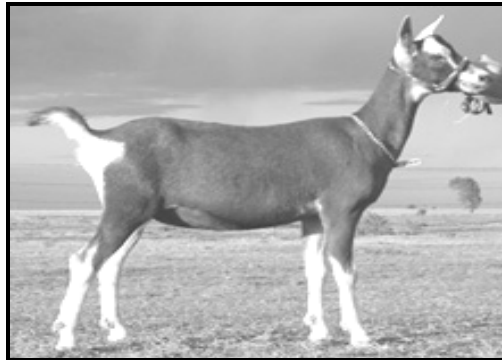
- 3.2 The table below gives data on temperature indicators and heat production for three different farm animals.

FARM ANIMAL	LOWER CRITICAL TEMPERATURE (°C)	OPTIMAL TEMPERATURE RANGE (°C)	HEAT PRODUCTION (kJ/h)
Dairy cow	2	15–23	2 500
Pig (sow)	10	12–18	800
Chicks (2 weeks)	21	28–32	6

- 3.2.1 Identify the animal with the highest heat production per hour. Give a reason for your answer by referring to the data in the table. (2)
- 3.2.2 Give TWO possible reasons why chicks would need the most intensive environmental control measures. (2)
- 3.2.3 Define the *optimum temperature range for production output*. (2)
- 3.2.4 Explain why pigs are kept in a sheltered environment in winter by referring to the data above. (2)

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

South Africa has a variety of indigenous farm animal breeds. The Mbuzi goat is one of the indigenous breeds marked by a variety of colours. The goats are becoming popular amongst breeders due to their adaptation abilities. They survive very well on steeper terrains because of their long, strong, thin legs, which also enable them to feed on most nutritious shrubs and trees. They are not susceptible to worms and have good motherly instincts. They defend themselves and their young against intruders with their sharp, strong horns.



3.3.1 Refer to the information above and describe the adaptation of Mbuzi goats under the following headings:

(a) Environmental conditions (2)

(b) Pest and disease management (2)

3.3.2 Most of the time, Mbuzi goats are kept under extensive conditions. They are only gathered for normal management practices. Name THREE such management practices. (3)

3.4 An animal (**A**) from a small production unit is compared to an animal (**B**) from a large production unit. It is calculated that both animals use approximately 6 kg of their daily feed intake for maintenance. The production output and feed intake of the two animals are indicated in the table below.

INDICATOR	ANIMAL A	ANIMAL B
Production output: milk production	12 litre/day	43 litre/day
Feed ingested per day	48 kg	56 kg

3.4.1 Calculate the quantity of feed that each animal used for production. (2)

3.4.2 Identify the animal (**A** or **B**) that used its ration more effectively. Motivate your answer. (3)

3.5 The picture below shows a broiler production unit.



This broiler unit is equipped with the following specialised equipment for environmental control:

- Foot baths at all the entrances
- Foldable side walls
- Electric heaters
- Fans in the roof and walls
- Insulation material on the roof

3.5.1 Choose the equipment from the list above that would be used in each of the following cases. Each type of equipment can be named only once. Write only the equipment next to the letter (a–d) in the ANSWER BOOK.

- (a) To keep the temperature inside the broiler unit constant day and night (1)
- (b) To increase the temperature inside the broiler unit during a sudden drop in the environmental temperature (1)
- (c) To decrease the temperature in the broiler unit on a very hot day (1)
- (d) To reduce the possibility of bringing pathogens into the broiler unit (1)

3.5.2 State FOUR possible characteristics of an intensive animal production unit based on the broiler unit shown above. (4)

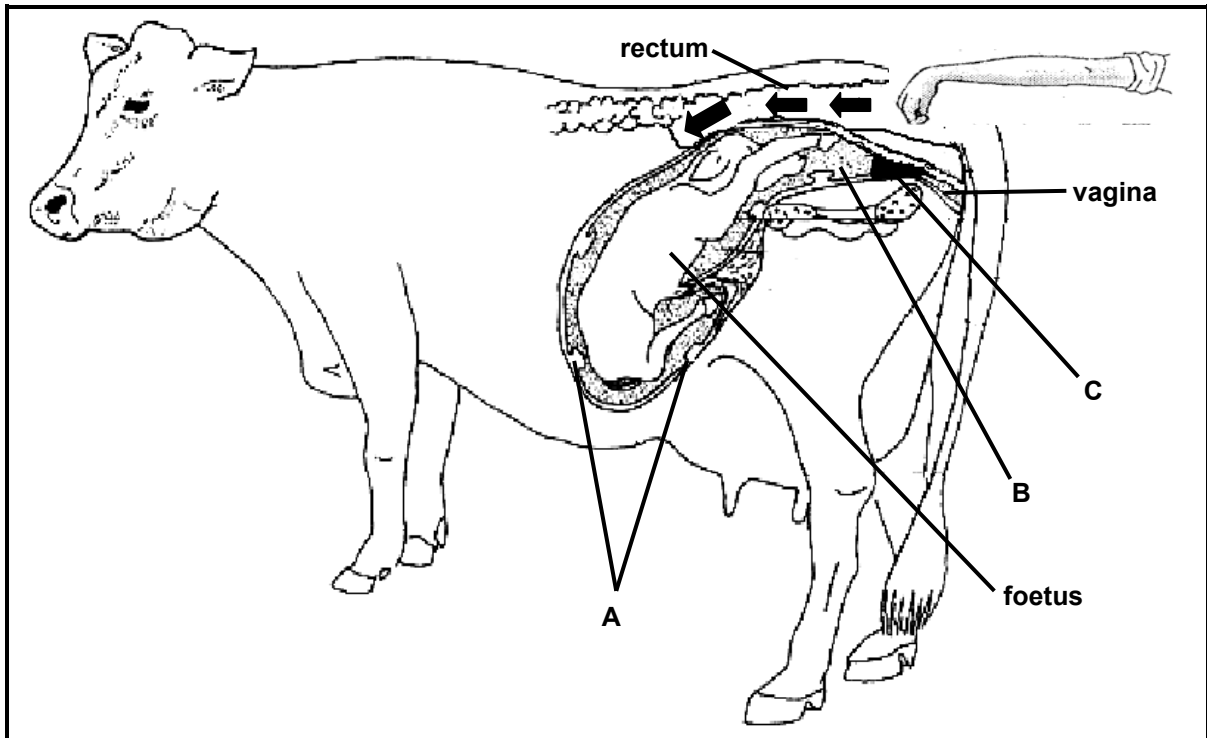
3.5.3 What is the greatest health risk for such a broiler unit? Give a reason to support your answer. (2)

**[35]**

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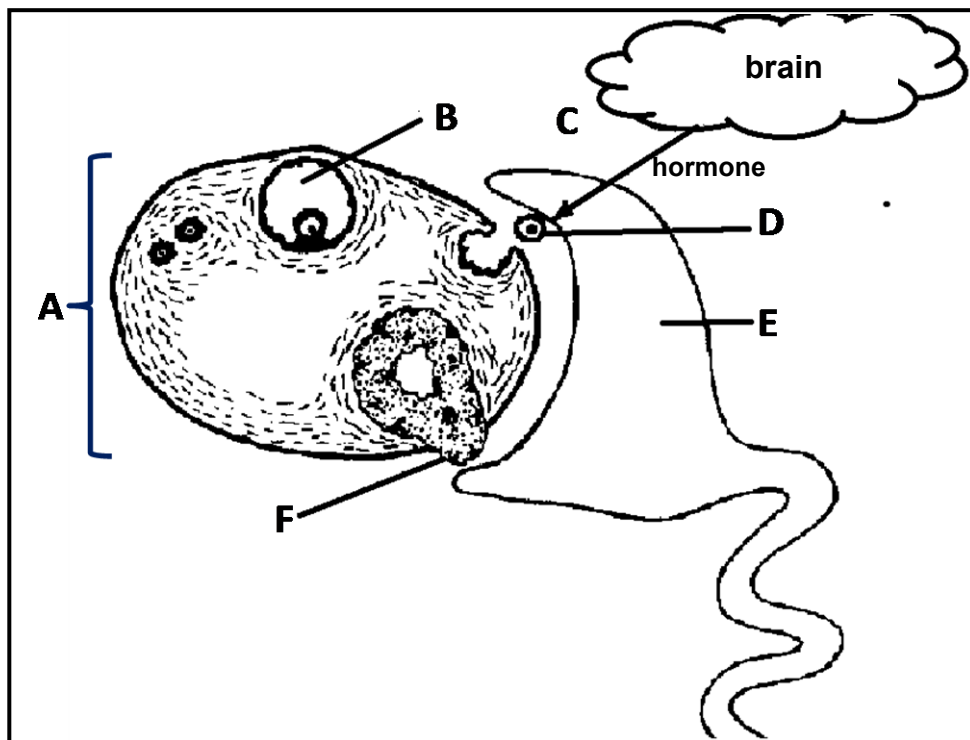
#### QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

- 4.1 The diagram below illustrates pregnancy testing in a cow. The hand is inserted through the rectum.



- 4.1.1 Identify parts **A**, **B** and **C**. (3)
- 4.1.2 State TWO advantages of detecting pregnancy early. (2)
- 4.1.3 Explain the role of the mucus plug found in part **C**. (2)
- 4.1.4 Name the condition that would occur in each of the following situations:
- (a) The foetus dies, decays and remains inside the cow (1)
  - (b) The fluid around the foetus is reabsorbed and a hard skeleton remains (1)
- 4.1.5 Pregnancy could be terminated before natural parturition with the expulsion of a visible foetus. Identify this situation and give TWO possible causes thereof. (3)

- 4.2 The diagram below shows a structure in the female reproductive system of a farm animal.



- 4.2.1 Name structures **A**, **B** and **E**. (3)
- 4.2.2 Name the hormone associated with each of the following functions: (1)
- (a) Stimulating the development of structure **B** (1)
  - (b) Stimulating process **D** (1)
  - (c) Characterises the visible signs of oestrus (1)
  - (d) Secreted by structure **F** (1)
- 4.2.3 Describe how structure **E** is adapted to successfully capture the ovum. (2)

- 4.3 The table below indicates some of the indigenous methods used to control diseases and pests in livestock.

INDIGENOUS CONTROL METHOD	FREQUENCY OF USE	PERCENTAGE (%)
Gall smearing	72	93,5
Herbs	67	87,0
Self-diagnosis	70	90,1
Bush burning	37	48,1
Herd isolation	17	22,0
Local concoctions/mixtures	27	35,0

[Adapted from a field survey – 1995]

- 4.3.1 Identify an indigenous control method that is comparable to the chemical control of diseases. (1)
- 4.3.2 State the TWO most commonly used methods in controlling pests and diseases by referring to the table above. (2)
- 4.3.3 State TWO ways in which bush burning could control infestations of ticks. (2)
- 4.3.4 Draw a bar graph to indicate the frequency of the use of indigenous control methods. (6)
- 4.3.5 Name THREE conventional control measures that a farmer should adopt to restrict infectious diseases. (3)
- [35]**

**TOTAL SECTION B: 105**  
**GRAND TOTAL: 150**