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GRADE 12

AGRICULTURAL SCIENCES P1

FEBRUARY/MARCH 2013

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages and 1 answer sheet.

INSTRUCTIONS AND INFORMATION

1. Answer ALL the questions.
2. SECTION A (QUESTION 1) must be answered on the attached ANSWER SHEET.
3. SECTION B (QUESTIONS 2 to 4) must be answered in the ANSWER BOOK.
4. Start EACH question from SECTION B on a NEW page.
5. Read ALL the questions carefully and answer only what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place your ANSWER SHEET for SECTION A (QUESTION 1) inside your ANSWER BOOK.
8. Non-programmable calculators may be used.
9. Show ALL your calculations.
10. 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 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. NO marks will be allocated if more than one cross (X) appears for an answer.

EXAMPLE:

1.1.11

<input checked="" type="checkbox"/> A	<input type="checkbox"/> B	<input type="checkbox"/> C	<input type="checkbox"/> D
---------------------------------------	----------------------------	----------------------------	----------------------------

- 1.1.1 The part of the alimentary canal of a fowl that will ensure mechanical digestion of food is the ...

- A crop.
- B proventriculus.
- C ventriculus.
- D cloaca.

- 1.1.2 ... found in gastric juice is responsible for creating a favourable pH medium for enzymes in the stomachs of farm animals.

- A Mucus
- B Rennin
- C Water
- D Hydrochloric acid

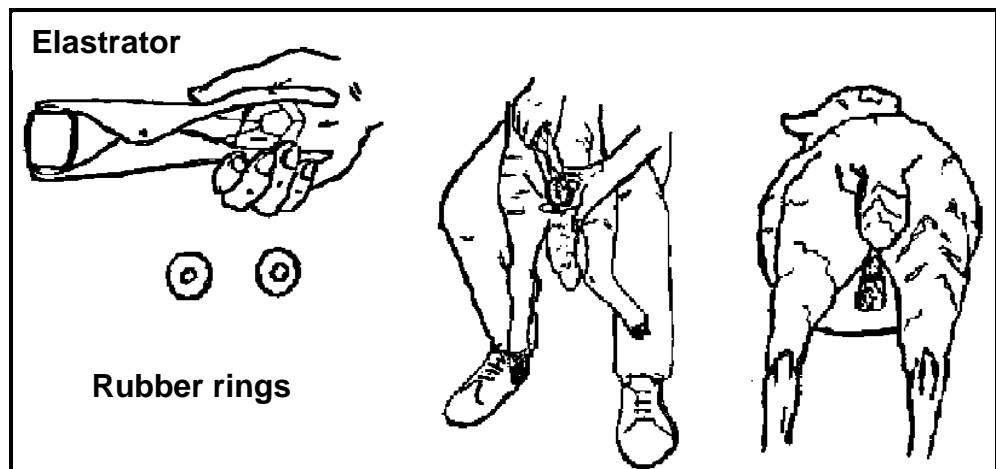
- 1.1.3 The rumen micro-organisms digest cellulose to produce the following volatile fatty acids:

- A Acetic acid, butyric acid and carbonic acid
- B Propionic acid, acetic acid and butyric acid
- C Propionic acid, butyric acid and methane
- D Butyric acid, acetic acid and hydrochloric acid

- 1.1.4 A roughage given to ruminant animals that supplements proteins is ...

- A lucerne.
- B oats straw.
- C silage.
- D teff hay.

- 1.1.5 The illustration below shows how farm animals are handled during the production process.



The animal production process illustrated above is known as ...

- A weighing.
 - B weaning.
 - C castration.
 - D shearing.
- 1.1.6 The possible advantages of a feedlot in animal production are listed below:

- (i) Stocking rate is increased
- (ii) Weaning stress on female animals is reduced
- (iii) Better control over animals
- (iv) The production output is increased

The correct combination of valid advantages is ...

- A (i), (ii) and (iii).
 - B (i), (ii) and (iv).
 - C (i), (iii) and (iv).
 - D (ii), (iii) and (iv).
- 1.1.7 A labour-saving feeding approach where farm animals have unlimited access to feeds placed in self-feeders and feed as much as they wish:

- A Ad lib.
- B Computer controlled
- C Crypt feeding
- D Natural grazing

1.1.8 To prevent the trampling of weak animals when transporting them by truck, ...

- A the animals must be kept calm before the journey.
- B the floor of the truck must be covered with an iron grid.
- C air and light must not be allowed to enter the part of the truck where the animals are kept.
- D animals of different ages and sexes should not be transported together.

1.1.9 The characteristic that is observed during the microscopic evaluation of quality semen:

- A Volume
- B Colour
- C Abnormalities
- D Density

1.1.10 The most effective way to control viral diseases in farm animals is to use ... as a preventative measure.

- A antibiotics
- B dosing
- C dipping
- D vaccination

(10 x 2) (20)

- 1.2 In the table below, a description and TWO possible answers are given. Decide whether the description 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 next to the question number (1.2.1–1.2.5) on the attached ANSWER SHEET.

Example:

COLUMN A		COLUMN B
A	maize meal	an example of a concentrate that is rich in protein
B	bone meal	

Answer:

The statement refers to:			
A only	B only	A and B	None
A	B	C	D

COLUMN A		COLUMN B
1.2.1	A mineral lick	recommended as a supplement for protein in the ration of ruminant animals
	B urea	
1.2.2	A crush pen	handling facility for beef cattle in an intensive production system
	B milking parlour	
1.2.3	A copulation	may be replaced by artificial insemination
	B fertilisation	
1.2.4	A mummification	sign of parturition in cows and heifers
	B maceration	
1.2.5	A abscesses	symptom of external parasite infection in farm animals
	B skin damage	

(5 x 2) (10)

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

- 1.3.1 The digestive gland in the alimentary canal that secretes both digestive juice and hormones
- 1.3.2 The condition in farm animals caused by a shortage of iron and which leads to paleness
- 1.3.3 The breeding method where two different types of farm animals mate and produce sterile offspring
- 1.3.4 The medication injected into an animal to control bacterial infections
- 1.3.5 The term used to describe a male animal that is interested in a female animal but lacks the ability to serve the female animal

(5 x 2) (10)

1.4 Change the UNDERLINED word(s) in each of the following statements to make them TRUE. Write only the appropriate word(s) next to the question number (1.4.1–1.4.5) on the attached ANSWER SHEET.

1.4.1 The reticulum is a tube-like fold of tissue used to channel milk to the abomasum of young suckling ruminant animals.

1.4.2 An intensive animal production system is characterised by a low production output per area of land.

1.4.3 Castration is the process of removing young suckling animals permanently from their mothers.

1.4.4 A maintenance ration is used for work, growth and fattening.

1.4.5 The common dipping system for tick control where the animal is completely immersed in the dipping compound is called a spray race. (5 x 1) (5)

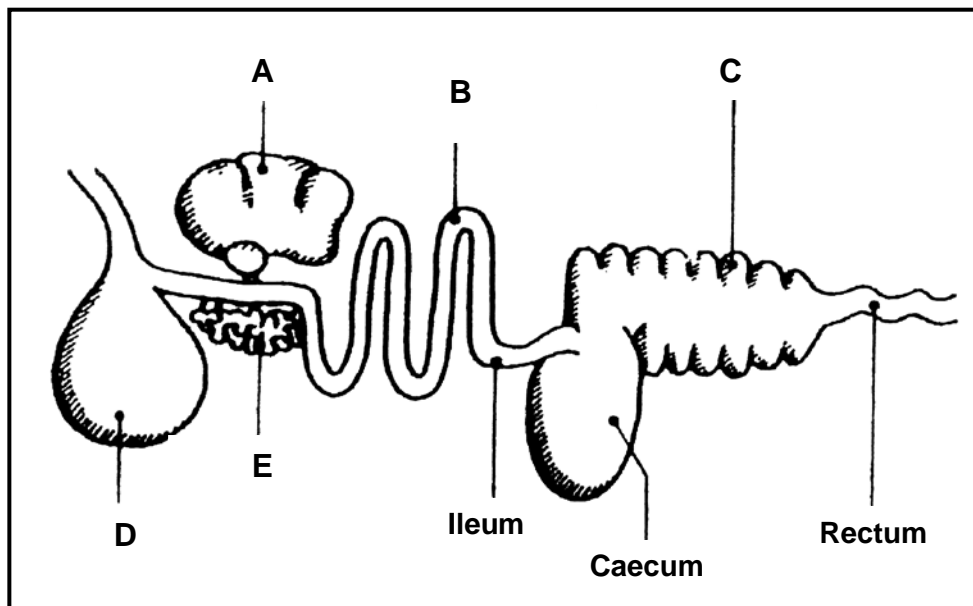
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page.

QUESTION 2: ANIMAL NUTRITION

2.1 The structure below illustrates the digestive system of a non-ruminant animal.



2.1.1 Identify parts **A** to **E**. (5)

2.1.2 Name the structure in the diagram where the most absorption of digested food takes place. (1)

2.1.3 Compare the main structural differences of part **B** in ruminant and non-ruminant animals. (2)

2.1.4 State THREE functions of the liquid secreted by part **A**. (3)

2.2 The feeds below are available to compile a ration for farm animals.

Feeds	Composition indicators (%)				
	DM	DP	TDN	Ca	P
Sunflower oilcake meal	89	31	69	0,5	0,6
Maize	85	10	90	0	0,3

2.2.1 Draw a bar graph to compare the DM and TDN values of sunflower oilcake meal with those of maize. (6)

2.2.2 Calculate the nutritive ratio (NR) of both feeds indicated in the table above. (4)

2.2.3 From the calculation in QUESTION 2.2.2, deduce the feed that is most suitable for production. Motivate your answer. (3)

2.3 The picture below shows beef cattle in a feeding facility.



2.3.1 The feeds used in the ration above include the following:

- Silage
- Raw salt
- Soybean oilcake meal

Select the feed that could be classified as follows:

- (a) Roughage (1)
- (b) Concentrate (1)

2.3.2 The ration provided to the beef cattle in the picture above, is a mixture of milled roughages and concentrates that form a balanced ration. Briefly explain the suitability of using such a ration for these animals. (2)

2.3.3 State THREE factors that play an important role in determining the quantity of water that these animals in the feeding facility take in. (3)

2.3.4 State TWO functions of each of the following vitamins:

- (a) Vitamin A (2)
- (b) Vitamin D (2)

[35]

Start this question on a NEW page.

QUESTION 3: ANIMAL PRODUCTION

3.1

FARM ANIMAL PRODUCTIVITY

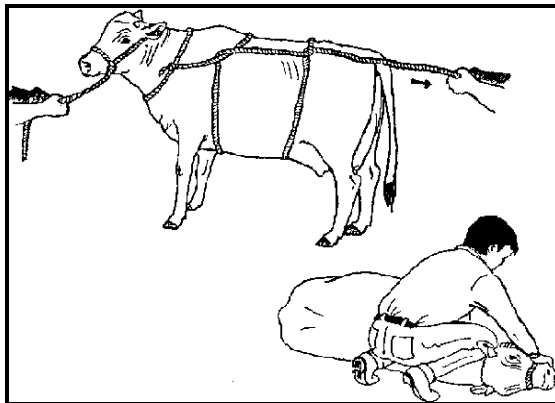
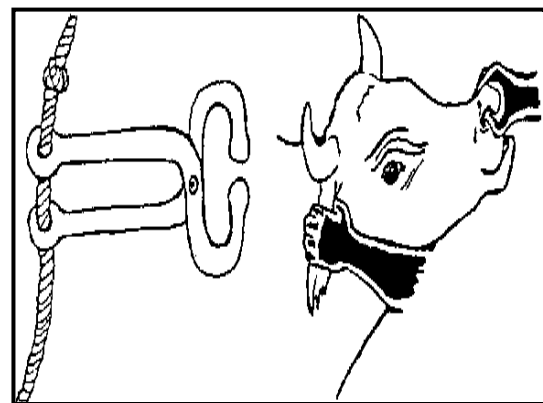
Animals experiencing excessively hot or cold conditions require more energy to maintain their basic metabolism and thus have less energy available to increase their body weight or to produce meat, milk or wool. In other words, more feed is required to counter environmental stresses. Under adverse conditions, livestock performance is inefficient relative to the quantity of feed consumed.

- 3.1.1 Identify TWO adverse environmental conditions in the passage above that affect livestock production in a negative way. (2)
- 3.1.2 Name THREE major factors that influence an animal's ability to reach its full production potential. (3)
- 3.1.3 Describe the economic impact of the adverse conditions in the passage above on the livestock farmer. (2)
- 3.1.4 Recommend TWO measures that a farmer needs to implement to address the adverse environmental conditions mentioned above. (2)
- 3.1.5 Give TWO reasons for the following observations:
- (a) On very hot days cows produce less milk than on normal warm days. (2)
- (b) On cold days cows produce less milk than on normal warm days. (2)

- 3.2 Sheep have strong flocking behaviour that makes them easy to handle. However, sheep will prove difficult to handle if you force them to act in ways that are not natural to them. The picture below shows a handler working with sheep in a chute.

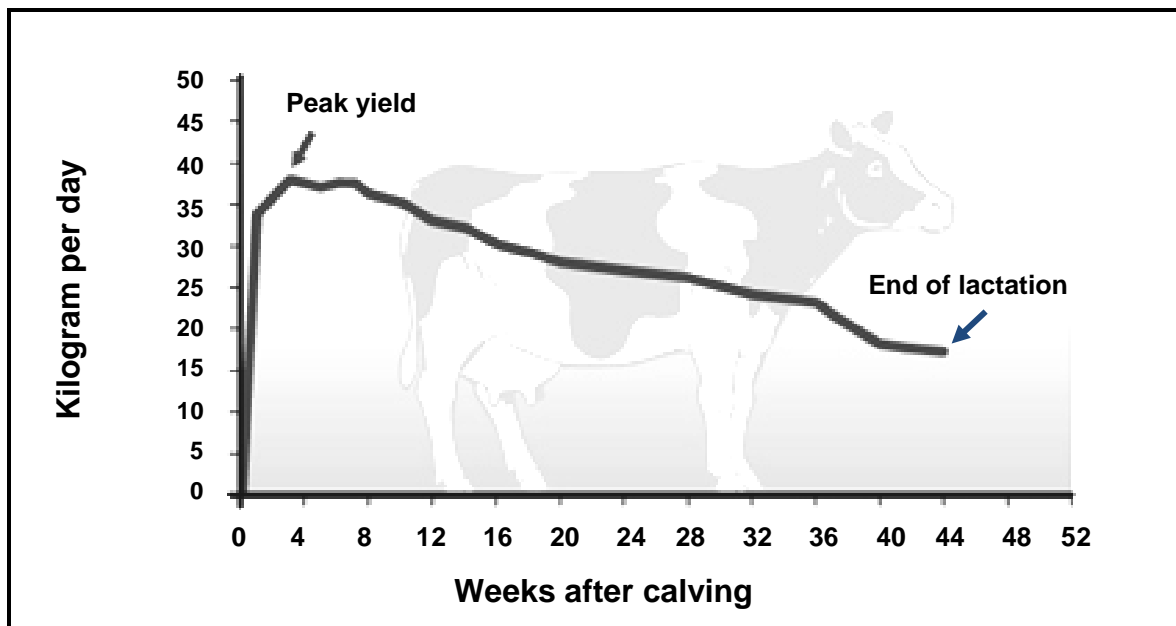


- 3.2.1 Identify THREE possible reasons for handling sheep in the facility in the picture on page 10. (3)
- 3.2.2 State TWO basic design features of the sheep handling facility in the picture on page 10. (2)
- 3.2.3 Farm animals with young suckling offspring show maternal instinct and are highly protective of their young. Explain how these animals should be handled in an enclosure or handling pen. (2)
- 3.2.4 The risk of sheep being stolen is greater than that of cattle. Support this statement by referring to the handling of sheep. (2)
- 3.3 The diagrams below illustrate the handling of large animals.

**DIAGRAM A****DIAGRAM B**

- 3.3.1 Identify the handling equipment used in DIAGRAMS A and B. (2)
- 3.3.2 State the purpose of handling the animal as illustrated in DIAGRAM A. (1)
- 3.3.3 Name the part of the head that is used to grip the animal as illustrated in DIAGRAM B. (1)

- 3.4 The graph below illustrates the milk production of a dairy cow over a period of time.



[Source: *Efficient Milking*]

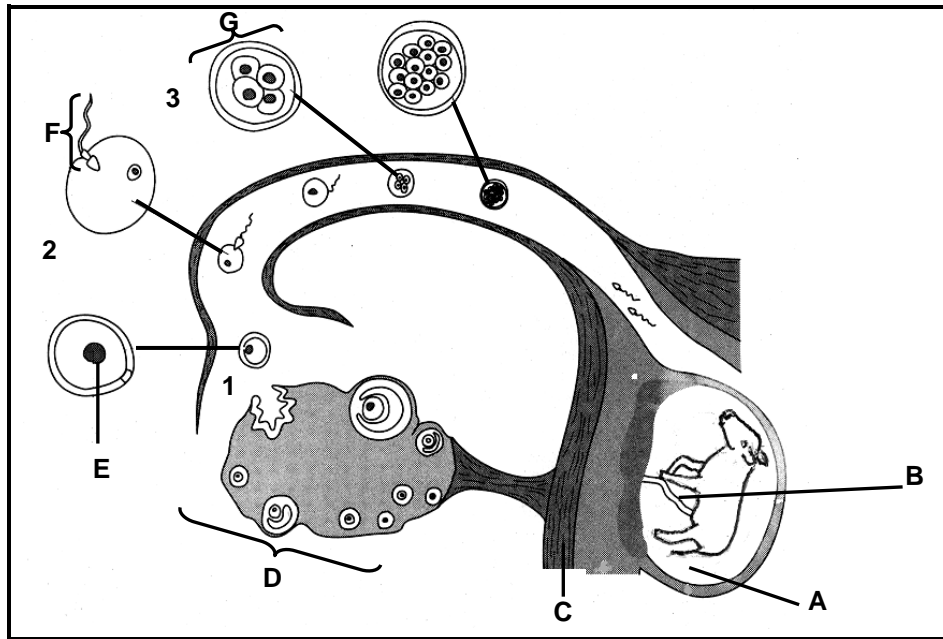
- 3.4.1 Identify the curve illustrated above. (1)
- 3.4.2 Use the graph above and indicate the time (in weeks) when the following occurred:
- (a) Drying-up of the cow (1)
 - (b) Calving (1)
 - (c) Largest feed intake (1)
 - (d) Peak of milk production (1)
 - (e) Time of conception if the cow needs to calf again 8 weeks after she has dried up (1)
- 3.4.3 State THREE factors that will influence the quantity of milk produced during the peak production period of the cow. (3)

[35]

Start this question on a NEW page.

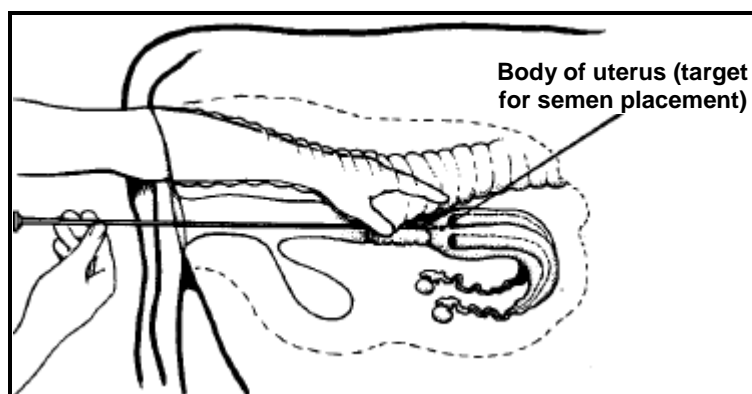
QUESTION 4: ANIMAL REPRODUCTION, PROTECTION AND CONTROL

- 4.1 The diagram below illustrates part of the reproductive system. Structures **B** to **G** and processes **1** to **3** occur in the Fallopian tube and uterus.



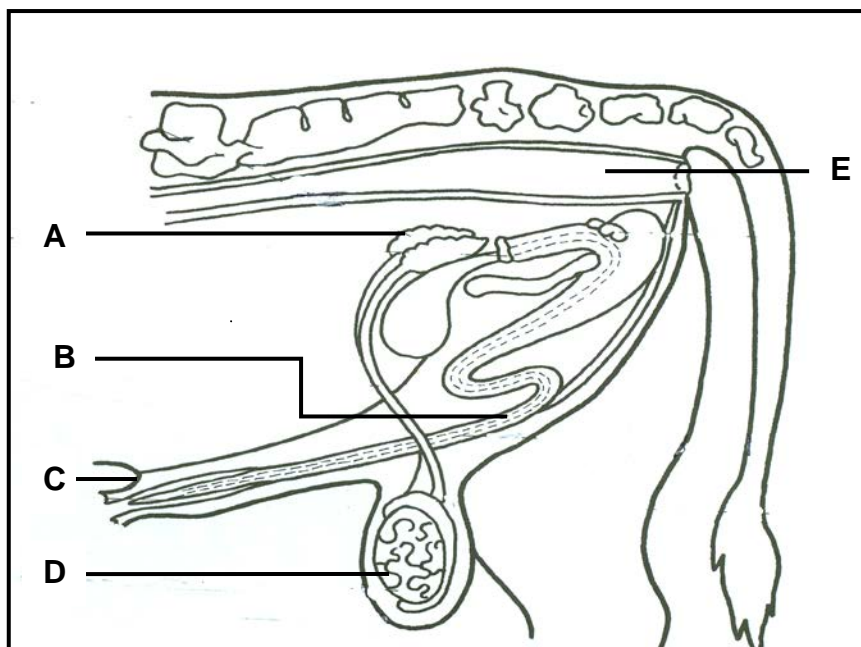
- 4.1.1 Identify the processes taking place at **1**, **2** and **3**. (3)
- 4.1.2 Name TWO functions of fluid **A**. (2)
- 4.1.3 State the main function of structure **B**. (2)
- 4.1.4 Indicate the hormone responsible for the process taking place at **1**. (1)
- 4.1.5 Describe how part **F** is adapted to enable it to enter the egg cell. (2)

- 4.2 The diagram below illustrates the artificial insemination (AI) technique in cattle.



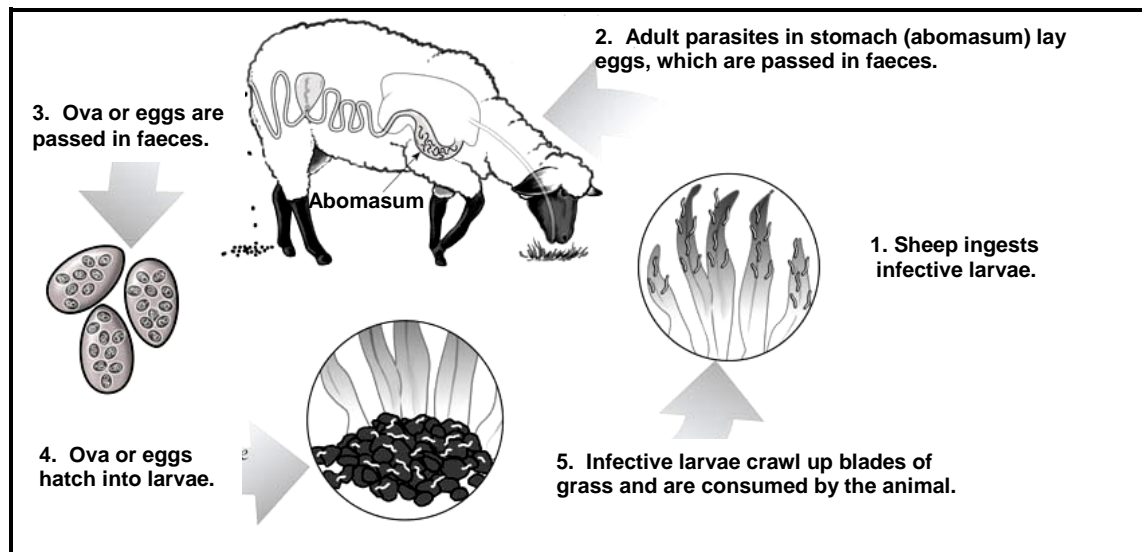
- 4.2.1 Indicate FOUR characteristics of good, fertile semen. (4)
- 4.2.2 Briefly describe the treatment of the frozen semen before placing it into the pipette for insemination. (2)
- 4.2.3 Suggest the best time for insemination after a cow shows the first signs of oestrus. (1)
- 4.2.4 Briefly explain the negative effect on a cow if the inseminator is not well trained. (2)

- 4.3 The diagram below illustrates the reproductive system of a bull.



- 4.3.1 Identify parts **A**, **B** and **D**. (3)
- 4.3.2 State the function of part **A**. (1)
- 4.3.3 State the function of the hormone secreted in part **D**. (1)
- 4.3.4 Briefly describe why part **D** is suspended from the animal body. (2)

4.4 The diagram below illustrates the life cycle of a parasite in sheep.



- 4.4.1 From the diagram above, deduce TWO visible symptoms of a roundworm infestation. (2)
- 4.4.2 Discuss TWO appropriate measures to control a roundworm infestation based on the diagram above. (4)
- 4.4.3 Give THREE reasons for using registered remedies and their recommended doses. (3)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150

ANSWER SHEET

CENTRE NUMBER:									
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EXAMINATION NUMBER:													
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SECTION A**QUESTION 1.1**

1.1.1	A	B	C	D
1.1.2	A	B	C	D
1.1.3	A	B	C	D
1.1.4	A	B	C	D
1.1.5	A	B	C	D
1.1.6	A	B	C	D
1.1.7	A	B	C	D
1.1.8	A	B	C	D
1.1.9	A	B	C	D
1.1.10	A	B	C	D

(10 x 2) (20)

QUESTION 1.3

1.3.1	
1.3.2	
1.3.3	
1.3.4	
1.3.5	

(5 x 2) (10)

QUESTION 1.2

	A only	B only	A and B	NONE
1.2.1				
1.2.2				
1.2.3				
1.2.4				
1.2.5				

(5 x 2) (10)

QUESTION 1.4

1.4.1	
1.4.2	
1.4.3	
1.4.4	
1.4.5	

(5 x 1) (5)

TOTAL SECTION A: 45