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# basic education

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

## **NATIONAL SENIOR CERTIFICATE**

**GRADE 12**

**AGRICULTURAL SCIENCES P1**

**FEBRUARY/MARCH 2018**

**MARKS: 150**

**TIME: 2½ hours**

**This question paper consists of 16 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. You may use a non-programmable calculator.
6. Show ALL the calculations, including formulae, 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 D.

1.1.1 ... is necessary for the healing of damaged tissue and assists in the healing of wounds in pigs.

- A Selenium
- B Iodine
- C Iron
- D Zinc

1.1.2 The structure in the stomach of a young calf that is responsible for the transportation of milk directly into the abomasum:

- A Trachea
- B Crop
- C Omasum
- D Oesophageal groove

1.1.3 Digestible energy can be defined as the ...

- A energy that is released when a feed is completely burnt to its final oxidation product.
- B total amount of energy released as heat.
- C difference between the gross energy value and the energy lost in manure.
- D energy that is available for maintenance and production.

1.1.4 One of the following is NOT correct with regard to factors influencing the digestibility of feeds:

- A Composition of the feed
- B Mineral content of the feed
- C Crude fibre content of the feed
- D Type of animal

1.1.5 The production system where animals are kept in high densities and fed highly specialised formulated feeds:

- A Semi-intensive
- B Extensive
- C Battery
- D Backyard

- 1.1.6 The following should be considered to avoid stress and aggressive conflicts in male sheep:
- A Group and house all male sheep in one pen.
  - B Place animals of the same sex together regardless of body weight and size.
  - C Group animals that are familiar with one another and of the same age and sex.
  - D Place a number of male sheep with female sheep during the breeding season.
- 1.1.7 The following is applicable to feed provision in a well-designed feed flow plan:
- (i) Buying feeds in small quantities is uneconomical.
  - (ii) Make provision for storage facilities for feeds because not all feeds required are readily available on farms.
  - (iii) Feed requirements of animals may be fulfilled by buying the feed at any time when needed.
  - (iv) Feeds must be protected against rain, spoilage, insects and rodents.
- Choose the CORRECT combination:
- A (i), (ii) and (iv)
  - B (i), (iii) and (iv)
  - C (ii), (iii) and (iv)
  - D (i), (ii) and (iii)
- 1.1.8 A method to administer medicine to the skin or directly to the wound:
- A Topical
  - B Oral
  - C Injection
  - D Dosing
- 1.1.9 The hormone responsible for the ripening of the follicles:
- A Progesterone
  - B Luteinising hormone
  - C Follicle stimulating hormone
  - D Prolactin
- 1.1.10 The common excretory canal for urine and semen in fowl:
- A Urethra
  - B Cloaca
  - C Vagina
  - D Vas deferens
- (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.

COLUMN A			COLUMN B
1.2.1	A:	Duodenum	the structure where maximum absorption of nutrients occurs mainly
	B:	Jejunum	
1.2.2	A:	Calcium and phosphorus	nutrients responsible for the formation of bones
	B:	Vitamin D and magnesium	
1.2.3	A:	Optimal production	the level of animal production that would earn the farmer the largest income on the long run
	B:	Maximum production	
1.2.4	A:	Testis degradation	the phenomenon where the testes remain in the abdominal cavity
	B:	Lack of libido	
1.2.5	A:	Corpus luteum	the structure that develops on the ovary after ovulation
	B:	Placenta	

(5 x 2) (10)

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

- 1.3.1 The enzyme in the saliva of pigs responsible for the breaking down of starch to simple sugars
- 1.3.2 An organism that spends most or part of its life on the host animal
- 1.3.3 Materials, such as sawdust and straw, which are placed on the floors of pigsties to insulate cold cement floors and absorb moisture
- 1.3.4 The phenomenon where a superior cow is treated with hormones to produce many ova
- 1.3.5 The organelle in the mid-piece of the sperm cell that supplies energy for movement

(5 x 2) (10)

1.4 Change the UNDERLINED WORD(S) in EACH of the following statements to make it TRUE. Write only the answer next to the question number (1.4.1–1.4.5) in the ANSWER BOOK.

1.4.1 Urea is a white water-soluble substance used to supplement carbohydrates in the rations and licks of ruminants.

1.4.2 The driving licence is a document carried by the driver with a clear identification of the animals transported on a public road.

1.4.3 The method used to increase the number of identical offspring from a single embryo, is embryo flushing.

1.4.4 The endoderm is the layer from which the heart, skeleton, muscles, urogenital and vascular systems develop.

1.4.5 Adrenalin is the hormone in bulls that enhances sexual desire.

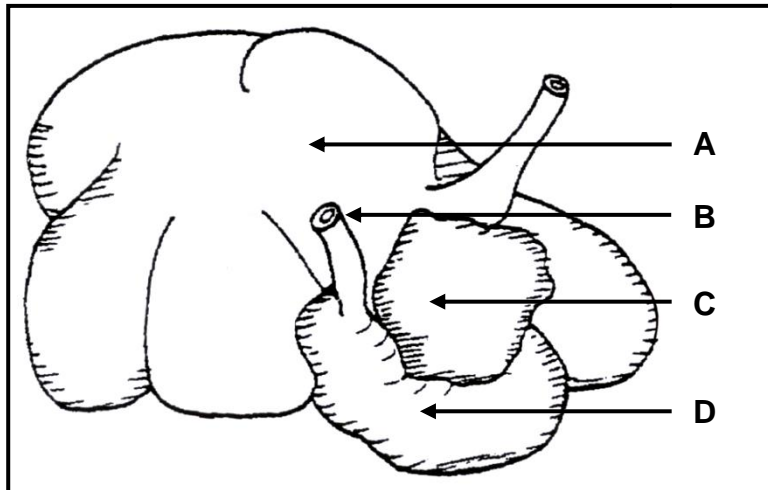
(5 x 1) (5)

**TOTAL SECTION A: 45**

**SECTION B****QUESTION 2: ANIMAL NUTRITION**

Start this question on a NEW page.

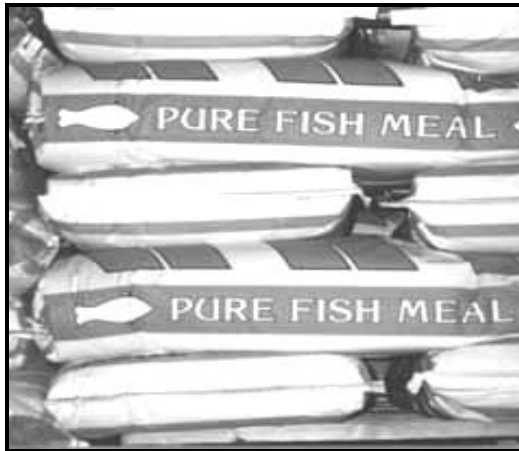
2.1 The diagram below illustrates the alimentary canal of a farm animal.



- 2.1.1 Write down the letter (A–D) of the part where cellulose digestion occurs. (1)
- 2.1.2 Name the cellulose-digesting enzyme secreted by the organisms in part **A**. (1)
- 2.1.3 State TWO requirements of the organisms found in part **A**. (2)
- 2.1.4 Indicate the type of digestion that occurs in part **D**. (1)
- 2.1.5 Give a reason for your answer to QUESTION 2.1.4. (1)



2.2 The pictures below show different animal feeds available.



**FEED A**



**FEED B**



**FEED C**



**FEED D**

2.2.1 Classify the type of feed shown in **FEED A** and **FEED C**. (2)

2.2.2 Write down the letter (A–D) of the feed in the pictures above that can be recommended for farm animals under EACH of the following conditions:

- |  |     |
|--|-----|
| (a) Finishing off of cattle for the abattoir           | (1) |
| (b) To correct mineral deficiency                      | (1) |
| (c) To improve fertility in rams                       | (1) |
| (d) To supply bulkiness in rations of ruminant animals | (1) |

2.2.3 Non-ruminants digest **FEED B** better when it is ground. Justify this statement. (2)

2.3 In a feed trial, an animal was fed 24 kg of dry hay and it excreted 12,5 kg of dry manure. Of this hay 11,5 kg was digested and absorbed.

2.3.1 Calculate the digestibility coefficient of this hay. (3)

2.3.2 Suggest at which stage the hay fed to the animals above was cut. (1)

2.3.3 Give a reason for your answer to QUESTION 2.3.2, based on the calculated value above. (2)

2.3.4 Name TWO supplementary substances that could be used to improve digestibility of this hay. (2)

2.4 The table below shows a fodder flow plan for 50 beef cattle over a period of 6 months.

	JAN.	FEB.	MAR.	APR.	MAY	JUN.
Natural pasture (ton)	160	160	140	120	80	60
Supplementary feed (kg/animal/day)				1	2	4
Cost of supplementary feed (R/kg)				30	38	50
Feed required (ton)	140	140	140	140	140	140
Price of beef (R/kg)	40	35	30	30	35	60

2.4.1 Identify any TWO months in the table above when the feed was insufficient. (2)

2.4.2 From the data above, give TWO reasons for your answer to QUESTION 2.4.1. (2)

2.4.3 Calculate the total quantity of supplementary feed (in tons) for ALL the animals during May. (3)

2.5 The table below shows the crude protein and crude fibre content of the different feeds.

FEED	CRUDE PROTEIN (CP) (%)	CRUDE FIBRE (CF) (%)
Natural lucerne pastures	23	26
Lucerne hay	14	30
Oil-cake meal	37	16
Maize meal	9	2
Sorghum stover	4	40

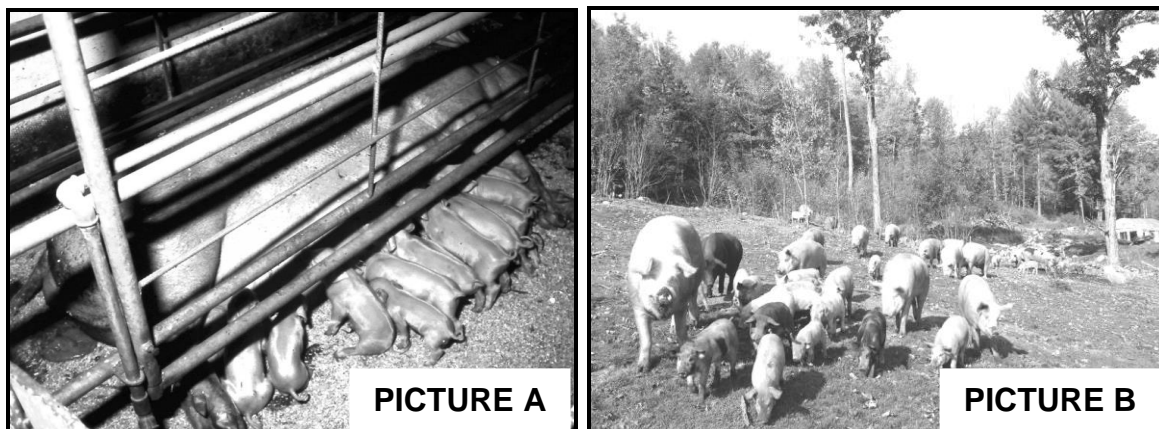
Use the data in the table above to draw a bar graph of the crude protein and crude fibre content of the different feeds.

(6)  
[35]

**QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL**

Start this question on a NEW page.

3.1 The pictures below indicate TWO different pig production systems.



3.1.1 Identify the TWO production systems shown in PICTURES A and B. (2)

3.1.2 Compare the TWO production systems based on the following:

(a) Method of feeding (2)

(b) Space per production output (2)

3.2 The table below shows the feeding and temperature requirements for broilers at different stages of growth.

AGE (weeks)	FEED	NUTRITIONAL VALUE	TEMPERATURE REQUIREMENTS
0–1	Starter mash	23% protein fortified with vitamins and mineral salts	32,2 °C to 35 °C
1–2	Starter mash	23% protein fortified with vitamins and mineral salts	29,4 °C to 32,2 °C
3–4	Grower mash	20% protein fortified with vitamins and mineral salts	26,7 °C to 29,4 °C
5–slaughter	Finisher mash	18% protein fortified with carbohydrates	Normal room temperature (25 °C)

3.2.1 Identify the main nutrient for broilers of ALL age groups. (1)

3.2.2 Indicate the importance of the nutrient in QUESTION 3.2.1 for broilers. (1)

3.2.3 Give the main reason for the inclusion of carbohydrates in a finisher mash. (1)

3.2.4 Deduce the relationship between the protein level of the feed, temperature requirements and the age of the broilers. (3)

- 3.3 Give ONE word/term for each of the following descriptions of tools used for farm animal identification purposes by choosing a word/term from the list below. Write only the word/term next to the question number (3.3.1–3.3.4) in the ANSWER BOOK.

ear tag; branding iron; smart neck band; tattoo pliers
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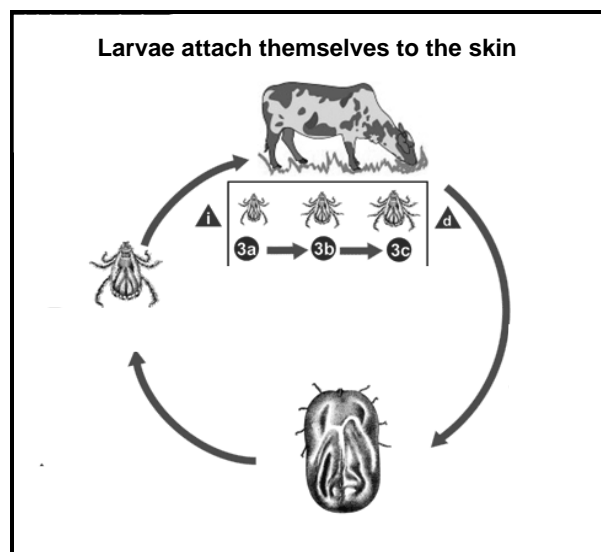
- 3.3.1 Used to leave a particular permanent mark on the animal, especially cattle (1)
- 3.3.2 Used to identify animals with specific coded information on family lines and generation (1)
- 3.3.3 Equipped with an advanced electronic device to locate an animal and send feedback on the actions performed by the animal (1)
- 3.3.4 Used for the identification of animals, especially stud horses (1)

- 3.4 The facility below is used in an animal production enterprise.

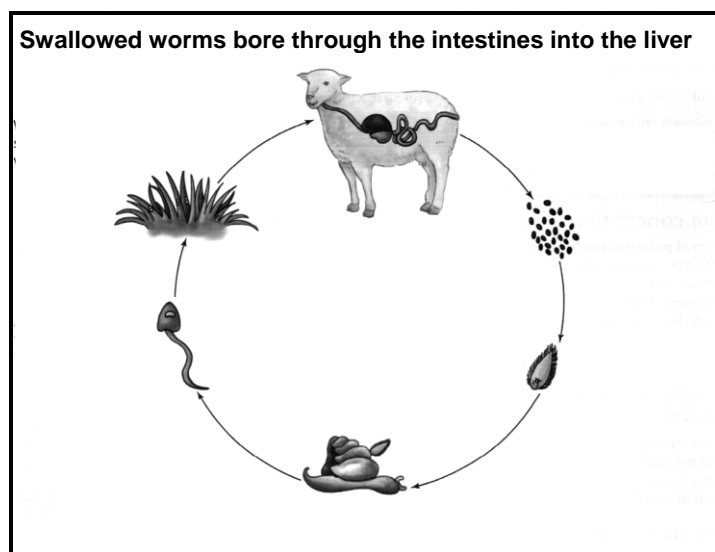


- 3.4.1 Identify the facility above. (1)
- 3.4.2 What is the facility, identified in QUESTION 3.4.1, used for? (1)
- 3.4.3 State TWO design features of this facility that will make it suitable for its use. (2)
- 3.4.4 Suggest TWO forms of harm to animals when the facility above is used. (2)

3.5 The diagrams below represent two parasites in farm animals.



**PARASITE A**



**PARASITE B**

3.5.1 Classify the TWO types of parasites illustrated in **A** and **B**. (2)

3.5.2 Use the diagrams to motivate EACH answer to QUESTION 3.5.1. (2)

3.5.3 State ONE preventative measure against the parasite illustrated in **B**. (1)

3.6 Animal diseases are caused by pathogens. Some diseases can be transmitted on contact; others need a disease-carrying organism. All diseases have a negative impact on farmers, labourers and the economy of the country.

3.6.1 Give a scientific term used in animal health to describe EACH of the following conditions:

(a) Diseases that can be transmitted from animal to animal (1)

(b) Disease-carrying organism (1)

3.6.2 Name ONE bacterial disease that can be transmitted from one animal to the other. (1)

3.6.3 State ONE role of the farmer to control the occurrence of the diseases in QUESTION 3.6.2. (1)

3.6.4 Suggest TWO ways in which farm workers can be exposed to animal diseases. (2)

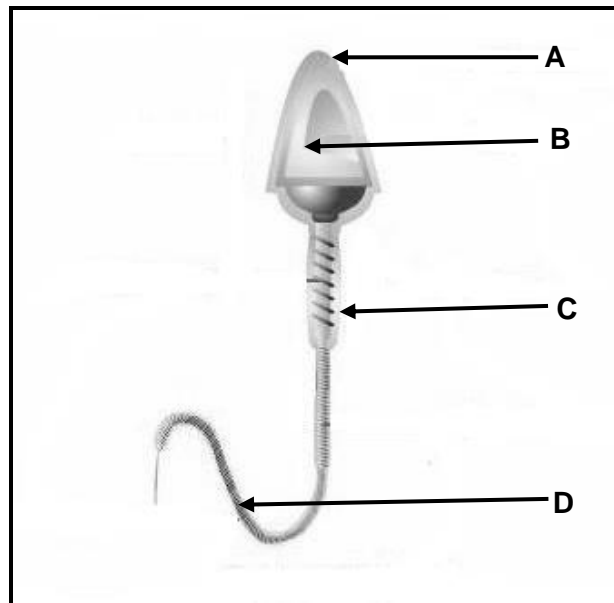
3.6.5 Indicate TWO roles of the state in controlling the spread of infectious diseases. (2)

**[35]**

**QUESTION 4: ANIMAL REPRODUCTION**

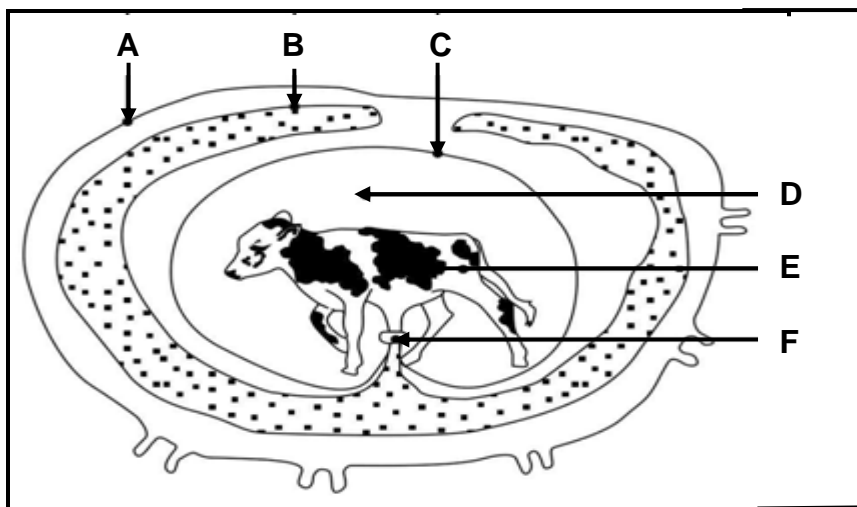
Start this question on a NEW page.

4.1 The diagram below represents a sperm cell.



- 4.1.1 Identify part **A**. (1)
- 4.1.2 Give a function of the parts labelled:
- (a) **A** (1)
  - (b) **B** (1)
  - (c) **D** (1)
- 4.1.3 Distinguish between a *sperm cell* and *semen*. (2)
- 4.1.4 Name the female reproductive cell. (1)

4.2 The diagram below illustrates foetus development in cattle.



4.2.1 Identify parts **B** and **F**. (2)

4.2.2 State the function of part **D**. (1)

4.2.3 Name the condition described by EACH of the following statements:

(a) The foetus dies and all the fluids are reabsorbed with the hard and dry parts remaining in the uterus. (1)

(b) The foetus dies and the soft tissue decays and everything remains in the uterus. (1)

(c) Pregnancy is terminated before the normal time of parturition and the dead foetus is expelled. (1)

(d) The placenta remains in the uterus after parturition for seven days. (1)

4.3

A commercial dairy farmer has 100 fertile cows and one bull. All the animals are well fed, a disease control system is in place and the enterprise is well managed. However, the calving percentage was only 55% over the last three years.

4.3.1 In the scenario above, identify the major problem in the enterprise. (1)

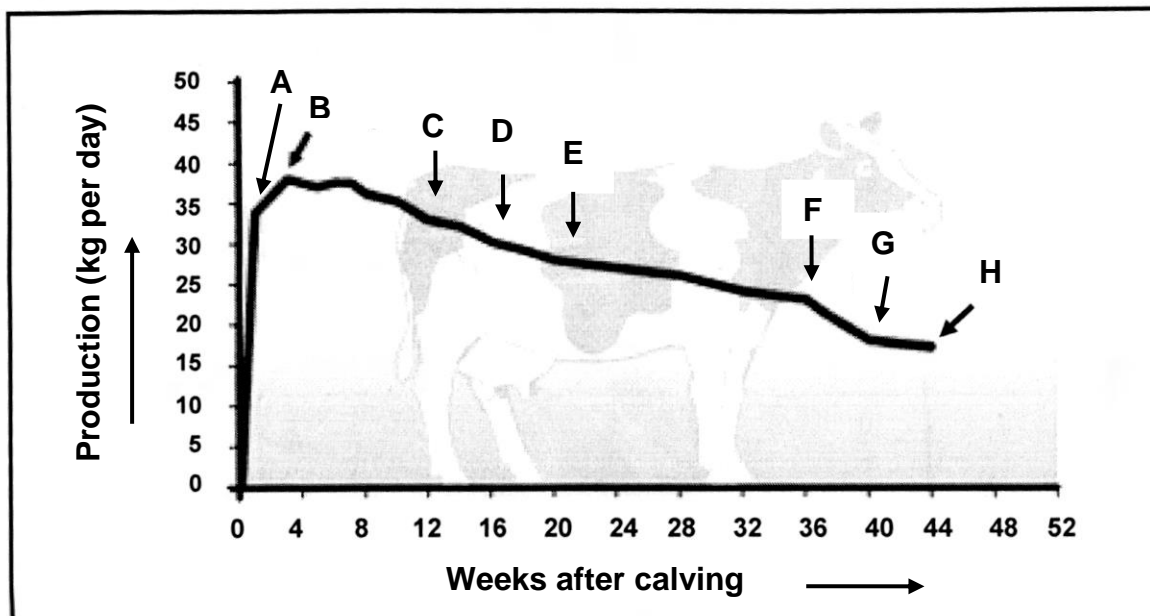
4.3.2 Advise the farmer on ONE scientific technique to use in cows that will result in a much higher conception rate. (1)

4.3.3 If the farmer does not use the technique in QUESTION 4.3.2, how can the conception rate of the cows be improved? (1)

4.3.4 Explain the impact of nutrition on the fertility of bulls. (2)

4.3.5 Give TWO other reasons why the bull in the scenario above performs poorly. (2)

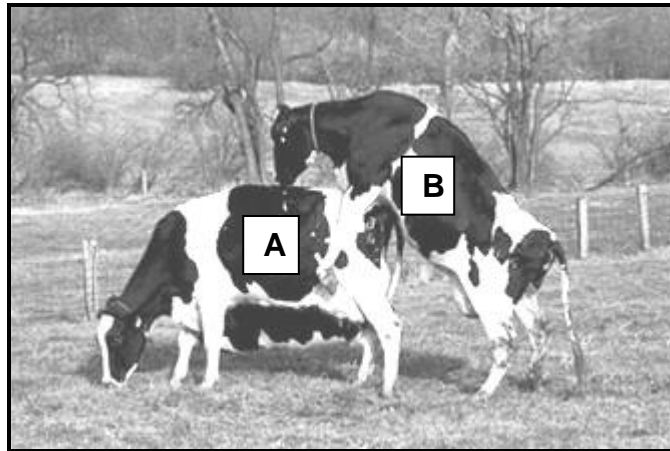
- 4.4 The graph below illustrates the milk production of a dairy cow over a period of one year.



- 4.4.1 Give the term describing the graph above. (1)
- 4.4.2 Write down the letter (A–H) on the graph that indicates where EACH of the following occurs:
- (a) Drying off of the cow (1)
  - (b) Calving (1)
  - (c) Peak milk production (1)
  - (d) Time of conception if the cow needs to calf again eight weeks after she has dried off (1)
- 4.4.3 Give TWO reasons to explain the abnormal drop in the milk production between point **F** and point **G**. (2)



4.5 The picture below shows dairy cows in oestrus.



- 4.5.1 Define the concept *oestrus* in dairy cows. (2)
- 4.5.2 State TWO visible signs of oestrus in dairy cows, except the one in the picture above. (2)
- 4.5.3 Name the cow (**A** or **B**) that is definitely in oestrus. (1)
- 4.5.4 Name the:
- (a) Hormone responsible for the signs of oestrus (1)
  - (b) Duration of the oestrus cycle (in days) (1)
- [35]**

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