



basic education

Department:
Basic Education
REPUBLIC OF SOUTH AFRICA

**NATIONAL
SENIOR CERTIFICATE**

GRADE 12

AGRICULTURAL SCIENCES P1

FEBRUARY/MARCH 2015

MARKS: 150

TIME: 2½ hours

This question paper consists of 15 pages.

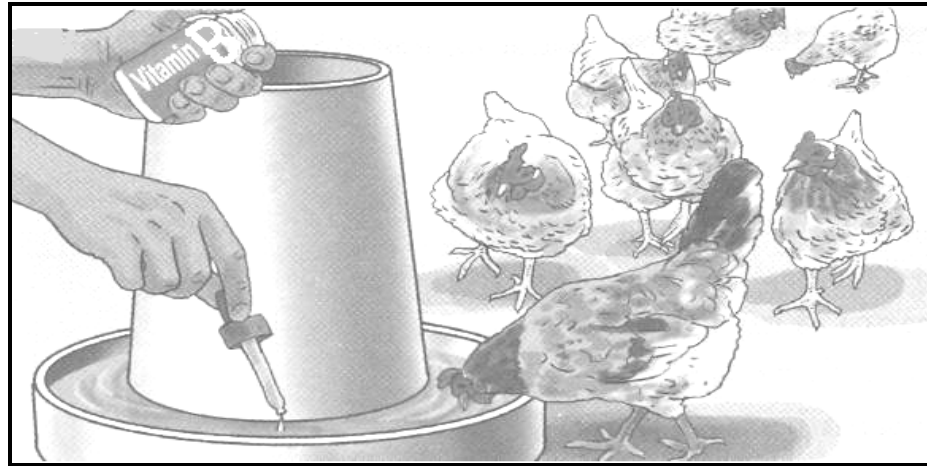
INSTRUCTIONS AND INFORMATION

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. 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 The chemical symbol for the mineral element responsible for the formation of haemoglobin in the red blood cells:
- A Ca
 - B P
 - C Na
 - D Fe
- 1.1.2 The process that involves the transporting of water and nutrient molecules from the small intestines into the bloodstream:
- A Mastication
 - B Absorption
 - C Digestion
 - D Assimilation
- 1.1.3 The animal with the highest protein requirements:
- A Old ewe during the rainy season
 - B Bull in the off-season
 - C Dried-off sow
 - D Dairy cow in milk
- 1.1.4 As the environmental temperature increases above the normal comfort levels, ruminant animals tend to ...
- A eat less and drink more water.
 - B eat more and drink less water.
 - C eat more and drink more water.
 - D eat less and drink less water.
- 1.1.5 A cow abandons her calf immediately after birth. This condition can be directly linked to inadequate ...
- A mothering instincts.
 - B conducive climatic conditions.
 - C handling.
 - D management.
- 1.1.6 An example of a congenital defect:
- A A broken penis
 - B Cystic ovaries
 - C Impotence
 - D Double cervix

- 1.1.7 The supplementing of the nutritional element, ..., is represented in the diagram below.



- A antibiotics
 B soluble vitamins mixed with water
 C licks
 D growth stimulants
- 1.1.8 The correct way to handle chickens includes the following:
- (i) Chase and grab chickens.
 - (ii) Move chickens gently into a tight group.
 - (iii) Grab a chicken by the wings or tail.
 - (iv) Hold the chicken firmly, but not too tight, for it to feel secure.
 - (v) Grab chickens by their feet.

Choose the CORRECT combination:

- A (ii), (iii) and (v)
 B (i), (iii) and (iv)
 C (ii), (iv) and (v)
 D (ii), (iii) and (iv)
- 1.1.9 A process where superior cows are treated with hormones to produce many more ova during a single oestrus cycle:
- A Superovulation
 B Synchronisation
 C Flushing
 D Steaming up
- 1.1.10 The membrane surrounding the foetus responsible for the removal of urine:
- A Placenta
 B Chorion
 C Amnion
 D Allantois

(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 to 1.2.5) in the ANSWER BOOK, for example 1.2.6 B only.

Example: 1.2.6

COLUMN A		COLUMN B
A:	Roughage	A feed with a high % of TDN
B:	Concentrate	

Answer: 1.2.6 B only

COLUMN A			COLUMN B
1.2.1	A:	Wide	A nutritive ratio (NR) of 1 : 8
	B:	Suitable for fattening	
1.2.2	A:	Only attacks horses	Redwater is responsible for the destruction of red blood cells
	B:	Protozoan disease	
1.2.3	A:	Battery system	A system of keeping each layer in her own small wire cage for her entire productive life
	B:	Backyard system	
1.2.4	A:	Teats	Site of milk synthesis
	B:	Milk veins	
1.2.5	A:	Dystocia	The period that starts after parturition and normally continues for an average of 305 days in producing dairy
	B:	Lactation	

(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 The index used to determine the quality of a protein in a feed

1.3.2 A mineral deficiency that is responsible for parakeratosis in pigs

1.3.3 A board with handholds that is used to handle pigs

1.3.4 The process whereby eggs are produced by the ovary

1.3.5 The type of cloning used to generate an embryo which is implanted in the uterus 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 The Punnett square is a method used to determine the combined ratio of two feed components to get a required nutrient value.
- 1.4.2 A production ration that provides just enough nutrients to keep an animal alive and in the same condition.
- 1.4.3 The colon is a part of the digestive system where undigested food is finally stored before it passes through the anus.
- 1.4.4 The part of the sperm cell that facilitates penetration into the ovum is called the mid-piece.
- 1.4.5 Flushing is the implantation of an already fertilised egg cell from a superior animal into a recipient animal. (5 x 1) (5)
- TOTAL SECTION A: 45**

SECTION B

Start this question on a NEW page.

QUESTION 2: ANIMAL NUTRITION

2.1 The diagrams below represent the alimentary canals of two farm animals.

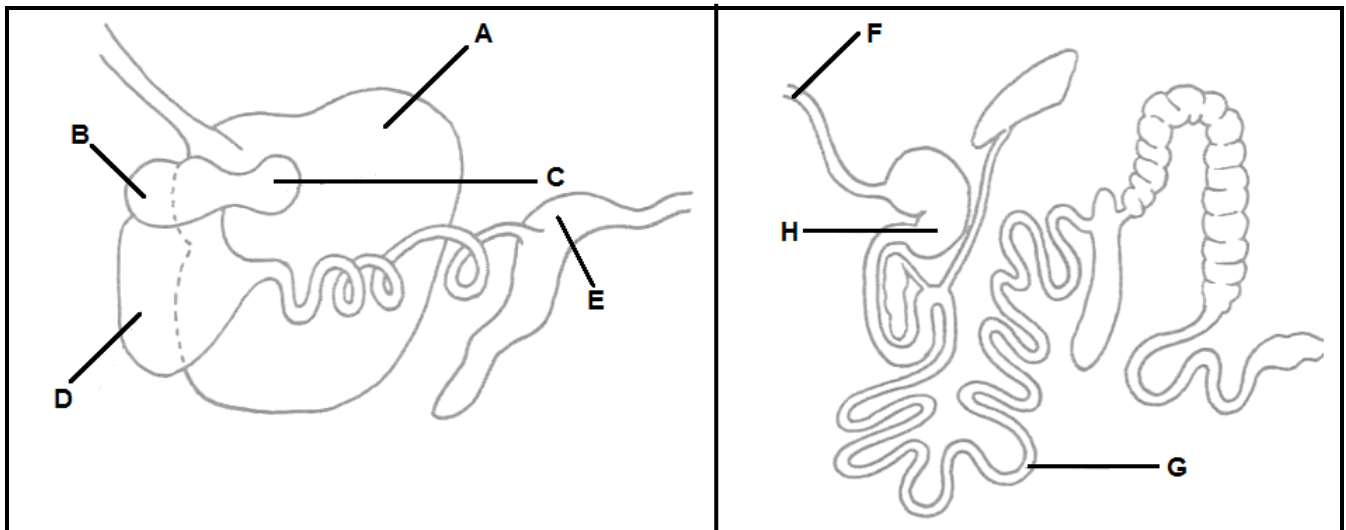


DIAGRAM 1

DIAGRAM 2

2.1.1 Complete the table below by writing down the answers to (a), (b), (c) and (d). Write only the word next to the question number (2.1.1 (a)–(d)) in the ANSWER BOOK.

DIGESTIVE SYSTEMS OF FARM ANIMALS		
DIAGRAM	TYPE OF ANIMAL	EXAMPLE OF A FARM ANIMAL
Diagram 1	(a)	(b)
Diagram 2	(c)	(d)

(4)

2.1.2 Indicate the letter (A–E) and the name of the part where hydrochloric acid is secreted in DIAGRAM 1 above.

(2)

2.2 Fodder-flow planning provides for own feed production, available feeds and the nutrient requirements of animals in a production system.

2.2.1 Define the concept *fodder flow*.

(2)

2.2.2 Explain the following aspects when planning a fodder flow:

(a) Economic viability

(2)

(b) Sustainability

(2)

2.3 A heifer was fed with 25 kg feed with a moisture content of 15%. This heifer excreted 8 kg dry manure.

2.3.1 Calculate the digestibility coefficient of the feed. (5)

2.3.2 Explain the implication of the digestibility coefficient in QUESTION 2.3.1. (2)

2.4 The table below indicates rations and their respective nutritive ratio (NR) values.

RATIONS	NUTRITIVE RATIO (NR)
A	1 : 10
B	1 : 4

2.4.1 Indicate the ration (**A** or **B**) which will be more suitable for:

(a) Fattening old ewes (1)

(b) Ewes in the last 4 weeks of pregnancy (1)

(c) Young growing animals (1)

2.4.2 Give a reason for the answer to QUESTION 2.4.1(a). (1)

2.4.3 Identify the ration above that contains the highest levels of the following feeds:

(a) Maize meal (1)

(b) Fish meal (1)

2.4.4 Describe the implication of the nutritive ratio in ration **B**. (2)

2.5 The diagram below represents a form of mineral supplementation in cattle.



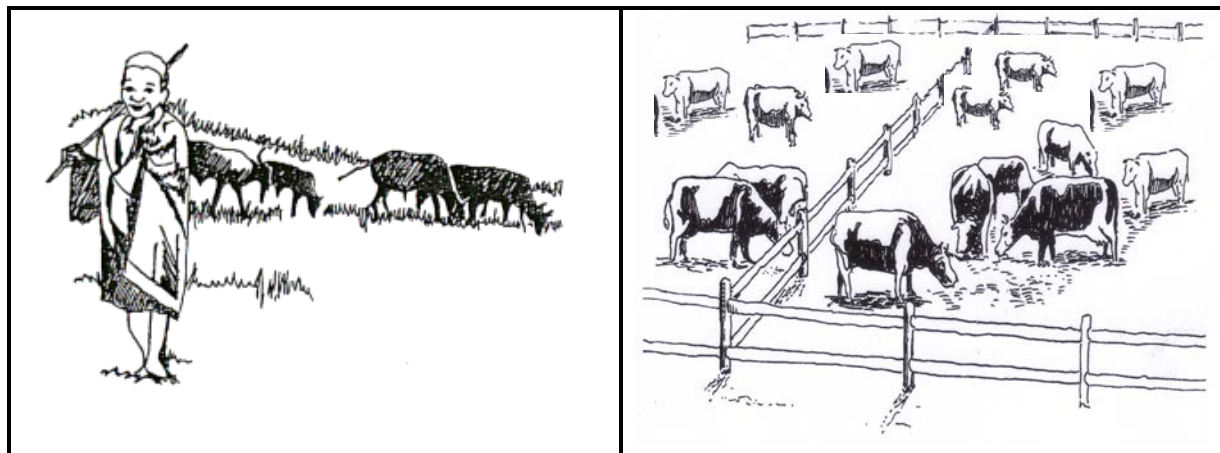
2.5.1 Indicate the mineral supplementation method represented in the diagram above. (1)

- 2.5.2 Name TWO minerals that could be supplemented using the method in QUESTION 2.5.1. (2)
- 2.5.3 Suggest a possible partial substitute for protein that could be used in the ration of ruminants. (1)
- 2.5.4 Briefly explain how the following growth regulators would increase the production output of a farm animal:
- (a) Hormones (2)
 - (b) Antibiotics (2)
- [35]**

QUESTION 3: ANIMAL PRODUCTION, PROTECTION AND CONTROL

Start this question on a NEW page.

3.1 The illustrations below indicate two animal production systems.



A: RURAL CATTLE HERDING

B: CATTLE IN A FEEDLOT

3.1.1 Identify the animal production systems represented by **A** and **B** in the above illustrations. (2)

3.1.2 Compare the following aspects of the animal production systems illustrated above:

(a) Capital investment (2)

(b) Area of land occupied (2)

3.1.3 Give TWO examples of intensive production systems for poultry. (2)

3.2 Below is a list of structures or practices that are used in the handling and management of farm animals in an animal production system.

- A dairy parlour
- A rope with a halter to tie animals to a pole
- A single strand of movable electrical wire
- A separate crush
- Ostriches/Geese and donkeys

Indicate which of the items above are the most suitable for each of the following situations:

3.2.1 A temporary structure for dairy cattle to utilise planted pastures (1)

3.2.2 To contain animals in a small area (1)

3.2.3 To inseminate Holstein cows (1)

3.2.4 To protect sheep against small predators, stray dogs and intruders (1)

3.3

Solar radiation is a major cause of heat stress and it increases the body temperature of farm animals. When farm animals are stressed their production also decreases.
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3.3.1 Suggest THREE measures that a farmer can take to reduce heat stress in cattle under intensive production conditions. (3)

3.3.2 Describe the correlation between high environmental temperature and feed intake in animals not adapted to hot environmental conditions. (2)

3.4 During an experiment a group of heifers was injected with a growth stimulant to test the effectiveness of the newly-developed stimulant. The results of the growth response in the heifers in the experiment were tabulated in the table below.

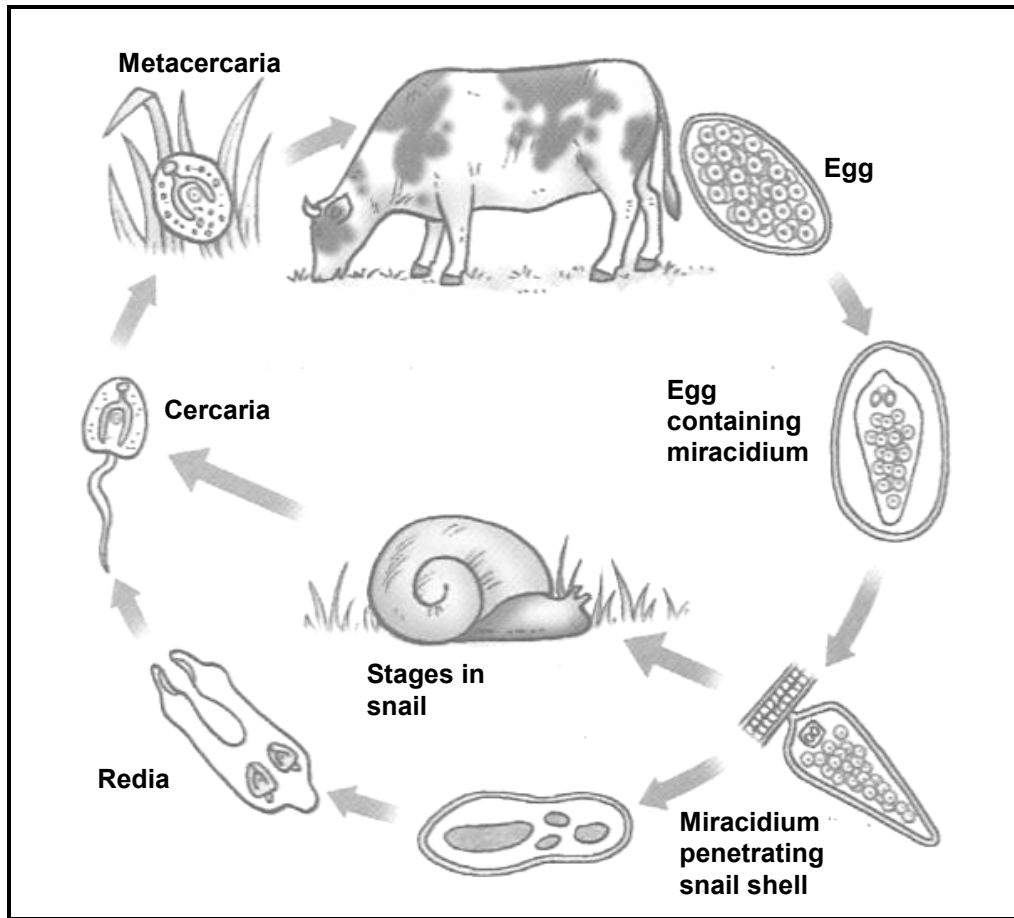
GROWTH STIMULANT (VOLUME IN ml)	GROWTH RESPONSE (kg)
0	120
5	250
10	340
15	395
20	410
25	415
30	420

3.4.1 Draw a line graph to illustrate the volume of growth stimulant and the growth response of these heifers. (6)

3.4.2 Name TWO growth stimulants used in animal production systems. (2)

3.4.3 Determine the growth response of the heifers at a growth stimulant application of 15 ml. (1)

3.5 The schematic representation below shows the life cycle of a parasite.



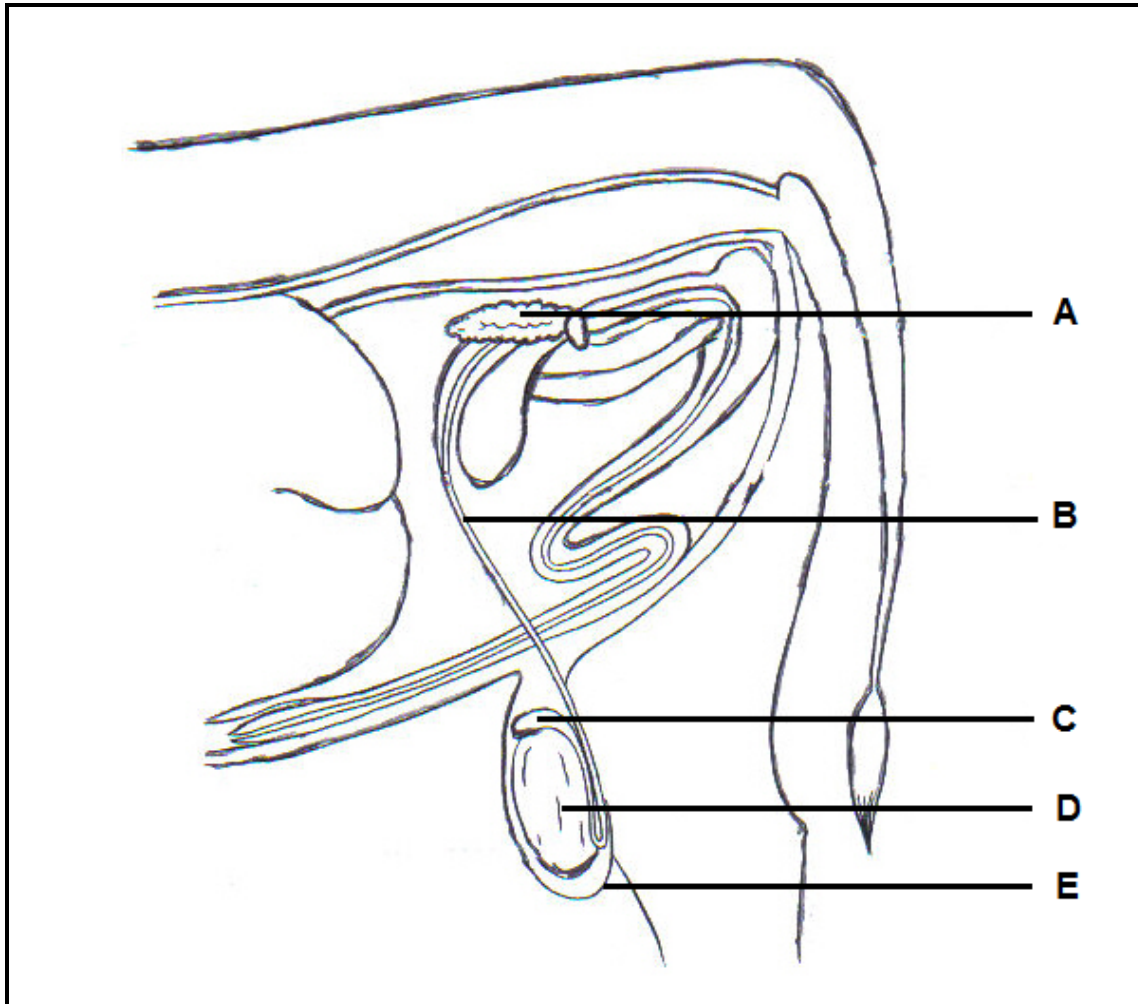
- 3.5.1 Identify the type of parasite in the above schematic representation. (1)
- 3.5.2 State TWO negative impacts that the parasite in the schematic representation has on animal production. (2)
- 3.5.3 Explain the way in which the animal in the schematic representation is infected by this parasite. (2)
- 3.5.4 Name the intermediate host in the schematic representation above. (1)
- 3.5.5 Suggest THREE measures how pasture management can be used to control this type of parasite. (3)

[35]

QUESTION 4: ANIMAL REPRODUCTION

Start this question on a NEW page.

4.1 The diagram below represents the reproductive system of a farm animal.



- 4.1.1 Indicate the process that takes place in part **D**. (1)
- 4.1.2 Identify parts **A**, **B** and **E**. (3)
- 4.1.3 Name and explain TWO congenital defects of part **D** that lead to infertility. (4)
- 4.1.4 State TWO functions of part **C**. (2)

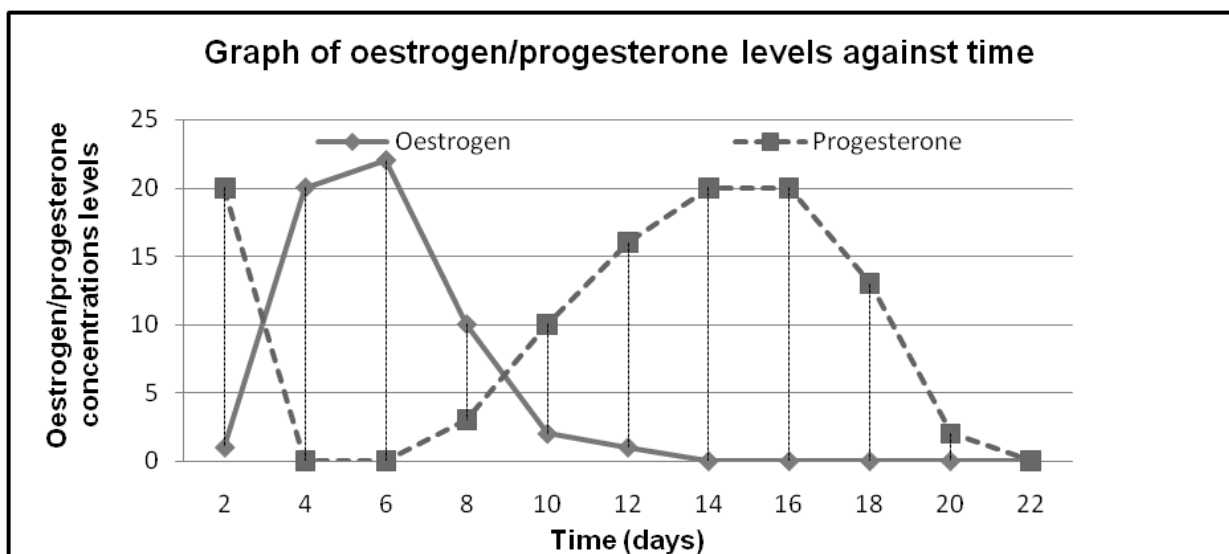
4.2 Cows normally allow mating when they are in oestrus.

4.2.1 Define the term *oestrus*. (2)

4.2.2 State THREE visible signs of oestrus in cows. (3)

4.2.3 Indicate THREE practical methods a farmer can use to assist with the identification of cows on heat. (3)

4.3 A non-pregnant cow was isolated from the rest of the herd for a research programme. Blood samples were taken daily from the cow to analyse the oestrogen and progesterone levels over a period of 22 days. The results were recorded and presented graphically as shown below.



4.3.1 Identify the most suitable day for the farmer to release the cow to mate with a bull. (1)

4.3.2 Give TWO reasons for the answer to QUESTION 4.3.1. (2)

4.3.3 Indicate the day on which ovulation might have taken place. (1)

4.3.4 Name the stage of oestrus when progesterone is at its highest level. (1)

4.3.5 Deduce whether the cow has become pregnant. Motivate the answer. (3)

4.4 Currently modern technologies like artificial insemination (AI), synchronisation of oestrus and embryo transfer (ET) are used by farmers to enhance faster and better production, productivity and genetic superiority in farm animals.

- 4.4.1 Describe the *synchronisation of oestrus*. (2)
- 4.4.2 State THREE advantages of AI for dairy cows. (3)
- 4.4.3 Indicate FOUR processes followed during embryo transfer in the correct sequence. (4)
- [35]**

TOTAL SECTION B: 105
GRAND TOTAL: 150