education

Department:
Education
REPUBLIC OF SOUTH AFRICA

NATIONAL SENIOR CERTIFICATE

GRADE 12

AGRICULTURAL SCIENCES P2

FEBRUARY/MARCH 2009

MARKS: 150

TIME: 2 hours

This question paper consists of 18 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 make sure you answer only what is asked.
6. Number the answers correctly according to the numbering system used in this question paper.
7. Place the completed ANSWER SHEET for SECTION A (QUESTION 1) inside the ANSWER BOOK.
8. Write neatly and legibly.

SECTION A

QUESTION 1

1.1 Various options are provided as possible 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	X	B	C	D

1.1.1 The concept 'nutritive ratio' is used to give an indication of the ... content of the feed.

A fibre
B mineral
C non-nitrogen compound
D protein

1.1.2 The maintenance ration is the amount of food an animal requires to support ...

A life.
B production.
C life as well as production.
D life, production and work.

1.1.3 Beneficial micro-organisms in the rumen of cattle are ...

A bacteria and viruses.
B protozoa and bacteria.
C fungi and bacteria.
D protozoa and fungi.

1.1.4 The protein which is generally accepted as a standard protein because it has the highest biological value is …

A fish.
B beef.
C egg.
D legume.

1.1.5 One of the following is NOT an important stage of reproduction:

A Copulation
B Fertilisation
C Ingestion
D Parturition

1.1.6 Milk fever can be related to a deficiency of ...

A phosphorus.
B calcium.
C vitamin D.
D magnesium.

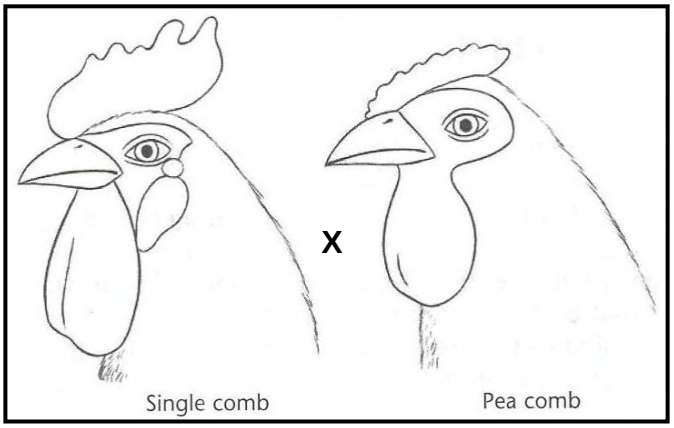
1.1.7 The type of capital that is regarded as a permanent and durable asset is …

A wages of workers.
B fuel for tractors.
C a dam.
D a tractor.

1.1.8 One of the following factors is NOT a production factor:

A Labour
B Vegetation
C Management
D Soil

1.1.9 The diagrams below illustrate a single-comb cock, with a heterozygote genotype represented by Cc, which is crossed with a pea-comb hen with a genotype represented by cc. Their offspring will have the following phenotype ratio:



A 50% single comb and 50% pea comb
B All single comb
C All pea comb
D 75% single comb and 25% pea comb

1.1.10 NO_3^- (nitrate ion) as a chemical compound has the following characteristics:

i NO_3^- has an electrical charge and is adsorbed onto a negatively charged soil colloid.
ii NO_3^- is an example of a cation.
iii NO_3^- can be a source of nitrogen in the soil solution.
iv NO_3^- is a source of oxygen to anaerobic microbes in waterlogged soils.

Choose the description(s) from the list below that match(es) with the characteristics of the chemical substance above:

A i, ii, iii and iv
B ii, iii and iv
C iii and iv
D iii only (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 block next to the question number (1.2.1 – 1.2.5) on the attached ANSWER SHEET.

Example:

COLUMN A		COLUMN B
A:	Liver	the place where bile is stored in the animal body
B:	Gall bladder	

Answer:

This statement refers to:			
ONLY A	**ONLY B**	**A AND B**	**NONE**
A	~~B~~	C	D

COLUMN A			COLUMN B
1.2.1	A:	Abomasum	proper functioning of this stomach in the young suckling ruminant is essential
	B:	Omasum	
1.2.2	A:	Salivary amylase	an example of a proteolytic enzyme
	B:	Trypsin	
1.2.3	A:	Fibre	an organic compound found in the feed that will be less digestible
	B:	Cellulose	
1.2.4	A:	Unemployment	repercussions of sudden mechanisation
	B:	Self-employment	
1.2.5	A:	Herbicide resistant	characteristic of genetically modified crops
	B:	Proof of no health risks	

(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 viral disease which is carried by midges from one animal to another during the early summer period after heavy rain

1.3.2 The quantity of the product that can be purchased at any given time by consumers at all possible alternative prices

1.3.3 Money that carries interest and which is supplied to an entrepreneur by a financial institution

1.3.4 The actual sorting process of products according to the standard specifications

1.3.5 The monosaccharide that is formed when maize meal is digested to its final digestive product (5 x 2) (10)

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

1.4.1 <u>Molasses</u> is the compound commonly used as non-protein nitrogen source in ruminant feeds.

1.4.2 The hormone <u>insulin</u> controls the secretion of the pancreatic juice.

1.4.3 <u>Fixed</u> capital is the type of capital that is used for one production season only.

1.4.4 Overcapitalisation refers to a situation where too much <u>management</u> is invested into the farming enterprise in relation to the available soil and labour.

1.4.5 <u>Mutation</u> is the genetic characteristic that is responsible for increased growth and productivity when crossbreeding is applied. (5 x 1) (5)

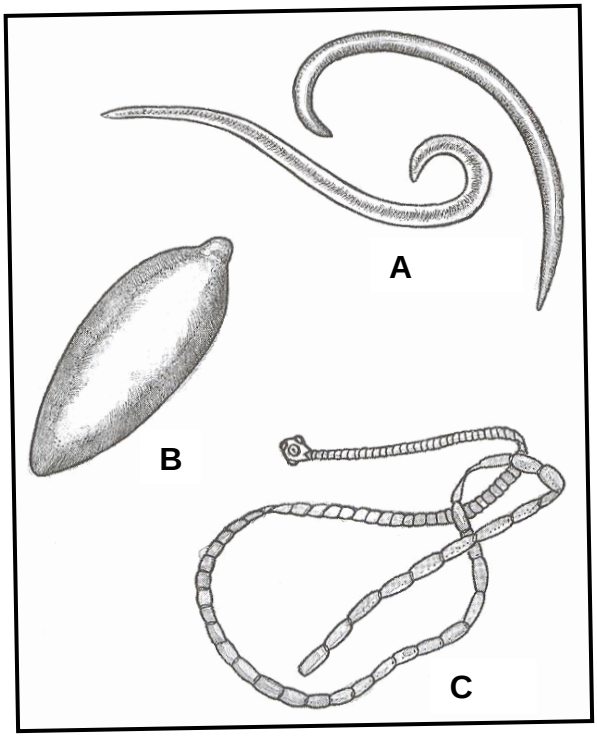
TOTAL SECTION A: 45

SECTION B

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 2

2.1 The diagrams below represent some of the internal parasites found in livestock.



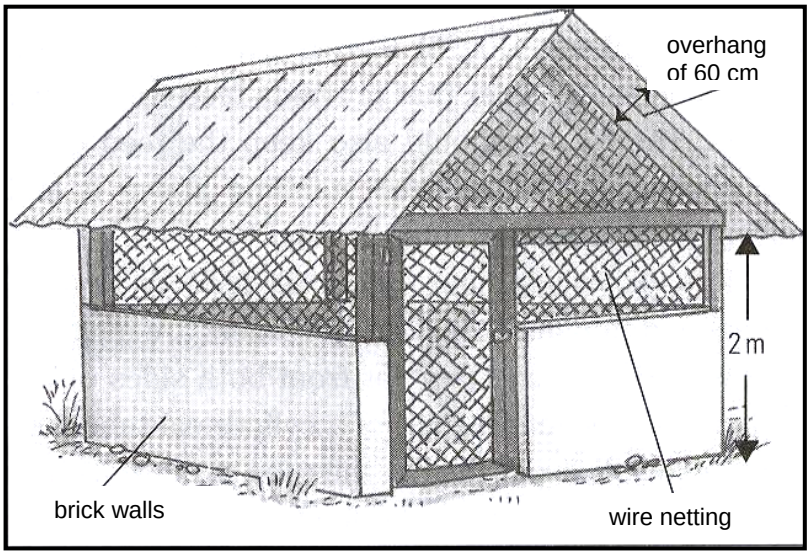
2.1.1 Identify the parasites that are labelled A – C. (3)

2.1.2 Select TWO of these parasites that need two hosts to complete their life cycles. (2)

2.1.3 Briefly state any TWO economic losses that may be caused by these parasites. (2)

2.2 The state has an important role to play in the prevention and control of animal diseases and pests. List FOUR services that the Department of Agriculture renders in this regard. (4)

2.3 Effective poultry production depends largely on proper housing facilities. A common shelter used by small farmers is the deep-litter house shown below.



Formulate FOUR requirements that this poultry farmer considered when the above structure was designed. (4)

2.4 Name THREE groups of micro-organisms that are pathogens and therefore cause diseases in animals. (3)

2.5

CASE STUDY

A group of emerging farmers is involved in the production of tomatoes, mainly for own consumption. They have little knowledge of farming and their highest qualification is Grade 7. Their land covers two hectares and the Department of Agriculture provides them with seeds, fertilisers, a water pump and fungicides.

They use two tractors to plough the two hectares. In 2007 the tomato harvest was too much for each family to consume. This resulted in high losses due to this oversupply of the crop.

2.5.1 Give ONE reason for the high loss of tomatoes in 2007. (1)

2.5.2 Indicate ONE production factor which was not fully utilised in the production process of tomatoes. (1)

2.5.3 Use the information from the case study to give ONE example of EACH of the following types of capital:

(a) Movable capital
(b) Fixed capital
(c) Working capital (3)

2.6 Mrs Mvubo is a young, inexperienced farmer who has bought a farm in a poor socio-economic environment. Her main purpose is to create job opportunities for people in her community and also to improve her entrepreneurial skills.

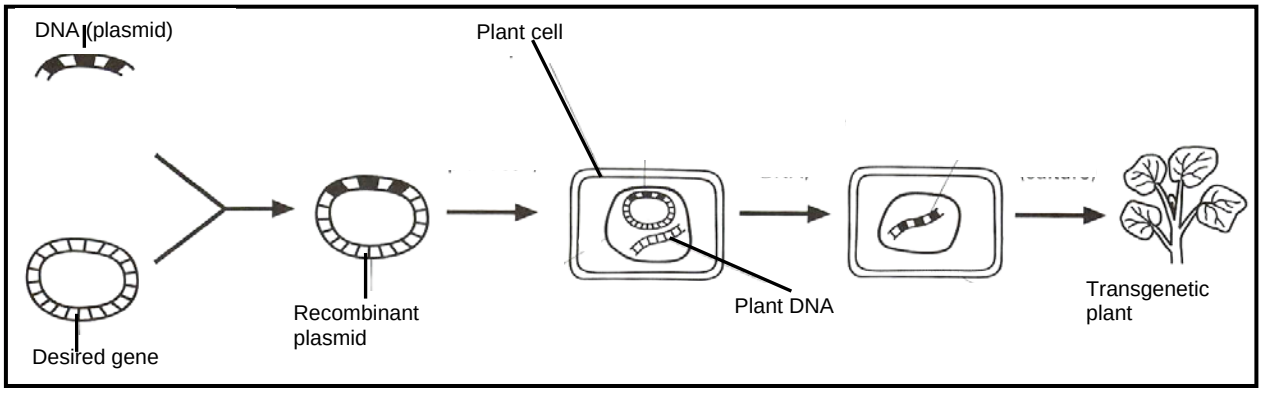
The following animals can be found on the farm: young piglets, layers, goats and beef cattle. The farm has sufficient water for irrigation.

2.6.1 Name TWO skills that Mrs Mvubo must have in order to manage the farm well. (2)

2.6.2 Name TWO managerial principles that a farmer must follow in order to be successful. (2)

2.6.3 Identify ONE factor that can make the effective marketing of her products difficult. (1)

2.7 The schematic representation below illustrates a plant breeding process followed in the development of a new cultivar.



2.7.1 Indicate the main function of DNA (deoxyribonucleic acid) as mentioned in the above diagram. (1)

2.7.2 Name the organism that is used as a vector to transfer genes from one organism to other crop plants. (1)

2.7.3 Briefly explain why the product of the process illustrated above is called a transgenetic plant. (2)

2.7.4 Name the type of technology illustrated in the above diagram. (1)

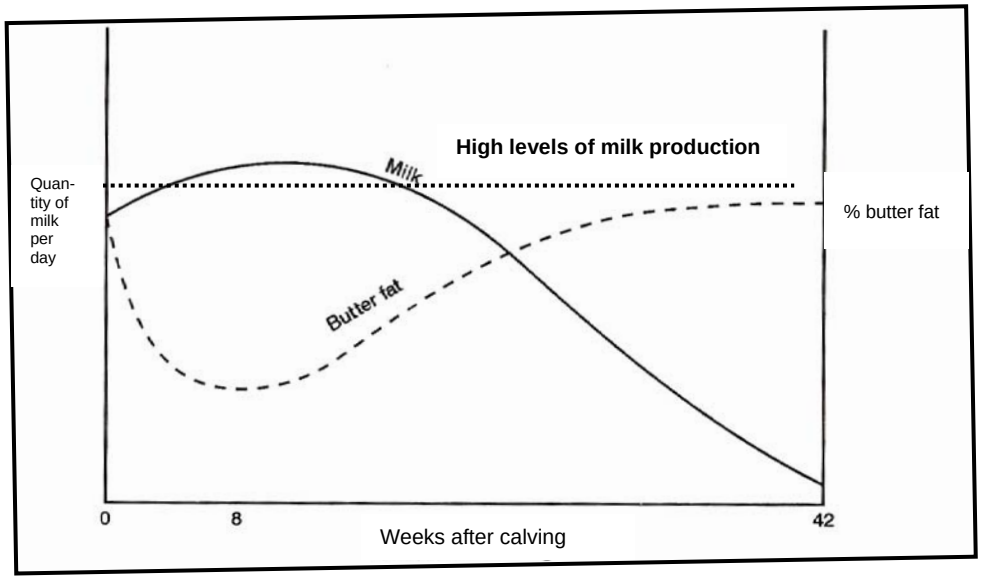
2.7.5 Describe TWO advantages for the crop farmer who uses plant material that involves the technique mentioned in QUESTION 2.7.4. (2)

[35]

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 3

3.1 The graph below represents a normal lactation curve of dairy cows.



3.1.1 Name the first milk produced by the cow after calving. (1)

3.1.2 State TWO characteristics of the milk mentioned in QUESTION 3.1.1. (2)

3.1.3 Indicate the time in weeks when the cow reaches her maximum production. (1)

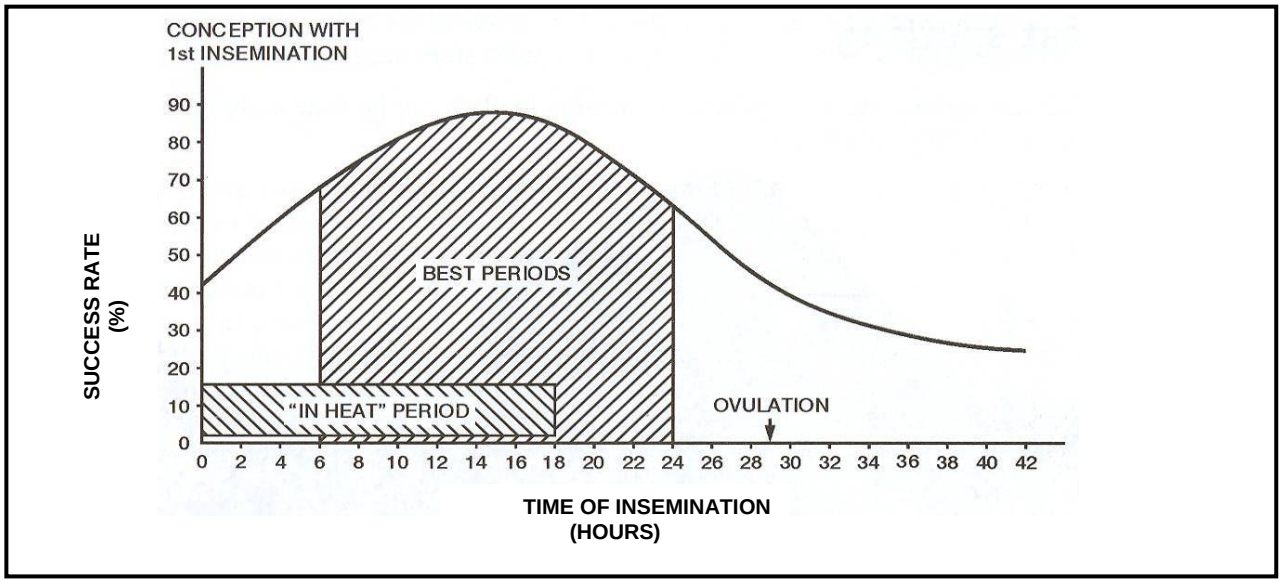
3.1.4 Determine the time in weeks when a cow will be in peak production above the high levels of milk production. (1)

3.1.5 Name at least TWO stimuli that will affect the cow to release milk from her udder. (2)

3.1.6 How can the dairy farmer ensure that the cow produces milk at maximum levels during the full duration of the lactation period? (2)

3.1.7 Which TWO environmental conditions will have a negative effect on a dairy cow's milk production? (2)

3.2 A crucial factor in the insemination technique is to do the procedure at the correct time in the oestrus period. The graph below depicts the optimal time for artificial insemination (AI):



3.2.1 Indicate the time in hours during which the cow will be on heat. (1)

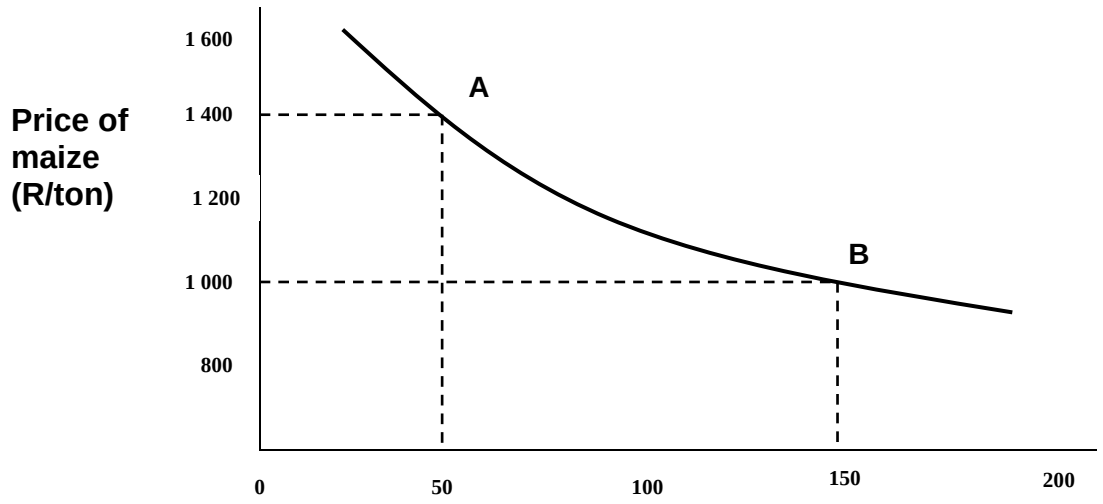
3.2.2 Deduce, from the graph, the best time to inseminate a cow for optimal results. (1)

3.2.3 Determine the time in hours when ovulation will occur. (1)

3.2.4 Give the main reason for the increase in the commercial value of the herd when AI is used. (1)

3.2.5 Name TWO ways in which the spread of diseases can be prevented or controlled when AI is used. (2)

3.3 The price of local maize is mainly determined by international maize prices and the dollar/rand exchange rate. These levels are given and the local grain producer has no influence on them. There are other factors that also affect the production and price of maize like the El Niño phenomenon, the demand for bio-fuels and the cropping system used. Below are possible graphical price estimates of maize production of a small farmer in a maize production area.



3.3.1 Give a suitable caption (heading) for the graph above. (1)

3.3.2 Indicate the relationship between the quantity of maize production and the maize price as illustrated in the graph above. (2)

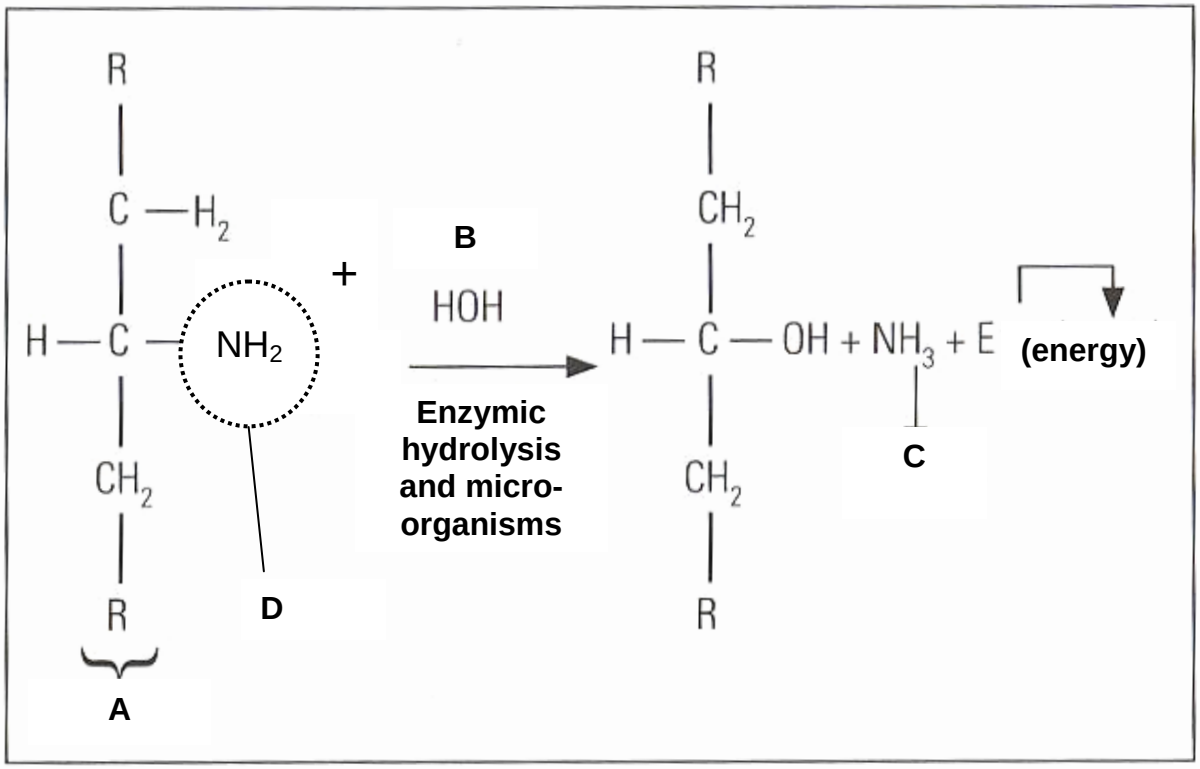
3.3.3 Deduce, from the graph above, the price of maize when the farmer produces 50 tons of maize. (2)

3.3.4 Maize production was affected by drought due to the El Niño phenomenon. Name any TWO outcomes of this situation on the maize production. (2)

3.3.5 The farmer planted 30 ha of maize and the yield obtained was 5 tons per hectare. Calculate the possible gross income per hectare that this farmer will obtain. (2)

3.3.6 The production cost for maize on this farm is given as R3 500,00 per hectare. Calculate the profit per hectare that this farmer will obtain using the data supplied. (2)

3.4 The chemical reaction below occurs in the soil when organic matter is decomposed by the activities of micro-organisms.



3.4.1 Name the substances represented by labels **A**, **B** and **C**. (3)

3.4.2 Briefly describe the effect of temperature in the soil where this reaction occurs. Substantiate your answer by referring to the reaction above. (2)

3.4.3 Name the substance that acts as a catalyst to speed up this chemical reaction. (1)

3.4.4 Name the functional group indicated by label **D**. (1)
[35]

Start this question on a NEW page in the ANSWER BOOK.

QUESTION 4

4.1 There are five stages in the processing of food in the body of an animal to release energy and nutrients into body cells. The schematic representation (DIAGRAM 1) below refers to the path of food through the alimentary canals of animals.

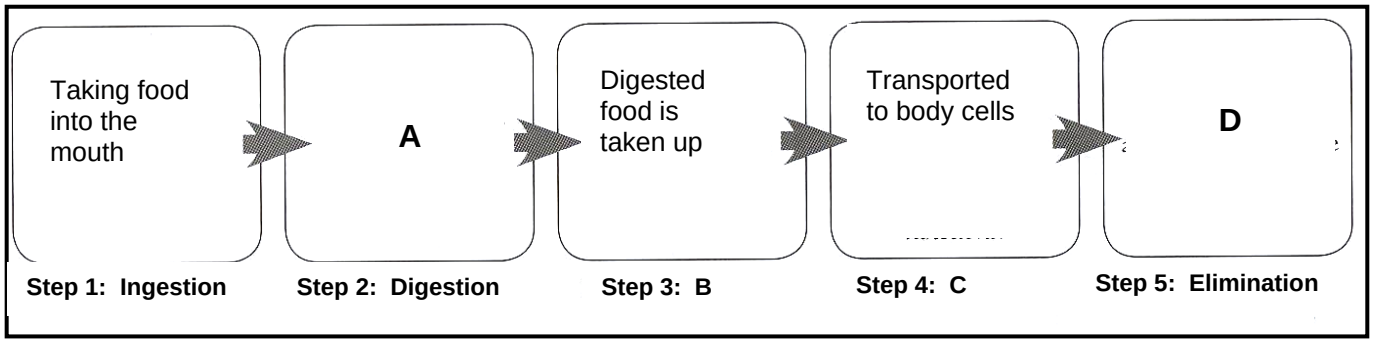


DIAGRAM 1

The diagram below represents the parts of the alimentary canal of a farm animal (DIAGRAM 2).

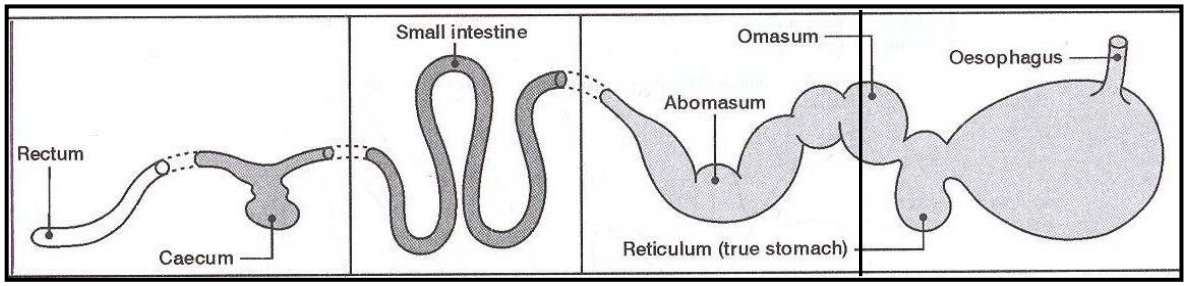


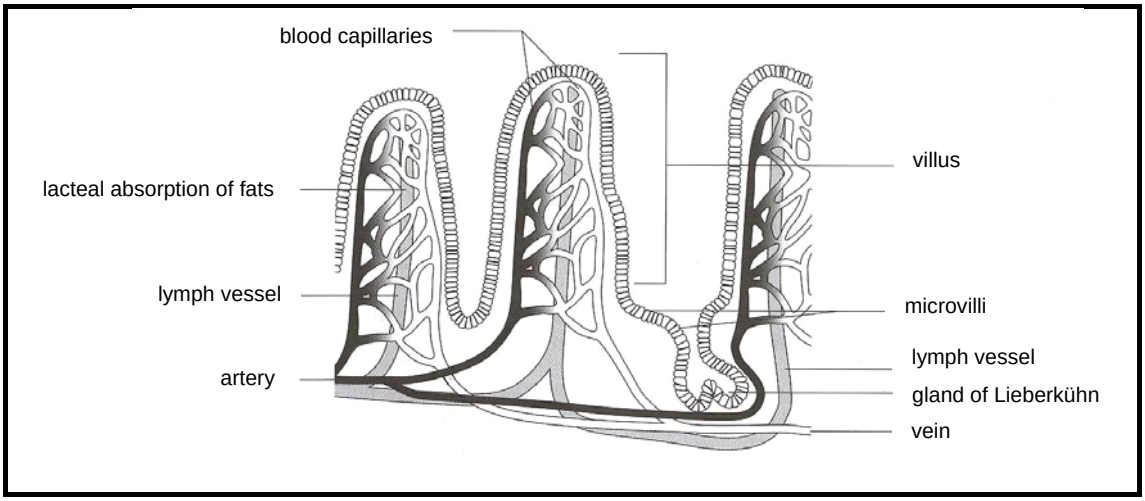
DIAGRAM 2

4.1.1 Write down the missing indicators labelled **A** – **D** in the schematic representation above (DIAGRAM 1). (4)

4.1.2 Match the part of the alimentary canal of the farm animal indicated by labels **E** – **H** above (DIAGRAM 2) with the folowing descriptions:

(a) A stomach which is also referred to as the glandular stomach
(b) Absorption of certain fermented products takes place here
(c) Maximum absorption occurs here (3)

4.1.3 The diagram below represents a structure that plays a very important role in the absorption of nutrients.



Identify TWO visible adaptations from the diagram above that make this structure suitable for maximum absorption of nutrients. (2)

4.2 A group of learners studied the feeding facility of pigs over a period of time. The enclosure has water nozzles as a watering facility and an automatic feeder that releases feed as the animals enter the feeding facility. The number of times that the pigs visited the watering facility was measured against the maximum day temperature.

1. Water usage

Times used water facility (per day per pig)	Temperature (°C)
1	10
3	18
4	22
6	30
10	38
14	42

2. Feed intake

Times used feeding facility (per day per pig)	Temperature (°C)
9	10
7	18
6	22
4	30
2	38
1	42

4.2.1 Organise the information collected in the two tables by drawing a bar graph from the data. Include the data from both tables on one graph. (4)

4.2.2 Explain how a farmer would use heat control (heating and cooling facilities) in his pig unit. (2)

4.3 A trial was conducted in a feedlot with sheep to determine the digestibility of experimental lucerne feed. During the experimental period the mass of feed intake was measured as well as the mass of excretion.

A sheep has an intake of 8 kg lucerne hay with a moisture content of 10%. The sheep excretes 2 kg of manure with a moisture content of 50%.

Determine the coefficient of digestibility of the lucerne hay. (3)

4.4 Discuss the following two labour problems in the farming industry:

4.4.1 The shortage of labourers (3)

4.4.2 The lack of training (2)

4.5 The effective marketing of agricultural products is vital for any production enterprise. The illustration below represents a method of marketing agricultural products in a unique way.

4.5.1 Identify the method of marketing that is represented by the above illustration. (1)

4.5.2 Deduce a possible reason from the illustration to support your answer in QUESTION 4.5.1. (1)

4.5.3 Give ONE reason why the marketing system illustrated above is steadily gaining popularity. (1)

4.5.4 It is vital that the attention of possible consumers (buyers) is attracted in any trading business. Describe TWO ways visible in the above illustration in which the attention of consumers is attracted. (2)

4.6 The following list of factors might influence the production of dairy cows from birth to when they are in full production. Use only these listed factors to answer the questions that follow.

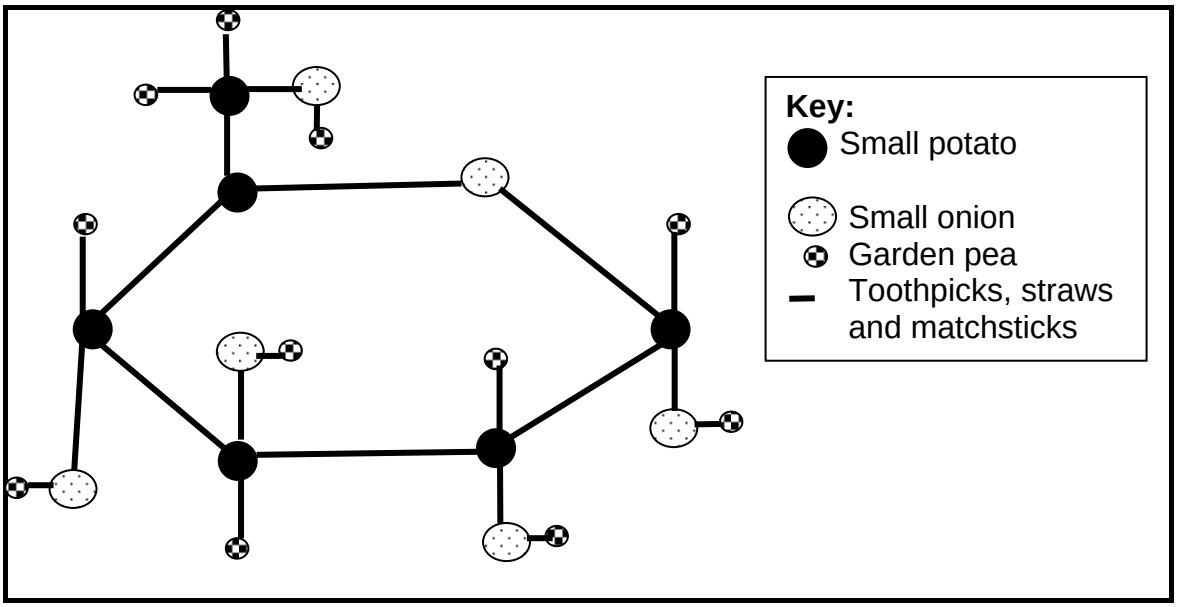
Feed supply to animal	Animal growth rate	Housing facility
Animal diseases	Feed conversion ratio	Handling of animals
Climate	Size of animal	Colour of animal
Size of udder	Size of camps	Availability of water

4.6.1 Identify an environmental factor that influences the growth and production of these dairy cows. (1)

4.6.2 Indicate TWO genetic factors that would directly influence the milk production potential of these cows. (2)

4.6.3 Name a method used to improve the genetic factors in a herd of dairy cattle. (1)

4.7 Learners worked in a group to build models of chemical compounds in an activity in their class. They used matchsticks, straws, toothpicks, small potatoes, garden peas and onions to build their model. The diagram below represents the model that they built in their class group.



4.7.1 Deduce, from the diagram, the chemical element that the garden peas represent. (1)

4.7.2 Determine, from the diagram, the possible carbohydrate that this model represent. (1)

4.7.3 Indicate the solubility of this chemical compound in water. (1)
[35]

TOTAL SECTION B: 105

GRAND TOTAL: 150

ANSWER SHEET

SECTION A

EXAMINATION NUMBER:													

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 1.2

	ONLY A	**ONLY B**	**A AND B**	**NONE**
1.2.1	A	B	C	D
1.2.2	A	B	C	D
1.2.3	A	B	C	D
1.2.4	A	B	C	D
1.2.5	A	B	C	D

(5 x 2) (10)

QUESTION 1.3

1.3.1 _____

1.3.2 _____

1.3.3 _____

1.3.4 _____

1.3.5 _____

(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