

GAUTENG DEPARTMENT OF EDUCATION

SENIOR CERTIFICATE EXAMINATION

AGRICULTURAL SCIENCE SG

OCTOBER / NOVEMBER 2005
OKTOBER / NOVEMBER 2005

TIME: 3 hours

MARKS: 300

REQUIREMENTS:

- An approved (non-programmable) pocket calculator. Candidates must supply their own calculators.

INSTRUCTIONS:

- The examination paper consists of TWO sections.
- Answer ALL the questions.
- Answer Question 1A (Multiple-choice questions) on the **answer sheet** on the **inside cover** of your **answer book**.
- Please use the same numbering system as in the paper.
- Please write neatly and legibly.

SECTION A

QUESTION 1A
MULTIPLE-CHOICE QUESTIONS

Various possible answers are given for the following questions. Indicate the correct answer by making a cross (X) over the appropriate letter next to the question number on the **answer sheet** on the **inside cover** of your **answer book**.

EXAMPLE:

A	B	<input checked="" type="checkbox"/>	D
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If more than one cross appears, no marks will be awarded.

1.1 A soil profile is related to _____.

- A. colour
- B. structure
- C. texture
- D. horizon

1.2 The upper layer of soil is comprised of the _____ horizon.

- A. C
- B. A
- C. O
- D. B

- 1.3 The element that can prevent osteomalacia is _____ .
- A. calcium
 - B. phosphorus
 - C. magnesium
 - D. sodium
- 1.4 One of the following organs does not belong to a fowl.
- A. Proventriculus
 - B. Anus
 - C. Ventriculus
 - D. Caeca
- 1.5 Villi are structures found in the _____ .
- A. small intestine
 - B. oesophagus
 - C. stomach
 - D. pancreas
- 1.6 This part of a ruminant's stomach is called the true stomach.
- A. Rumen
 - B. Abomasum
 - C. Omasum
 - D. Reticulum
- 1.7 The enzyme in the small intestine of animals which splits fat, is _____ .
- A. pepsin
 - B. rennin
 - C. lipase
 - D. amylase
- 1.8 The element essential for the synthesis of vitamin B₁₂ is _____ .
- A. copper
 - B. iodine
 - C. iron
 - D. cobalt
- 1.9 Bulkiness in a ration of a ruminant can be obtained by _____ .
- A. nitrogen-free extract
 - B. crude protein
 - C. non-protein nitrogen
 - D. roughage

- 1.10 The factor that does **not** determine digestibility of a feed, is the _____ .
- A. season of the year
 - B. type of animal
 - C. quantity taken in
 - D. age of the plant
- 1.11 Uniformity of families is improved by _____ .
- A. cross breeding
 - B. species crossing
 - C. inbreeding
 - D. upgrading
- 1.12 The oestrus cycle of a cow is repeated every _____ .
- A. 26 days
 - B. 18-24 hours
 - C. 18-24 days
 - D. 10-18 days
- 1.13 A cow should be inseminated _____ .
- A. fourteen hours after oestrus
 - B. in the evening
 - C. in the morning
 - D. during oestrus
- 1.14 The agricultural importance of the photosynthesis process is _____ .
- A. to produce products for the market
 - B. to produce chlorophyll
 - C. to use the absorbed water
 - D. to use the energy of the sun
- 1.15 The most important force by which the upward movement of water in the xylem takes place is _____ .
- A. diffusion
 - B. capillarity
 - C. the suction caused by transpiration
 - D. osmosis
- 1.16 An iron shortage in plants causes _____ .
- A. rosette
 - B. black heart
 - C. chlorosis
 - D. leaf scorch

- 1.17 One male gamete in pollen fuses with the _____ .
- A. ovum
 - B. ovule
 - C. antipodal cell
 - D. auxiliary cell
- 1.18 The Karoo may be classified as _____ .
- A. semi-desert
 - B. desert
 - C. savannah
 - D. grassland
- 1.19 A tensiometer is associated with _____ .
- A. irrigation scheduling
 - B. water saving
 - C. drainage
 - D. plant nutrition
- 1.20 Which one of the following is **not** a contributory factor to soil erosion in South Africa?
- A. Slope of land
 - B. Temperature
 - C. Veld fires
 - D. Incorrect cultivation
- 1.21 Long-term credit may be used to _____ .
- A. build a dam
 - B. buy cattle
 - C. buy fertilizers
 - D. pay debts
- 1.22 The first step when undertaking land surveys is to _____ .
- A. make profile test holes
 - B. map the soil
 - C. study the characteristics of soil
 - D. take aerial photographs
- 1.23 Milk fever is a deficiency symptom caused by a deficiency of _____ .
- A. phosphorus
 - B. vitamin D
 - C. magnesium
 - D. calcium

- 1.24 Which one of the following is an example of working capital?
- A. Dams
 - B. Fertilizers
 - C. Cattle
 - D. Buildings
- 1.25 Which one of the following indicates that a soil was formed from sandstone and contains very few iron compounds?
- A. Yellow colour
 - B. A dark colour
 - C. Red colour
 - D. A light colour

25x2= **(50)**

QUESTION 1B

Write down the correct term for each of the following statements:

- 1.26 The process by which the ripe ovum is released into the infundibulum.
- 1.27 The process by which sperms are developed in the sex organs of the bull.
- 1.28 A process essential for the drawing up of soil maps.
- 1.29 The loss of water through evaporation from leaf surfaces.
- 1.30 The vertical section through soil shows the different soil horizons.
- 1.31 The coldest slope in South Africa.
- 1.32 The upward movement of water through micropores in the soil.
- 1.33 The soft elastic tube which runs through the neck to the stomach.
- 1.34 The anaerobic microbes found in the rumen of cattle.
- 1.35 The application of water in the form of drops.

10x2= **(20)**

QUESTION 1C

Complete the following statements by writing only the missing word next to the question number.

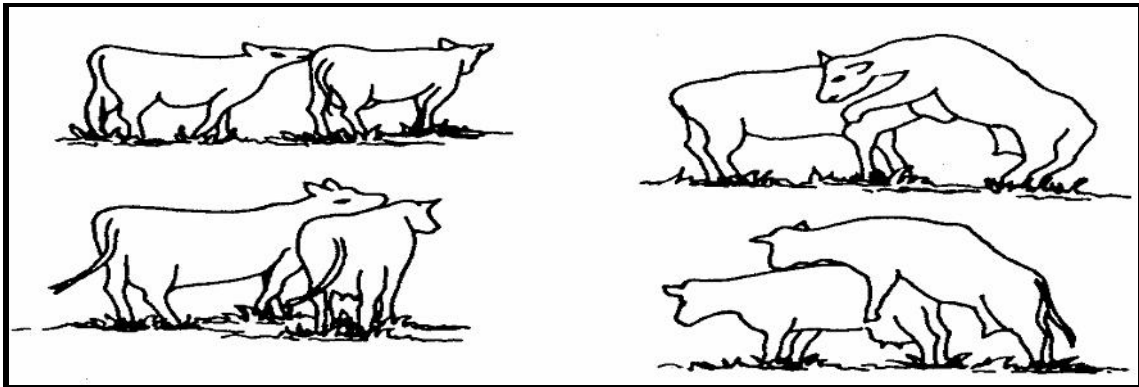
- 1.36 _____ is the metabolic process through which energy is released in the plant.
- 1.37 For the development of roots, plants need _____ .
- 1.38 A farmer can fatten a number of old ewes for the market by feeding them _____ .
- 1.39 Prolonged blood clotting is a deficiency/symptom caused by _____ .
- 1.40 The place where buyers and sellers meet and trade according to rules, is known as _____ . 5 x 1 = (5)

TOTAL FOR SECTION A: [75]

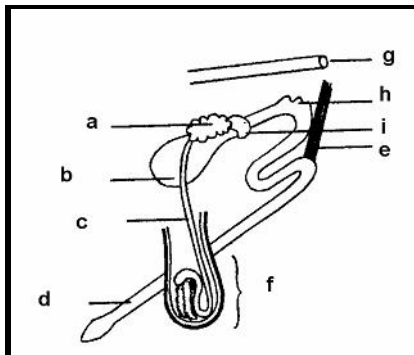
SECTION B

QUESTION 2

- 2.1 Study the illustrations of a cow on heat and answer the question.



- 2.1.1 What are the visible signs of a cow on heat (oestrus)? (8)
- 2.2 Provide FIVE advantages of artificial insemination. (5)
- 2.3 List FIVE possible causes for a normal bull not taking interest in the cows which are in oestrus. (5)
- 2.4 Study the diagram below of the reproductive organs of the bull and answer the questions that follow.



- 2.4.1 Indicate the names of TWO organs that may, because of congenital defects, influence the bull's ability to mate/fertilize. (2)
- 2.4.2 Indicate the letter of the organ that may, because of anatomical defects, cause sterility in the bull. (1)
- 2.4.3 State TWO reasons why the organ named in Question 2.4.2 may be defective. (2)
- 2.4.4 What is the condition referred to in Question 2.4.2 and 2.4.3 called? (1)
- 2.4.5 Identify parts **a** to **i**. (9)
- 2.5 Name the breeding system to which the following cases refer:
- 2.5.1 The development of new breeds (1)
- 2.5.2 The mating of a mother and her son (1)
- 2.5.3 The mating of related animals to retain the relationship with an outstanding ancestor (1)
- 2.5.4 The mating of pure-bred animals of different breeds (1)
- 2.5.5 Continuous use of a male animal of a specific breed on a herd of another breed (1)
- 2.6 List SEVEN factors that may lead to infertility amongst cows. (7)
- [45]**

QUESTION 3

- 3.1 Study the diagram below illustrating the digestive system of a cow and answer the questions that follow.

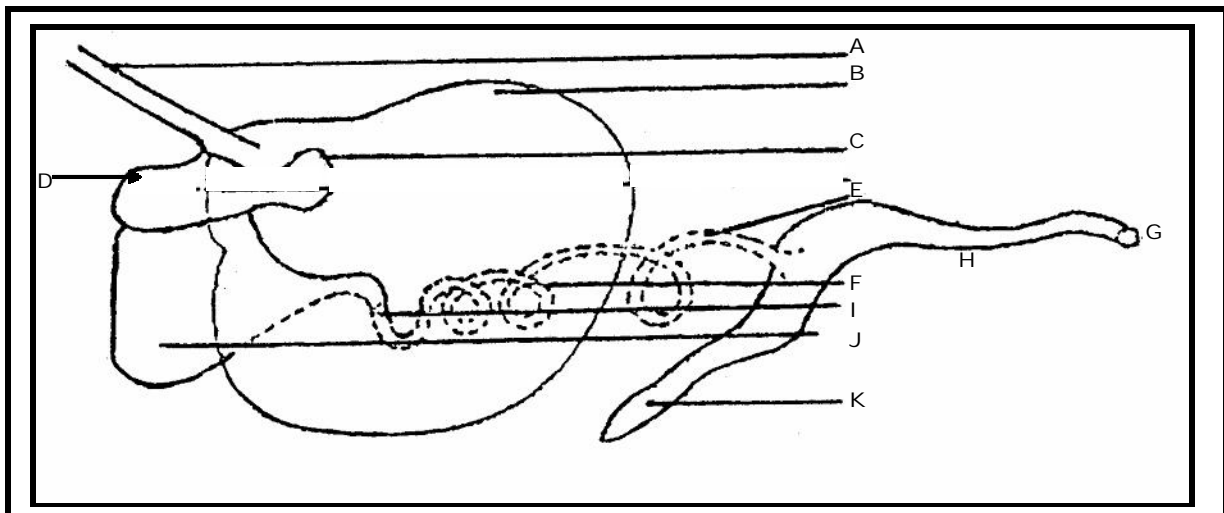


FIGURE 3.1

3.1.1 Write down the name of the part in which each of the following occurs:

- (a) Volatile fatty acids produced during microbial action
- (b) Vitamin B-complex synthesized
- (c) Secretion of bile
- (d) Excretion stored (4)

3.1.2 (a) Explain how an animal's ration containing straw, which consists of cellulose, is digested. (4)

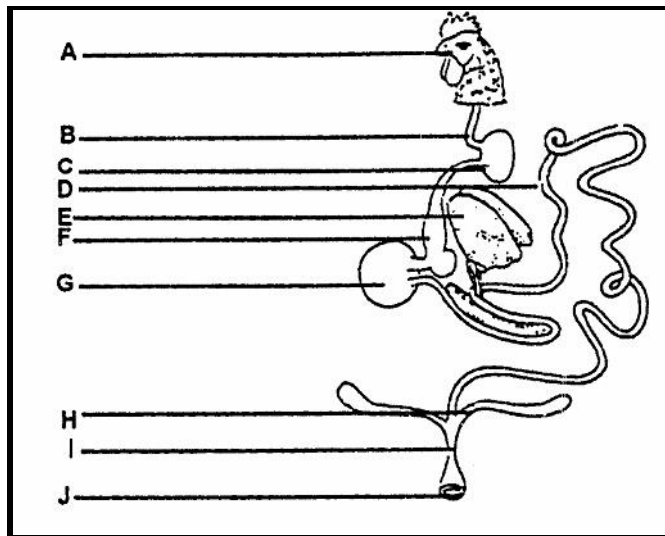
(b) In which parts of the above-mentioned system does cellulose digestion occur? (2)

3.1.3 Except for the digestion of cellulose, state the other functions of micro-organisms in the digestive system shown in **Figure 3.1**. (3)

3.1.4 List the requirements for microbial activity in the digestive system of cows. (4)

3.1.5 Name parts **A** to **F** on the diagram of the digestive system of the cow. (**Figure 3.1**) (6)

3.2 Study the diagram below and answer the questions that follow.

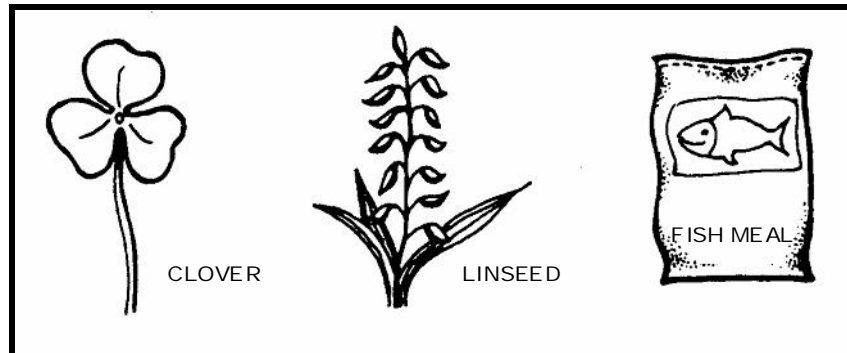


3.2.1 State the name of the part in which each of the following occurs:

- (a) Absorption of digestive nutrients
- (b) Grinding of food
- (c) Storage and softening of food
- (d) Excretion of urine and faeces (4)

3.2.2 How are parts **F** and **G** structurally adapted to perform their functions? (2)

3.3 The following illustrations are examples of protein. Study them and answer the questions that follow:



- 3.3.1 Name the TWO groups of proteins illustrated. (2)
 3.3.2 Name the smaller units of which protein is built up. (1)
 3.3.3 List FIVE reasons why farm animals should receive proteins in their ration. (5)

3.4 Name FOUR reasons why Vitamin A is essential for farm animals. (4)

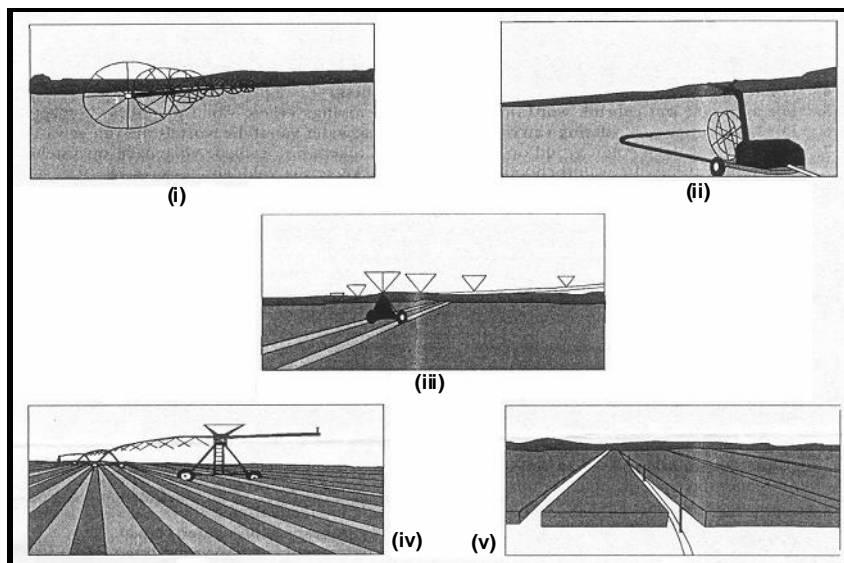
3.5 Name the nutrient deficiency responsible for each of the following diseases:

- 3.5.1 Parakeratosis
 3.5.2 Goitre
 3.5.3 Wasting disease
 3.5.4 Swayback (4)

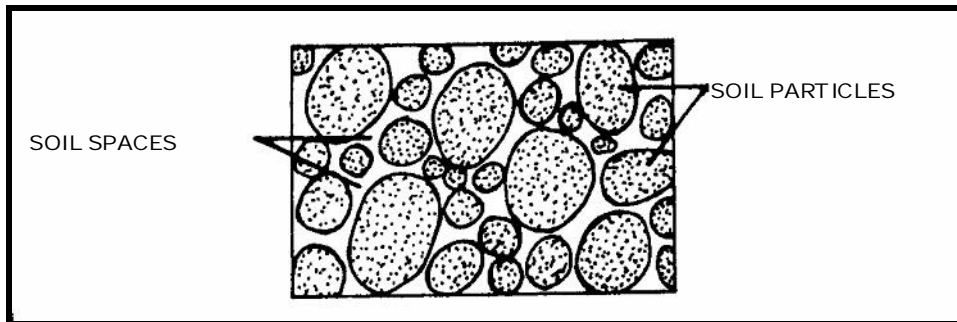
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QUESTION 4

4.1 Study the illustrations below and answer the questions that follow.



- 4.1.1 What type of irrigation method is illustrated? (1)
- 4.1.2 Identify the different variations of this irrigation method as illustrated from **(i)** to **(v)**. (5)
- 4.1.3 Name
- a) FOUR advantages and (4)
- b) FOUR disadvantages of the irrigation method illustrated. (4)
- 4.2 List the FIVE main types of natural veld in South Africa. (5)
- 4.3 Mention FIVE factors that contribute to the development of a soil structure. (5)
- 4.4 Discuss the influence of soil temperature on crop production under the following headings:
- 4.4.1 Chemical reaction (3)
- 4.4.2 Microbes (3)
- 4.4.3 Plant growth (3)
- 4.5 Study the following illustration of soil and answer the questions that follow.



- 4.5.1 Define **total pore space** and name the types of pore spaces in the soil. (4)
- 4.5.2 Compare the two types of space in Question 4.5.1 with reference to the following:
- (a) Type of soil and where the spaces are predominantly found
- (b) Functions
- (c) Properties (8)

[45]

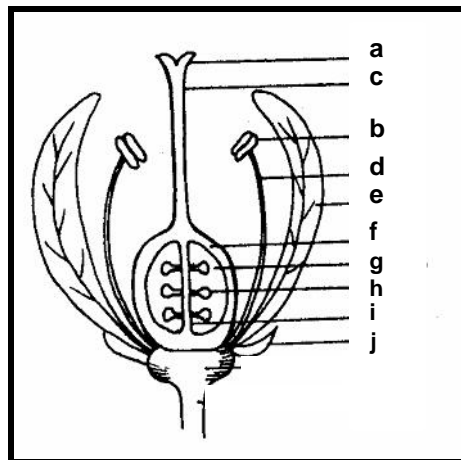
QUESTION 5

- 5.1 Explain the steps taken when a soil survey is done. (7)
- 5.2 State SIX economic characteristics of soil. (6)
- 5.3 List FIVE factors to be considered when drainage systems are installed. (5)
- 5.4 Name the factors which hamper the marketing of agricultural products. (7)
- 5.5 Name SEVEN ways in which a farmer can increase labour productivity. (7)
- 5.6 Name and briefly describe THREE types of capital related to farming and give an example of each. (9)
- 5.7 Indicate FOUR ways through which water can be lost from the soil. (4)

[45]

QUESTION 6

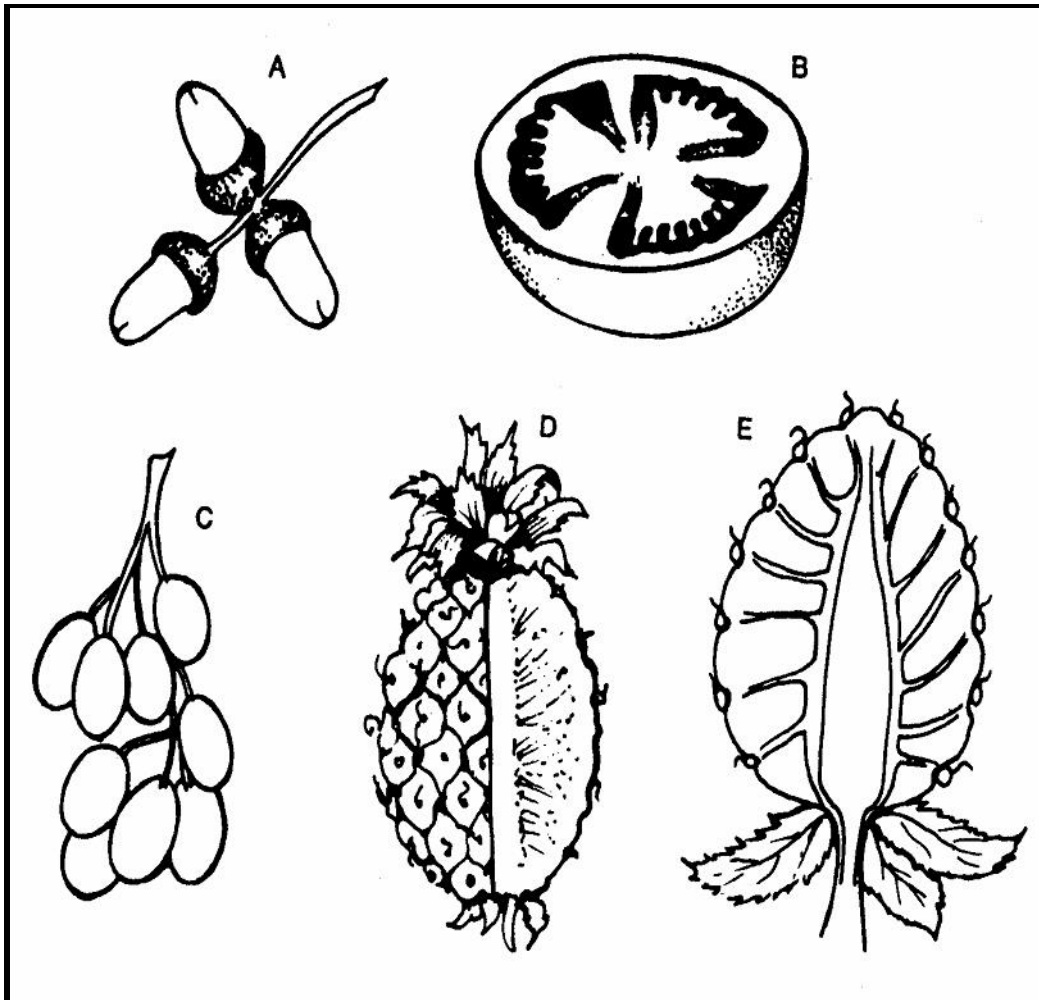
- 6.1 Study the diagram below illustrating a dicotyledonous flower and answer the questions that follow.



- 6.1.1 Provide the name of the part
- (a) in which female gametes are found. (1)
- (b) that develops into a fruit. (1)
- (c) that connects the flower to the plant. (1)
- (d) that protects the other leaf crowns during the bud stage. (1)
- 6.1.2 State FOUR reasons why the diagram above is a dicotyledonous flower. (4)

- 6.1.3 Which type of pollination will be used by this flower? Substantiate your answer. (3)
- 6.1.4 Name the pollination agents involved. (1)
- 6.1.5 Label parts a to j in the diagram. (10)
- 6.1.6 Describe the meaning of **double fertilization**. (3)

6.2 Study the following examples of fruit and answer the question that follows.



- 6.2.1 Identify the types of fruit as represented by diagrams A to E. (5)

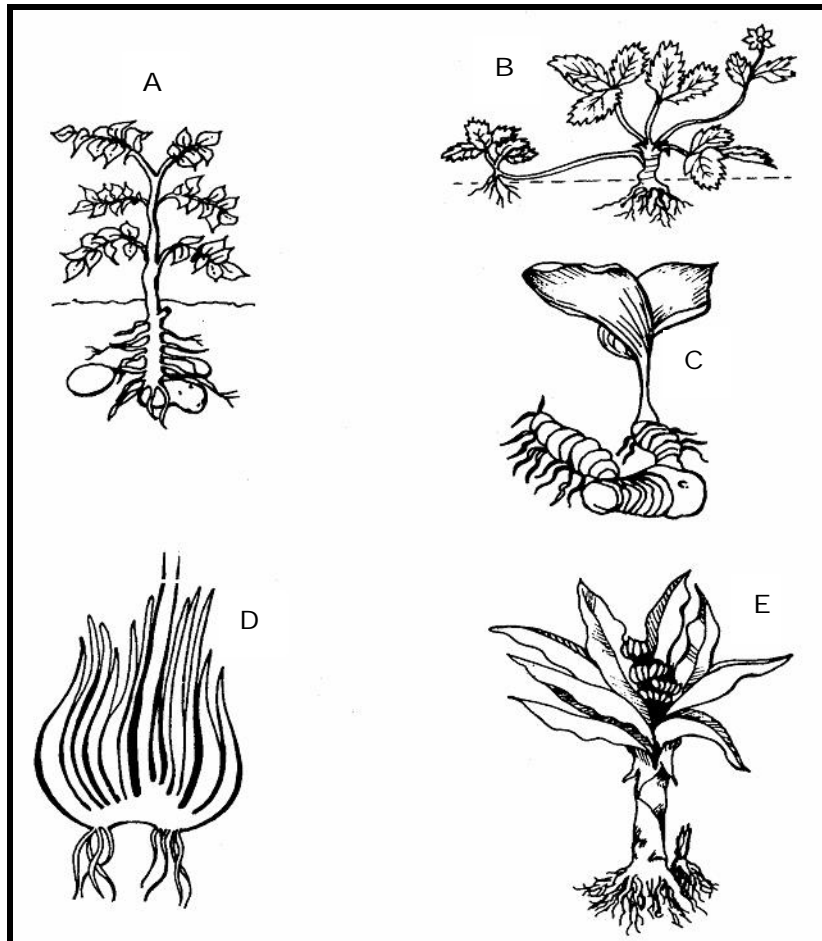
6.3 What do you understand by the following terms:

6.3.1 Rhizome (2)

6.3.2 Bulb (2)

6.4 Define the concept **photosynthesis**. (3)

6.5 Name the illustrated methods of asexual reproduction numbered **A** to **E**.



(5)

6.6 Name the fertilizer that can be applied in each of the following cases.

6.6.1 A potassium fertilizer for a soil with high sodium content

6.6.2 A nitrogen fertilizer which can be applied by means of leaf spraying

6.6.3 A fertilizer for an acid, sandy soil, poor in nitrogen (3)

[45]

TOTAL FOR SECTION B: [225]

TOTAL: 300

END