INSTRUCTIONS TO CANDIDATES:

(To be read out by the external invigilator before the start of the examination)

There are 46 questions in this paper. Attempt ALL questions even if you are not so sure of some of the answers.

The Examination is divided into three parts:

PART A: Multiple-Choice (Questions 1 to 25)
PART B: Short-Answer (Questions 26 to 45)
PART C: Extended Response (Question 46)

The Answer Sheet is part of the Examination Booklet. Take out the middle pages and remove the Answer Sheet by tearing along the perforation. You may use the blank sheet for rough work.

For each question in PART A (Questions 1 to 25) choose the best answer by writing the letter A or B or C or D in the space provided on the ANSWER SHEET.

For each question in PART B (Questions 26 to 45) work out the answer and write the answer in the space provided on the ANSWER SHEET.

For the question in PART C (Question 46) write your answer in a short paragraph in the space provided on the ANSWER SHEET.

If you find a question very difficult, do not spend too much time thinking about it. Leave the question out and go on with the rest of the paper. If you have time in the end, return to the difficult questions and think about them more carefully.

Write your answers in BLUE or BLACK (pen or biro).

If you decide to change an answer, make your correction as shown below so that it is clearer to the markers what your final answer is. Do NOT use correction fluid on your answer sheet.

Hand in BOTH the Answer Sheet and the papers used for rough work at the end of the examination.

Extra time will NOT be allowed to complete the examination under any circumstances.

Penalty for cheating or assisting to cheat in national examinations is non-certification.

DO NOT TURN OVER THIS PAGE AND DO NOT WRITE UNTIL YOU ARE TOLD TO START.
PART A (Questions 1-25)

For QUESTIONS 1-25, choose the best answer by writing A or B or C or D or E in the space provided on your answer sheet.

**QUESTION 1**
Which of the following is an inorganic fertilizer?
A. guano B. manure
C. sulphate of ammonia D. compost

**QUESTION 2**
A plant shows the following symptoms; leaves are yellowish, pale green on the lower leaves, growth is stunted and production in yield is low. Which nutrient element is most probably deficient?
A. phosphorus B. potassium C. nitrogen D. sulphur

**QUESTION 3**
Legume crops are commonly grown in order to replenish a vital nutrient to the soil. What is this nutrient?
A. phosphate B. potassium C. nitrate D. sulphate

**QUESTION 4**
A hen sitting over the chicks is termed as

**For Questions 5 and 6, study the words below and then answer the questions.**

(i) boar (ii) cow (iii) cock (iv) bull (v) hen
(iv) calf (vii) sow (viii) gilt (ix) chick (x) piglet

**QUESTION 5**
Which of the words above are associated with pig farming?
A. (i), (vii), (viii) and (x) B. (i), (vii) and (ix) only
C. (i), (iii), (viii) and (x) D. (i) and (vii) only

**QUESTION 6**
Which list contains females only?
A. (ii), (v) and (vii) only B. (iv), (ix) and (x) only
C. (ii), (v), (vii) and (viii) D. (i), (iii) and (iv) only
QUESTION 7
When a hen lays eggs and incubates them not all the eggs hatch to produce chicks. Which of the following could be a possible reason for the eggs not hatching.
A. The rooster did not mate with the hen. B. Some eggs were not fertilised.
C. The egg was not laid properly. D. The hen was immature.

QUESTION 8
Which of the following has become a common problem for rural people practising shifting cultivation?
A. Increase in population has led to shortage of arable land.
B. Most land has been used up by developing towns.
C. Urban drift has increased the demand for land use.
D. Modern technology has made this practice obsolete.

QUESTION 9
Which of the following are all considered to be macronutrients for plants?
A. oxygen, carbon dioxide, phosphorus B. nitrogen, phosphorus, potassium
C. molybdenum, cobalt and sodium D. nitrogen, sulphur, potassium

QUESTION 10
At which stage of the insect life cycle would it be most destructive to crops?
A. adult only
B. larva only
C. egg and pupa
D. adult and larva

QUESTION 11
Which of the following is best used to neutralise acidic soils?
A. NPK fertiliser B. manure C. compost D. lime
For Questions 12 and 13, refer to the following diagram.

**QUESTION 12**
Which parts of the flower form the male reproductive organs?
A. anther, filament and petals  
B. stigma, ovary and style  
C. anther and filament only  
D. stigma and style only

**QUESTION 13**
From which part of the flower does the fruit usually develop?
A. receptacle  
B. ovary  
C. stigma  
D. ovule

**QUESTION 14**
In mammals, what is the period between conception and birth called?
A. gestation  
B. incubation  
C. fertilisation  
D. development

Questions 15 and 16 refer to the following information.
The diagram shows the structure of a hen’s egg.

**QUESTION 15**
At which of the parts labelled P, Q, R, S or T, does fertilisation take place?
A. P  
B. Q  
C. R  
D. T
**QUESTION 16**
What is the structure labelled S called?
A. inner membrane  
B. outer membrane  
C. vitelline membrane  
D. albumen membrane

**Questions 17 to 19 refer to the following information.**
The diagram shows the digestive system of a chicken.

**QUESTION 17**
What substance is produced in the structure labelled Y in the diagram?
A. hormones  
B. digestive enzymes  
C. bile  
D. pancreatic juice

**QUESTION 18**
What is the name of the structure labelled X in the diagram?
A. crop  
B. caecum  
C. stomach  
D. gizzard

**QUESTION 19**
What is the function of the structure labelled Z?
A. to separate food from water  
B. to digest strong plant fibres  
C. to store the faeces  
D. to absorb starchy foods.

**QUESTION 20**
Which list contains poultry products only?
A. meat, eggs, feathers  
B. meat, milk, eggs  
C. meat, milk, feathers  
D. feathers, egg, feed
For Question 21 and 22, refer to the diagram below.

**QUESTION 21**
For what reason has the bee visited the flower?
A. to fertilise the ovules  
B. to lay its eggs  
C. to pollinate the flower  
D. to find food

**QUESTION 22**
What has most probably attracted the bee to visit this flower?
A. sweet scent and rich pollen  
B. bright colours and sweet scent  
C. rich pollen and hunger  
D. hunger and bright colours

**QUESTION 23**
Which agent is responsible for pollinating the plant pictured opposite?
A. insects  
B. animals  
C. water  
D. wind

**QUESTION 24**
A broiler farmer spends K850 to raise 50 chickens and sells them all. How much should he sell the chickens for to make a profit of K250?
A. K11.00  
B. K17.00  
C. K22.00  
D. 34.00

**QUESTION 25**
The diagram shows the structure of a root.
Which letter represents the region of active growth?
PART B (Questions 26 to 45)

For each question work out the answer and write it in the space provided on the ANSWER SHEET.

Questions 26 to 29 refer to the following information showing the hydrologic cycle.

**QUESTION 26**
What is the name of the process taking place at number ① on the diagram?

**QUESTION 27**
What is the name of the process taking place at number ② on the diagram?

**QUESTION 28**
What is the name of the process taking place at number ③ on the diagram?

**QUESTION 29**
What is the name of the process taking place at number ④ on the diagram?

**QUESTION 30**
A landowner cuts trees on his land and sells them for a large profit. With some of his profits he buys a number of seedlings and plants them to replace the trees he has felled.

Of what type of agricultural practice is this a good example?
Questions 31 to 34 refer to following information.

**QUESTION 31**
What is the name of the structure labelled Y in both diagrams?

**QUESTION 32**
What does the structure labelled X develop into when the seed grows?

**QUESTION 33**
What is the function of the structure labelled Z in diagram II?

**QUESTION 34**
What is the name of the process by which these seeds start to develop into adult plants?

Questions 35 and 36 refer to the diagram below.

**QUESTION 35**
The diagram shows two gases moving into and out of the plant.
What is the name of the process by which these gases move into and out of the plant?

**QUESTION 36**
What process, involving these two gases, is taking place in the plant at this time?

**QUESTION 37**
In order to grow properly, a plant needs a variety of mineral elements to be available in the soil. Some minerals such as nitrogen, potassium and magnesium, are required in relatively large amounts. Other minerals, such as boron, zinc and molybdenum, are needed but only in small amounts.
What name is given to the type of mineral that is only required in very small amounts?
Questions 38 to 41 refer to the following information.

**QUESTION 38**
What type of plant is commonly associated with process ①, biological nitrogen fixation.

**QUESTION 39**
Nitrogen is found in many forms: nitrogen gas (N₂), nitrite (NO₂), nitrate (NO₃), ammonia (NH₃) and ammonium (NH₄⁺).

In which form(s) is nitrogen available for plants to use?

**QUESTION 40**
What type of organism is responsible for converting atmospheric nitrogen into forms that are available for plant use (processes ② and ③)?

**QUESTION 41**
What type of organic compounds, made by the plant, require nitrogen?

**QUESTION 42**
Soils are made of several distinct layers. What name is given to these layers?
Questions 43 to 45 refer to the following graph showing the effect of adding fertiliser on the yield of a cereal crop.

**QUESTION 43**

What was the crop yield before any fertiliser was added?

**QUESTION 44**

How much fertiliser needs to be added in order to double the unfertilised crop yield?

**QUESTION 45**

What benefit is there to the farmer in increasing his fertiliser application from 600 to 800 kg per hectare?
PART C (Question 46) (5 marks)

For question 46, write the answers in the spaces provided on your ANSWER SHEET.

QUESTION 46

The illustrations below show:
(i) The results of a sedimentation test on a sample of soil.
(ii) A soil texture analysis triangle.
(iii) A graph showing available soil water for different types of soil.

(i)

Figure 2: Soil Texture and Available Water

(a) Calculate the percentage of each particle size, sand, silt and clay, in the soil sample. (3 marks)
(b) Use the results from (a) and the soil texture triangle to name the type of soil. (1 mark)
(c) A sample of this soil was weighed. The sample was then left out in the sun until it was thoroughly dry and then it was weighed again. From this experiment it was found that 18% of the soil (by weight) was water.

Using the water availability graph (iii), calculate how much of the water in the soil would be available for plants to use. (1 mark)

END OF EXAMINATION