

**THE NATIONAL EXAMINATIONS COUNCIL OF TANZANIA**



**EXAMINERS' REPORT ON THE PERFORMANCE  
OF CANDIDATES**

**ACSEE, 2014**

**134 AGRICULTURE**

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## FOREWORD

The Agriculture Examiners' Report on the Advanced Certificate of Secondary Education Examination (ACSEE) 2014 in Agriculture subject was written in order to provide feedback to students, teachers, parents, policy makers and other educational stakeholders on the candidates' performance in this subject. This subject is among the subjects which had good performance in ACSEE 2014. The report has therefore, tried to reveal a number of factors that contributed to candidates' good performance.

The Advanced Certificate of Secondary Education Examination marks the end of two years of secondary education. It is a summative evaluation which, among other things, shows the effectiveness of the education system in general and education delivery system in particular. Essentially, candidates' responses to the examination questions is a strong indicator of what the education system was able or unable to offer to the students in their two years of Advanced Secondary Education.

The analysis presented in this report is intended to contribute towards the understanding of the reasons behind the good performance of the candidates. The report highlights some of the factors that made the candidates perform well. Such factors include meeting the demand of the questions, ability to express themselves in English Language, mastery of the subject matter, knowledge in the questions concerned and having enough practical skills. Furthermore, the performance of the few candidates who did not do well has also been analysed. The feedback provided will enable the educational administrators, school managers, teachers and students to identify proper measures to improve candidates' performance in future examinations administered by the Council.

The National Examinations Council of Tanzania will highly appreciate comments and suggestions from teachers, students and the public in general that can be used for improving future Examiners' Reports.

Finally, the Council would like to thank all the Examinations Officers, Examiners and all who participated in preparation of this report.



Dr. Charles E. Msonde  
**EXECUTIVE SECRETARY**

## **1.0 INTRODUCTION**

This report presents the performance of the candidates who sat for the year 2014 Advanced Certificate of Secondary Education Examination in Agriculture subject. The 2014 Agriculture Examination was set according to the 2009 Agriculture syllabus and tested its competences and adhered to the 2011 examination format.

The report is intended to provide feedback to education stakeholders on the performance of candidates, with the aim of improving candidates' performance by noting their weaknesses in responding to the questions. Generally, the report will assist in enhancing teaching-learning process and consequently improve candidates' performance.

The examination comprised of three (03) papers, 134/1 Agriculture 1, 134/2 Agriculture 2 both being theory papers and 134/3 Agriculture 3, a practical paper. Both papers are of 3 hours duration.

The theory paper 1 consisted of three (3) sections; A, B and C. Section A covered the theme namely Agricultural Engineering and Land Planning which comprise the topics on Farm Power, Workshop Technology, Farm Mechanization and Machinery, Farm Structure and Introduction to Irrigation which consisted five question in which candidates were required to choose three questions, section B cover the theme namely Soil Science which comprise the topics on Introduction to Soil Science and Introduction to Soil Chemistry which consisted two questions in which candidates were required to answer one question and section C cover the theme Agricultural Economics which comprise the topics on Agricultural Production Economics, Farm Planning, Introduction to Agricultural Prices and Fundamental of International Trade which consisted two question in which candidates were required to answer one question. All questions were short answer questions and carried 20 marks each. Paper 2 consisted of two sections A and B and the candidates were required to choose five questions out of ten at least two questions from each of the section. Section A covered the theme namely Crop Science and Production which comprised of the topics on Plant Diseases, Introduction to Weed Science, Crop Pests and Plant Breeding and B cover the theme namely Livestock Science and Production which cover the topics on Introduction to Animal Nutrition, Pasture Agronomy, Livestock Reproduction, Breeding and Improvement, Introduction to Animal Health and Environmental and Technological Challenges in Agricultural Development. All questions were short answer questions and carried 20 marks each. Paper 3 was a practical paper and consisted of three questions all short answer questions. The candidates

were required to answer all questions. Question one (1) carried 20 marks while question two (2) and question three (3) carried 15 marks each.

A total of 351 candidates from 11 examination centres sat for the examination in the subject in 2014 and the performance was good. The statistics shows that 350 candidates (99.72%) who sat for the examination this year passed and only 01 candidate (0.28%) failed. This year's results indicate an increase of 1.37 percent pass compared to 2013 results where 98.35 percent of the candidates passed the examination.

This report indicates the analysis of each question by briefly giving an overview of what the candidates were required to do, the way they responded and the reasons for their good/poor performance in each question. Some extracts of the sample answers showing candidates performance have been included.

## **2.0 ANALYSIS OF THE CANDIDATES' PERFORMANCE IN EACH QUESTION:**

### **2.1 134/1 AGRICULTURE 1**

#### **2.1.1 Question 1: Workshop Technology**

The question was composed of three parts (a), (b) and (c). In this question candidates were asked to: (a) give one main use of the carpentry tools (i) sliding bevel (ii) pincers (iii) mortise gauge (iv) jack plane and (v) rip saw (b) describe six steps which are followed in planing a piece of timber to the desired width and thickness and (c) briefly describe the precautions to be taken when carrying out (i) chiselling (ii) sawing. The question carried twenty (20) marks.

The question was attempted by 21.7 percent of the candidates and all of them scored below average, the highest score was 6.5 marks. There was no best performance in this question.

The question was highly omitted since most of the candidates did not attempt it and those who attempted it scored very few marks. The question was attempted by 21.7 percent of the candidates and all of them scored below average. There was no best performance in this question because the highest score was 6.5 out of the 20 marks allocated to the question. The candidates' general

performance in this question was poor. The following reasons could have contributed to this performance: lack of practical skills for the candidates to make them familiar with tools which were asked, lack of inquisitive minds to know those use of carpentry tools bearing in minds that carpentry workshop and carpenters form part and parcel of livelihood in the society, failure to express themselves in English so that the concept they wanted to express could be known and lastly they might have never seen the tools in their surrounding and even in their agriculture laboratory of which is not found in many schools.

In part (a) most of the candidates provided correct responses to (a) (iv) jack plane and (v) rip saw because they are commonest tools in the community. However, in part (b), most of the candidates failed to describe six steps to be followed in planing a piece of timber to a desired width and thickness. This part demanded practical skills which lacked to most of the candidates. In part (c), the candidates described how they can protect themselves when they are in the workshop instead of describing precautions to be taken when carrying out chiselling and sawing in the workshop as required. In their responses most of them wrote that they should wear goggles, boots, overall and some candidates mentioned about the precaution to be taken into the workshop. Extract 1.2 shows a sample of a poor response.

#### Extract 1.2

4 (a)	Sliding bevel -
(ii)	Pliers -
(iii)	Mortise gauge - for making mark in <sup>the</sup> wood for cutting tenons.
(iv)	Jack plane - For smoothening of a rough wood
(v)	Rip saw - For cutting wood along the grain.
(b)	- The piece of timber is shaped to the desired width by the use of plane.
	- While it is shaped the straightness is observed over the piece of timber.
	- Make sure that there is no nail in the timber to avoid destroying of the plane.
	- The plane is rub against the timber until the desired shape, width and thickness is obtained.

(C)(i)	During chiselling the following precaution should be taken :-
	- Wearing of goggles to avoid accident to the eyes
	- Wearing of boots to avoid being injured by nails
	- Stand few distance away when the process is done to avoid injury due to unexpected jump of the chisel.
	- Make sure that the chisel is sharpened -
	- Knocking the chisel slow to avoid jumping of the chisel.

Extract 1.2 shows a sample of a response of a candidate who scored low marks. This candidate provided incorrect responses. However, he/she only managed to give the correct use of carpentry tools in part (a) (iv) and (v).

## 2.1.2 Question 2: Farm Power

The question was composed of four parts (a), (b), (c) and (d) and the candidates were required to: (a) (i) explain why it is desirable to keep pre-cleaner of a tractor free of trash (ii) explain briefly the effect of low oil level in the reservoir of an air cleaner of a tractor which is running and working in the field (b) outline any four advantages and disadvantages of using animals as a source of power in the farm (c) (i) state two possible cause of a tractor to stop suddenly and briefly describe two measures that can be taken to correct the fault (ii) elaborate four advantages and two disadvantages of four stroke engines (d) briefly describe the maintenance of the ignition system of the tractor. The question carried twenty (20) marks.

The question was attempted by 73.8 percent of the candidates, of which 25.6 percent scored from 1.5 to 5 marks, 58.8 percent scored from 5.5 to 9 and 15.6 percent scored from 9.5 to 17. The candidates' general performance in this question was good.

The first part of the question was answered well by many candidates who gave responses such as to "avoid engine to clog and enable engine to work better" as a reason why it is desirable to keep pre-cleaner of a tractor free of trash. Part (b) of the question was also answered well by many candidates. For Part (c) of the question, the candidates were able to explain the following points which cause a tractor to stop suddenly (i) poor terminal connection and faulty ignition system. Despite the good performance in this question, a few candidates did not show the relationship

between air cleaner and clean air which support combustion in part (a). Some candidates also confused the role of oil in the air cleaner and oil in the lubrication system. Moreover, a few candidates were confusing oil and fuel. Instead of writing absence of fuel in the fuel tank, they wrote absence of oil in the oil tank. Part (c) (ii) was not answered well by the candidates. This is probably because they misunderstood the question as most of them wrote about operating procedure of a four stroke engine. Many candidates also responded incorrectly in part (d), where they described maintenance of the general tractor instead of describing the ignition system. Extracts 2.1 and 2.2 are samples of good and poor responses respectively.

#### Extract 2:1

2. (a) (i)	It is desirable to keep pre-cleaner of a tractor free of trash so as to ensure constant supply of air which support combustion of fuel.
(ii)	Low level of oil in the reservoir of air cleaner may cause insufficient air supply to the engine for combustion of fuel, because oil help to clean air.
(b)	Advantages of using animals as a source of power in the farm:-
(i)	Animals are cheap to buy compared to the tractor and its implements.
(ii)	Animals provides meat, milk and skin all these which increase income of the farmer.
(iii)	Animals do not require skilled labour, therefore local people may use animals in the farm.
(iv)	Animals provide manure which may be used to improve the fertility of the soil in the farm.
	Disadvantages of using animals in the farm as source of power:-
(i)	Animals may be affected with parasites and diseases.
(ii)	Animals have limited working time because they become tired.
(iii)	Animals cannot be suitable as source of power in large scale farms where there is plenty of work to do.
(iv)	Animals can not cultivate a large portion of the field for a short time like a tractor.



2.	(C.)	(i.) Cause for sudden stop of the tractor:-
		(a.) Lack of fuel in the reservoir.
		(b.) Lack of electrolyte in the battery if it is a petrol tractor.
		Measures the control the fault:-
		(a.) Making sure that the fuel level is high in the fuel tank before starting a tractor.
		(b.) Making sure that there is enough electrolyte in the battery before starting a tractor.
		(ii.) Four advantages of four stroke engines:-
		(a.) It provides more power than two stroke engine.
		(b.) They are heavy and hence suited for heavy duty.
		(c.) They have valves which control the entry and exit of fuel and burnt gases from the combustion chamber.
		(d.) They are mainly cooled by water, hence more efficient.
		Disadvantages of Four stroke engines:-
		(a.) They use more fuel than two stroke engines.
		(b.) They require more maintenance requirements than two stroke engines.
		(d.) Maintenance of the ignition system of the tractor:-
		(i.) The wire lines of the ignition system must be ensured that they are well insulated and replaced if possible.
		(ii.) The battery terminals must be clean so as to ensure the smooth flow of current.
		(iii.) The spark plugs must be replaced after a certain period of working so as to ensure proper functioning.

Extract 2.1 shows a sample of the response of candidate who answered most of the parts correctly. However, there were a few incorrect responses given such as *animal provide milk, meat and skin* of which this cannot be the advantage of using animal power. The candidate also wrote that *four stroke engines has the valve which control entry of fuel and exit of exhaust gases* as one of the advantages of four stroke engine, which was also incorrect.

### Extract 2.2

2a)	i) It is advisable to keep pre-cleaner of a tractor free of trash in order to provide effectively working of the tractor as well as to make the tractor long lasting due to effective maintenance of the tractor.
	ii) The effect of low level in the reservoir of an air cleaner will lead to the wearing of the metal parts as the results over heating of the tractor engine will reduce the effective working of the tractor.
2b)	i) Diesel power do not require high initial capital.
	ii) Diesel power the ex-equipment are much cheaper.

2b) iii) Animal power do not need skilled labour to operate the ox-equipment.

iv) Animal power is used by the farmer with small scale farming.

### DISADVANTAGES

i) Animal power are used in cultivation of small scale farming as the result they lead to the production from the farm to be low.

ii) Animal power are affected by micro-organisms such as bacteria which causes disease as the result they reduce the effective working of the animal and also affected by fleas and ticks which suck a lot of blood.

iii) Animal power lead to the poor utilization of the soil as the results of soil erosion.

iv) Animal power lead to the higher consumption of feed and on absence of feed they will not be able to work effectively.



2c(i) is the tractor stop suddenly due to presence of contaminated fuel in the fuel reservoir.

ii) The tractor stop suddenly due to presence of bubbles in the fuel.

### TWO MEASURES

2c(ii) i) The tractor should be corrected the fault through using clean fuel which is free from contamination according to the manufacturer.

ii) The tractor should correct the fault through bleeding of the engine where by the fuel will run free bubbles from the bleeding point and tighten the nuts and screws effectively and allow the tractor to continue working on the farm.

~~2c~~

2c(iii) is the four stroke engine provide proper sequence of working stroke according to the firing order.

2c(ii) The four stroke engine helps in checking the level of fuel in the fuel reservoir through the use of deep stick.

iii) The four stroke engine helps in closing and opening of exhaust manifold, because it has the valves which allow the entry of air and mixture of fuel in the combustion chamber and escape of exhaust gases from the combustion chamber.

Why the four stroke engine is one to one relation of the crankshaft make a half revolution which is  $180^\circ$ .

### DISADVANTAGES,

2c(iii) The four stroke engine use more fuel and hence it is economically loss.

The four stroke engine needs spark for ignited purpose so for absence there will be no production of power.

2d	i) there should a battery which store the power of the tractor when the tractor is idle.
	ii) there should be the indicator on how the machine works.
	iii) there should be provision of direct current from the battery for ignition as well as lighting of the tractor.

Extract 2.2 shows a sample of a response of the candidate who failed to provide correct responses to many parts of this question. The candidate failed to give the cause of a tractor to stop suddenly instead he/she wrote “presence of bubbles in the fuel”. The candidate also wrote that the above problem can be corrected by bleeding of engine which is incorrect. The candidate also failed to provide the advantages and disadvantages of four stroke engine.

### 2.1.3 Question 3: Farm Mechanization and Machinery

The question was composed of four parts (a), (b), (c) and (d). The question required the candidates to: (a) outline the function of parts found on a mouldboard plough which were (i) share (ii) mouldboard (iii) coulter (iv) landside (v) depth wheel (b) explain how to adjust the depth of ploughing in an ox-plough (c) calculate the total delivery rate in the application rate of a typical sprayer which is given in 100 litres/hectare and the operating rate is 0.25 ha/min (d) (i) list four factor that affect the application rate of a crop sprayer (ii) state six important things to be considered in the maintenance of a crop sprayer. The question carried twenty (20) marks.

The question was attempted by 59.7 percent of the candidates, of which 0.9 scored 00 mark, 13.7 percent scored from 0.5 to 5 marks, 21.7 percent scored from 5.5 to 9 marks, 48.6 scored from 9.5 to 15 marks and 16 percent

scored from 15.5 to 19 marks. The candidates' general performance in this question was good.

The majority of the candidates responded correctly and according to the demand of the question. However, a few candidates failed to give correct response in part (a) (iii) and part (d) (i) and (ii). In part (a) (iii), the candidates were supposed to outline the functions of coulter, but they failed due to lack of clear understanding of the demand of the question. The candidates were supposed to explain the functions of both skim and disk coulters in a single or combined form. The functions of the coulter are to cut the farrow slice and separate it from the unploughed land. In part (d) (i), the candidates supplied answers for part (d) (ii) while others supplied answers which are similar in both parts and items.

The poor performance in this question could be attributed to the candidates' inability to use such implements because nowadays many farmers use tractors or power tillers mounted by disk plough, and disk harrows as such very few areas are still using ox-ploughs. It was further observed that many candidates had language problems which made them fail to express themselves. In the case of calculations for the total delivery rate, those who did not score high marks used the formula wrongly. For example, instead of calculating the total delivery rate by calculating application rate times operating rate, they used application rate as the total delivery rate hence they divided it to operation rate. That was wrong because the value given was not for a total delivery rate but the application rate. The answer was easily obtained by multiplying the given variables directly.

The candidates who performed poorly had no knowledge on the practical aspects on how both mould board plough and the crop sprayer works. Extracts 3.1 and 3.2 are samples of good and poor responses respectively.



### Extract 3.1

3.	i/ Share - used to cut the soil during working
	ii/ Mould board - It used to turn the furrow and bury the vegetation after cutting.
	iii/ Landside - It receive down ward pressure of the mould board plough.
3. a)	i/ Depth wheel. It rotate which help mould board to be light on pulling.
	ii/ Depth of plough is adjusted by increasing of tilt and disc angle, when tilt angle increase it decrease disc angle and cut less deep while when disc angle decrease tilt angle increase and deep down ward the soil.
c)	Given Rate of operating = $0.25 \text{ ha/min}$ Rate of typical sprayer = $100 \text{ litres/hectare}$ Total delivery rate = ?
	from $\text{Rate of total delivery} = \frac{\text{Rate of typical sprayer}}{\text{Rate of operating}}$
	$0.25 \text{ ha/min} \times 100 \text{ litres/hectare}$
	$= 25 \text{ min/litre}$
	$\therefore$ The total delivery = $25 \text{ litres/min}$ .
d)	i/ Types of pesticide used. ii/ Cleanliness of sprayer. iii/ Calibration of sprayer. iv/ Clean water which used to dissolve chemicals.



3. (a) i/	Crop sprayer should be kept
	clean after work.
	ii/ Use of clean water when dissolving chemical.
	iii/ Moving part of crop sprayer which is metal should be lubricated.
	iv/ Crop sprayer should be used as it recommended.
	v/ Crop sprayer should be coated with materials which prevent rusting.
	vi/ Crop sprayer should be repaired the best or wearing out part.

Extract 3.1 shows a sample of the response of a candidate who performed well in this question. The candidate provided the functions of each items as required in part (a). The candidate also explained the use of both tilt angle and the depth wheel as the main adjusters for the depth of plough in an ox-plough, as required in part (b).

### Extract 3.2

3a) Functions of the following parts of mouldboard plough

i) Share - It cuts soil by levelling it.

ii) Mouldboard - Collecting and levelling the soil.

iii) coulter - Cuts and levels the the cut ridges.

iv) Landside - Dig ridges and breaks them.

v) Depth wheel - Cuts the depth of the soil level.

3b) The depth of ploughing in an ox-plough is adjusted by increasing more efficiency parts of an ox-plough.

3c)

$$\frac{Q}{A} = \frac{R \times A}{A}$$

$$\frac{Q}{A} = R$$

Quantity = 100 litres

Area = 0.25 ha.

Rate = 100 litres?

$$\text{Rate} = \frac{\text{Quantity}}{\text{Area}} = \frac{100}{0.25} \Rightarrow 400$$

$$\text{Rate} = \underline{\underline{400 \text{ kg}}}$$

3d	
(i)	Four factors that affect the application rate of crop sprayer.
⇒	Climatic factor is necessary to be carried during optimum temperature.
⇒	Organic matter content when the soil contain high organic matter contents it may affect effective the action of sprayer.
⇒	Time of application. Most of sprayers are used before planting and others after planting.
⇒	Type of sprayer to be used. Most of sprayers required to be we should selective to crops.
3dii	Important things to be considered in the maintenance of crop sprayer.
⇒	Should be less harmful to crops.
⇒	Should be not poisonous to human beings.
⇒	Crop sprayer should be friendly to environmental conditions like activation microbial activities.
⇒	Crop sprayer should be affordable and available all the time.
⇒	Crop Sprayer should be cheap in terms of cost.
⇒	Crop Sprayer should be portable and easy in application.

Extract 3.2 shows a sample of a response of a candidate who scored low marks. The candidate failed to provide correct responses in all parts. The responses indicate that the candidate either lacked knowledge of the subject matter or did not understand the requirements of the question.

#### **2.1.4 Question 4: Introduction to Irrigation**

The question was composed of four parts (a), (b), (c) and (d). The question required the candidates to: (a) describe the mechanism of (i) drip irrigation (ii) basin irrigation (b) elaborate the differences they would expect in root systems of crops which have been widely spaced in heavy irrigation and frequently light irrigation (c) (i) describe the three important sources of water for irrigation and briefly explain how they can be available to crops for growth (ii) account for situations that necessitate irrigation (d) (i) state two considerations to observe when water is applied from sprinklers (ii) advise why sprinkling has to be carried at night and free from periods of high wind. The question carried twenty (20) marks.

The question was attempted by 78.6 percent of the candidates, of which 45.9 percent scored from 0.5 to 5 marks, 45.9 percent scored from 5.5 to 9 marks and 8.2 percent scored from 9.5 to 17 marks. The general candidates' performance in this question was average.

The majority of the candidates who attempted this question were able to answer part (b) correctly. In part (c) (i), they managed to describe three sources of water for irrigation and explain how water can be available to crops for growth. However, part (a) (i) of the question was not attempted by many candidates. Lack of enough knowledge on the topic could be the reason which made them avoid this part of the question. Some candidates who attempted this part tried to conceptualize the drip applied to the patients in hospitals to answer the question. In part (a) (ii), many of the candidates attempted this part but had no clear understanding of basin irrigation. Most of them explained basin irrigation as just application of water on the base of the plant where a basin is made around the tree especially citrus fruits. Many of them did not mention about the amount of water applied in basin and by what means it reaches the area. The candidates mixed the responses of the first part of the question with the second part. In part (c) (ii), the candidates failed to account for situations that necessitate irrigation. For the case of part (d)

(i) which required the candidates to state consideration to observe when water is applied from sprinkler, some candidates did not indicate that it should be applied at the correct pressure and it should be free from contaminated water, instead they wrote irrelevant answers. In part (d) (ii), most of the candidates' responses did not show that they knew the answers as they kept guessing, which was an indication that they had no knowledge of subject matters. Extracts 4.1 and 4.2 are the samples for the good and poor responses respectively.

#### Extract 4.1

4	(b)
	(i) In roots which are frequently light irrigated there will be rotting of roots while in spaced heavy irrigation there will be well growth of roots.
	(ii) In roots which are frequently light irrigate there will be high probability of being attacked by fungal disease. Unlike in spaced <del>for</del> heavy irrigation
4	(a)
	(i) Drip irrigation - is the process of laying perforated pipes in the field in which water are supplied to the field through tiny nozzles.
	Mechanism.
	Water is drawn from the reservoir into the perforated pipe which contain some tiny nozzles in which water pass into the field by drop wise.
	(ii) Basin .
	This is the surface irrigation in which water is flooded to the whole field from the source by means of canals but the depth of water is controlled by dykes.



	(C) (i) Importance source of water for Irrigation
	are, ground water, rain water and
	Surface water
	(a) Surface water
	- The main source of surface water are lakes, rivers and dams, water from these sources are directed to the field by means of canals or furrows, in which plants obtain them for their growth.
	(b) Ground water
	- The main source of ground water are, well, springs, bore holes and water is drawn from these sources by means of pumps or a mule from a well then brought to the crops either through <del>strip</del> drip irrigation. In case of spring water may be directed to the field through canals and be utilized by crops for irrigation growth.
	(c) Rain water
	- rain water is captured and

4	(c) stored into <del>fact</del> tanks when the rain is raining and be used in lack of water period. This water can be brought to the crops by sprinklers into the field by using the pumping power of the sprinkler system.
	(2i) situations that necessitate irrigations are.
	(i) Area with low rainfall.
	(ii) Area with high infiltration and permeability.
	(iii) In dry <del>clm</del> weather condition.
	(d) (i) Consideration to observe when water is supplied from sprinklers are.
	(a) strength of the wind and wind direction.
	(b) light intensity (temperature) which results to evaporation.
	(ii) This is done in order to avoid evaporation and unevenly direction of water by the wind.

Extract 4.1 is a sample of a response of a candidate who scored high marks with slight incorrectness in part (b) where he/she wrote "there will be rotting of roots" in frequently high irrigated while in spaced heavy irrigated there will be "well growth of roots" and in part (d) (i) where he/she wrote "strength of the wind and wind direction" and "light intensity which results to evaporation" as consideration to observe when water is supplied from sprinklers.

#### Extract 4.2

Q4.	(a)
	i) Drip irrigation - The small <del>or</del> pipes or container <sup>is</sup> is filled with <del>water</del> water. The the small holes <del>are</del> is made to the top of container and buried upside down to the soil near the plant root. So the water flow stop by stop and absorbed by the plant easily.
	ii) Basin irrigation - The small channels is made from the source of water to the field and allow water to pass from source the field through those channels. Hence irrigate.
	(b)
	(a) The root appear sunken
	(b) The root penetrate deep to search for the water.
	(c) The numerous root was decreased.
	(c)
	i) @ underground water. They can be available to crop due to evaporation done from the soil the water in the form of water vapour rise up to the root of plant.



4	(c) (i)
	(b) overflow water - these are water which move above the soil and they are very available to the plant root hence help for growth
	(c) Stream water was used for irrigation by using sprinkler and other method.
	(ii) Situation that necessitate irrigation.
	(a) topography - this affect the irrigation due to high land which is impossible to conduct irrigation.
	(b) steep slope - also necessitate irrigation due to high soil erosion taking place
	(c) weeds - also necessitate irrigation due to blockage of the stem.
	(d) <del>obstacle</del> obstacles like stones also necessitate irrigation.
	(d) (i) (a) absence of water channels
	(b) absence of soil erosion.
	(ii) sprinkler is advisable to carry at night because there was no high temperature that heat the soil and period of high wind sprinkler is unusable because wind interfere sprinkler and cause decline of standing sprinkler.

Extract 4.2 is a sample of a response of a candidate who scored low marks. The candidate provided incorrect responses in all four parts, except for part (c) (i) where he/she managed to score a mark by writing "stream water is used in irrigation by means of sprinkler and other methods".

### **2.1.5 Question 5: Farm Structures**

The question was composed of three parts (a), (b) and (c). In this question the candidates were required to: (a) describe the make-up of (i) a crush (ii) a dip, (b) (i) state ten routine management practices that are carried out in the crush, (ii) outline the function of each of the five parts of a spray race, (c) explain why is it more advantageous to use a spray race than a dip in controlling ticks. The question carried twenty (20) marks.

The question was attempted by 62 percent of the candidates, of which 20.5 percent scored from 0.5 to 5 marks, 32.2 percent scored from 5.5 to 9 marks, 36.8 percent scored from 9.5 to 15 marks and 10.5 percent scored from 15.5 to 19 marks. The general performance in this question was good.

In part (a), items (i) and (ii) were well attempted by the majority of the candidates as were able to describe the make-up of both the crush and dip. However, they failed to understand the requirement of part (b) (i) as they confused “management practices” with “maintenance practices” as a result, instead of stating the management practices carried out in the crush, they stated maintenance practices for a crush. They provided incorrect statements such as replacement of metal posts. Part (b) (i) was well attempted by the majority of the candidates as were able to outline the function of each of the five parts of spray race. Only a few candidates failed to identify the parts and consequently failed to state the functions of the respective parts. The majority of the candidates also answered correctly part (c).

Despite the good performance in this question, a few candidates failed to respond well in part (a) (i), where instead of describing the make-up of a crush, they described topography which is a consideration for a locating a crush. In part (a) (ii), instead of responding by giving the make-up of dip, the candidates stated the purpose of a dip and identified the considerations for allocating a dips as the make-up of a dip which is wrong. In part (b) (i), the candidates failed to identify management practices done in a

crush over a dip in controlling ticks in which candidates gave the disadvantages of the dip contrary to the demand of the question. Sample responses for good and poor responses are shown in Extracts 5.1 and 5.2 respectively.

#### Extract 5.1

Series	A Crush.
	Is the one among the farm structure which is normally rectangle in shape made up of wood or metal.
	The crush has one open which is the entrance and exit in order to ensure comfort of an animal to be dip efficiently.
(ii)	A dip is the farm structure which is used in ticks control to animals. The dip made of the following parts
	a. Entrance - This allows the entry of animals in the dip.
	b - Assembly yard - is where animals are assembled before dipping and
	c - Foot path - is the small structure where basin contain chemical used to clean feet and kill all pathogens
	d - dip bath - contains chemicals in which animal clipped.
	e - Crusher - used to restrain animal in dipping process
	f - Drying yard - Animals are assembled after dipping so as to be dried and

5(a) (i) the removal of unwanted chemicals from their bodies

(ii) a - Artificial insemination

b - Milking

c - Dehorning

d - Identification

e - Drenching

f - Castrating

g - Deworming

h - Pregnancy diagnosis

i - Collection of semen

j - Disease diagnosis

(ii) a. Entrance - Allow the entrance of animals

b. Assembly yard - To assemble animals before sprayed with chemicals

c. Pump - Used to provide pressure to pump the chemicals

d. Crush - Confine or restrain animals during spraying

e. Spray race - Has nozzle which supply chemicals to the animals

5(c) i/ Simple and require not much care compared to dip which require many labour to control animals

5(c)	ii/. Spray race is less dangerous to animal than dip since no dip is easy for animal to drink chemicals.
	iii/. Easy to control tick to pregnant animals by spray race than the use of dip due to the tiredness of animal can fail to pass through the dip.
	iv/. Easy to control tick to sick animal than by using spray race than the use of dip since every though is weak for but can pass through the spray race but can not pass into dip due to its sickness.
	v/. Easy for small animals to be sprayed with chemicals by using spray race rather than dip which is suitable only for adult.
	vi/. Spray race is quite at some time as compared to dip method of controlling ticks.

Extract 5.1 shows a sample of a response of a candidate who performed well in all parts of the question with the exception of part (a) (i), where the candidate identified only two out three items that make up the crush based on the demands of the question. Due to this failure, the candidate was unable to score full marks.



## Extract 5.2

5. (a) Make-up of each of the following,

(i) A crush - is the structure constructed for the purpose of controlling external parasites like fleas ticks.

When constructed should observe the direction of the & blowing winds.

Topograph should be observed because it is mostly constructed in level surface.

Availability of water. Water should be available around it for daily management practices.

(ii) A dip - This is the structure constructed for the purpose of controlling external parasites because the whole animal is washed by the mixture of acaricides and certain amount of dilution to control.

Its construction / make-up,

(a) Should be constructed to the level soil.

(b) Should be constructed when water is available.

(c) Observation of direction winds.

b/. 1) Routine management practices carried out in the crushes.

(a) hygiene of the area around the crush.

(b) Repairing of crush structure for effective daily treatment of external parasites.

(c) Proper dilution of chemical used for operations.

(d) Encouragement of livestock keepers to have knowledge of avoiding external parasite - hence continuous treatment of parasites.

(d) Replacement of instrument that are used for in the crush for operation.

5(c)	—it is more advantageous to use a spray rather than dip in controlling ticks due to following reasons:
(i)	In dip control the whole animal is washed — the chemicals this cause chemicals to enter to the natural opening like nose, mouth and — cause the effect to the livestock animal.
(ii)	Sometime when animal is forced to the chemical cause a fracture of body parts.
(iii)	Dip cause death sometimes when animal — drink even small amount.

Extract 5.2 shows a sample of the response of the candidate who performed poorly in the question. He/she provides incorrect responses in part (a) (i) and (ii) and (b) (i).

### 2.1.6 Question 6: Introduction to Soil Chemistry

The question was composed of three parts (a), (b) and (c). The question required the candidates to: (a) (i) give the meaning of the term ‘liming’ as used in agriculture (ii) show how calcium carbonate reacts in the soil when it is used in liming by using chemical equations (b) account for five beneficial and two detrimental effects of liming (c) (i) state the relationship that exists between soil water and soil air in a given soil sample (ii) briefly explain four effects of too much water on nutrients availability in the soil. The question carried twenty (20) marks.

The question was attempted by 93.8 percent of the candidates, of which 8.1 percent scored from 2 to 5 marks, 37.5 percent scored from 5.5 to 9 marks, 50.2 percent scored from 9.5 to 14.5 marks and 4.2 percent scored from 15.5 to 20 marks. This question was attempted by the majority of the candidates and their performance was good.

In part (a) (i), the candidates were able to give the correct meaning of liming but failed to write correct equations in part (ii) as required. In part (b), the majority of the

candidates were able to account for five beneficial and two detrimental effects of liming. However, they failed to give correct relationship between soil water and soil air as required in (c) (i). Extracts 6.1 and 6.2 are samples of good and poor responses respectively.

### Extract 6.1

6 (i) Liming refers the practices of adding any material in the acidic soil with aiming at neutralizing it and turn it to be more productive. Example of liming materials are hydroxides, oxides and carbonates of magnesium and calcium such as calcium oxide (CaO), calcium carbonate (CaCO<sub>3</sub>), magnesium carbonate and other materials such as ashes, slag and waste materials of sugarcane from sugarcane industrial processing.

(ii) First calcium carbonate reacts with carbonic acid to form calcium hydrogen carbonate such as:

$$\text{CaCO}_3 + \text{H}_2\text{CO}_3 \rightleftharpoons \text{Ca}(\text{HCO}_3)_2$$

Then:

Calcium hydrogen carbonate formed reacts with hydrogen protons present in the soil that determine the acidity of the soil.

$$\text{Ca}(\text{HCO}_3)_2 + 2\text{H}^+ \rightleftharpoons \text{Ca} + \text{CO}_2 + 2\text{H}_2\text{O}$$

soil solution

Second, CaCO<sub>3</sub> react directly with hydrogen protons to form calcium, carbon dioxide and water

$$\text{CaCO}_3 + 2\text{H}^+ \rightleftharpoons \text{Ca} + \text{H}_2\text{O} + \text{CO}_2$$

soil solution

Like wise reaction above occurs on colloidal particles

colloidal particle	$\text{H}^+$	$+$	$\text{CaCO}_3$	$\rightleftharpoons$	colloidal particle	$\text{Ca}^{2+} + \text{H}_2\text{O} + \text{CO}_2$
	$\text{H}^+$					

or

colloidal particle	$\text{H}^+$	$+$	$\text{Ca}(\text{HCO}_3)_2$	$\rightleftharpoons$	colloidal particle	$\text{Ca}^{2+} + \text{CO}_2 + 2\text{H}_2\text{O}$
	$\text{H}^+$					



6.	b) Beneficial effects of liming
	i/ Increase calcium and magnesium availability in the soil for crop plant.
	ii/ Influence availability of plant nutrients due to rising pH of the soil, elements such as nitrogen, phosphorus, molybdenum, and potassium may be available.
	iii/ Facilitate microbial activities to increase due to change in pH of the soil hence fast decomposition of organic matter to release nutrients in the soil.
	iv/ Prevents the accumulation of Aluminium, manganese and zinc to toxic level.
	v/ Improvement of soil structure, texture and porosity due to fast decomposition of organic matter facilitated by bacteria. Organic matter contribute much to physical properties of the soil moderation since influence aeration due to lowering bulk density of the soil, water retention and infiltration.
	Detrimental effect of liming.
	i/ Cause harmful to plant roots this is due to rapid change in soil pH that has not already acclimated or adapted by the plant.
	ii/ Lead to nutrient reduction due to depletion of Aluminium, iron and manganese in the soil upto the extent that are not available to plant.
6.	C (i). The relationship is that both air and water occupy the pore spaces of the soil but the existence of air in the soil depends on the amount of water occupied the pore space if pore space are filled with water hence air is not present this is because water has high density than air means even if pore space containing air if

6(c)	Water molecules enter that porespace tend to displace air from its occupation and if water is not filled to pore space the air occupies that pore and exist above the water in the porespace.
6 c(ii)	Too much water <del>availability</del> in the soil affects nutrient availability
	(i) Washing away nutrients from the root zone hence lead to plant to loose or fail to acquire nutrients.
	(ii) Increase availability of Manganese and Aluminium to toxic level since most of nutrients such calcium are leached in the soil.
	(iii) Lack of air in the soil such as oxygen that could be used for plant respiration hence lead to death of plant tissue.
	(iv) Can lead to <del>accumulation</del> of change of soil pH and affect the microbial activities of the soil that can lead to the soil to become unproductive.

Extract 6.1 shows a sample of a response of a candidate who managed to answer all three parts correctly and according to the requirements of the question.

### Extract 6.2

6. (a) (i) Liming	is the process of adding material in the soil to promote good growth of plant example Calcium Carbonate: Calcium oxide, Magnesium Carbonate.
(ii) Calcium Carbonate	
	$\text{Soil particle} + \text{CaCO}_3 \xrightarrow{\text{H}_2\text{O}} \text{Ca(OH)}_2 + \text{H}^+$
b) Five beneficial and two detrimental effect of liming	
	Beneficial effect of liming.
	(i) It maintain the soil pH of the land.
	(ii) It help to increase the soil fertility.
	(iii) It help to neutralize the acidic of the soil.
	(iv) It help to allow good growth of plant in a certain place.
	<del>v) It help to maintain the temperature</del>
	v) It maintain the temperature of the soil.

6	a)	Two <del>to</del> detrimental effect of liming.
		(i) it kill the small organisms which help in decomposition of soil.
		(ii) It can lead to increase of chemical in the soil.
		c) (i) relationship that exists bt between soil water and soil air in a given soil sample.
		Soil water: these are water which are held on the soil, while soil air are temperature which present on the soil and these are related because.
		any plant growth depend on both side that is why soil water and soil air are related.
		ii) (i) decay of plant root because of too much water will lead to decay of roots.
		(ii) Low growth will occur due to the too much water in the soil.
		(iii) plant may be easy to be affected by plant disease like bacterial wilt.
		iv) Wilting of the plant because of too much water may lead to wilting of plant <del>Soil water</del> .

Extract 6.2 shows a sample of a response of a candidate who performed poorly in most parts of the question but managed to answer correctly part (a) (i) only.

### 2.1.7 Question 7: Introduction to Soil Chemistry and Introduction to Soil Science

The question was composed of four parts (a), (b), (c) and (d). In this question the candidates were required to: (a) give four functions of mineral elements (i) magnesium and (ii) potassium in plants (b) state one of the characteristic symptoms which indicate the deficiency of each of the following mineral elements in plants (i) sulphur (ii) manganese (iii) iron (iv) molybdenum (c) (i) explain by giving chemical equations representing the reactions of the sulphate of ammonia fertilizer in the soil when in continuous use as said to have a resultant effect of making soil acidic (ii) examine four effects of applying excessive quantity of urea fertilizer onto the soil on which sorghum plants are growing (d) elaborate four important activities of living organisms that influence the soil as a medium for plant growth. The question carried twenty (20) marks.

The question was attempted by only 3.9 percent of the candidates, of which 42.9 percent scored from 4 to 8 marks and the remaining 57.1 percent scored from 10 to 16 marks.



As shown in the data, the majority of the candidates who attempted this question had good performance. The candidates answered all parts correctly. A few candidates who scored low marks failed to give correct functions of magnesium and potassium in plants in part (a) (i) and (ii). In part (b) (i) to (iv), the candidates failed to give correct characteristic symptoms which indicate deficient of the respective mineral elements and in part (c) (i) they failed to write correct chemical equations. Extracts 7.1 and 7.2 are samples of good and poor responses respectively.

#### Extract 7.1

7 a)	To give four functions of each of the following are as follows:-
	(i) Magnesium.
	— Magnesium has the following functions:-
	a) Help in formation of chlorophyll.
	b) Help in maturity of the seeds.
	c) Help to strength the stem of the plant
	d) used to activate the enzyme functions.
7 b)	(ii) Potassium.
	— Potassium has the following functions in plants.
	a) Promote root growth and development.
	b) Promote tillering in crops like paddy
	c) Encourage seed development
	d) Increase rate of maturity.
7 b)	The characteristic symptoms which indicate deficiency of each of the following mineral elements in plants are as follows:-
	(i) Sulphur
	— Curling of the leaves.
	(ii) Manganese
	— Yellowing of the leaves.

7b) (ii) Iron

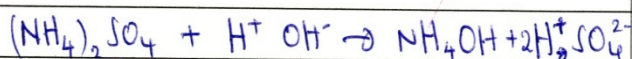
- Yellowing of the plant or Chlorosis

7d)	(iv) Molybdenum
-----	-----------------

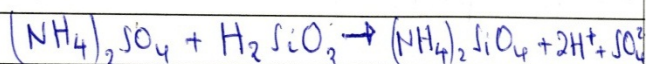
- Stunted growth of the plant.

7(c) It is true that continuous use of sulphate of ammonia fertilizer is said to have a resultant effect of making soil acidic, as follows:-

- When the fertilizer of sulphate of ammonia is added in the soil may react with the  $H_2O$  present in the soil to form strong acid of sulphuric acid.



- Also the fertilizer of sulphate of ammonia <sup>water soluble</sup> strong acid.  
Can react with the silicate compound to form the acid.



7 (c) (ii) Four effects of applying excessive quantity of urea fertilizer onto the soil on which sorghum plants are growing are :-

a) The vegetative growth of the sorghum plant will increase.

7 (c) (i)	b) The sorghum will fail to mature faster
	c) The soil will become more acidic
	d) The sorghum will have small number of panicles (aggregates of sorghum).
7 (d)	Four important activities of living organisms that influence soil as a medium for plant growth are:
	i) Mineralization.
	— The breaking down organic matter to release nutrient in the soil.
	ii) Nitrogen fixation.
	— The process where by the organisms changes the atmospheric nitrogen into nitrates.
	iii) Weathering.
	— The organisms help to break down the soil aggregates to soil particles which give good rooting space to plants
	iv) Respiration of the organisms.
	— This adds soil carbon dioxide which is used by plants for photosynthesis.

Extract 7.1 shows a sample of a response of a candidate who performed well in this question. The candidate failed to respond correctly in part (c) (i) only, where he/she was unable to explain by giving correct chemical equation representing the reactions of the sulphate of ammonia fertilizer to have a resultant effect of making soil acidic.



## Extract 7.2

7 (a)(i) Magnesium.

- Used to increase the mineral contents in plants
- useful in transportation of the plant system
- promoter stem and leaves growth
- Improves the health of the plants in the fields.

(ii) Potassium

- Helps the plant in opening and closing of stomata
- Helps the mineral salt which induce the transportation of materials in plants
- Improves the fruits growth and ripening.
- Cause leaves extended growth hence effectively in sunlight trapping by chlorophyll.

7 (b)(i) Sulphur - Chlorosis symptoms, yellowing of leaves.

(ii) Manganese - Unhealthier conditions of the plants

(iii) Iron - Wilted of the stems, and patches on the leaves.

(iv) Molybdenum, No root successful growth

7 (c)(i) Since sulphate of ammonia is the fertilizer causing acidic soil once timely used, it contains acidic ions

7 (c)(i)	into the soil and tend to accumulate and cause acidity of the soil. $(NH_4)_2SO_4 + H_2O \rightleftharpoons NH_4^+ + HSO_4^-$ $H_2SO_4 \longrightarrow 2H^+ + SO_4^{2-}$
7 (c)(ii)	Effects of excessively quantity of urea fertilizer into the soil on which sorghum plants are growing. (i) Urea, causes the accumulation basic materials in the soil, hence basicity of the soil which lower the microbial activities working under acidic medium. (ii) Excessively use of urea, cause the scorching effects to the leaves of the sorghum plants. (iii) Reduces the quality of the soil hence not being supportive to sorghum plants growth. (iv) Affects the free nitrogen fixing bacteria in the soil hence low quantity of nitrogen nitrate into the soil as the growth rate of sorghum reduced.
7 (d)	Activities of living organisms that influence soil as the medium for plant growth are as:- (i) Rooting system of some crops like legumes are supported by microbial activities for example - immobilization of minerals by bacteria to form organic matters required for plant growth. (ii) The waste products of the animals such excreta from animals add organic manure into the soil. (iii) Soil Mixing by termites and ants increase the soil fertility of the soil. (iv) Metabolic activities of animals, and respiration cause the constant carbon dioxide availability to the plant in the soil hence used for photosynthesis.

Extract 7.2 shows a sample of a response of a candidate who performed poorly in this question. The candidate failed to respond correctly in all parts except part (d), where he/she managed to write the activities of living organism that influence the soil as medium of plant growth, as it increases the soil fertility and enable availability of carbon dioxide to the plant for photosynthesis to take place.



### **2.1.8 Question 8: Introduction to Agricultural Prices, Agricultural Production Economics and Farm Planning**

The question was composed of three parts (a), (b) and (c). The question required the candidates to: (a) briefly explain the meaning of the terms (i) fixed costs (ii) variable costs (b) calculate (i) from the given data the gross margin of the school farm for one month (ii) the gross margin per cow (c) (i) give the meaning of the term 'labour productivity' as used in agricultural production (ii) account for two effects of HIV/AIDS on labour productivity in agriculture (iii) explain how HIV/AIDS affect resource allocation in agricultural production (iv) suggest measures to be taken to control HIV/AIDS among the vulnerable groups so that labour productivity in agricultural production is not affected. The question carried twenty (20) marks.

The question was attempted by 45.4 percent of the candidates, of which 6.2 percent scored from 1 to 5 marks, 23.6 percent scored from 5.5 to 9 marks, 51.6 percent scored from 10 to 14.5 marks and 18.6 percent scored from 15 to 18 marks. The general performance in this question was good.

The majority of the candidates responded according to the demand of the question in part (a) (i) by giving the meaning of fixed cost as "costs incurred on long term assets in agriculture production" and they give examples such as "farm tractor and insurance." Also in (a) (ii), variable cost was correctly answered as "cost of buying variable inputs such as seeds and animal feeds." In part (b) (i), most of the candidates wrote the correct gross margin of 850,000/=. In part (c) (ii), the candidates managed to give two effects of labour productivity in agriculture production as it reduce labour force due to the death of HIV/AIDS victims and reduce working hours for those who take care of the HIV/AIDS victims, therefore reduced labour efficiency. In part (c) (iii), only a few candidates were able to give correct response such as resources which could be used in production purposes were diverted and given to treat HIV/AIDS victims instead of being used in agriculture

production. Part (c) (iv) was answered correctly and according to the demand of the question. Responses such as “faithfulness and abstinence among couples” were given. It was also suggested that people should be taught on the use of condoms as one way of safe sex to control HIV/AIDS among the vulnerable groups so that labour productivity in agricultural production is not affected.

Despite the good performance in this question, a few candidates failed to give the correct gross margin. In part (c) (i), many candidates failed to give the meaning of labour productivity as used in agriculture production; instead they gave incorrect responses as labour productivity is the system of practice in agriculture production by influence of labour. This shows that failed to understand the demand of the question and lacked knowledge of the subject matter. In part (c) (iii), many candidates failed to respond as required, instead they explained the effects of HIV/AIDS as it reduce labour efficiency and reduce labour force due to the death of HIV/AIDS victims. A few candidates gave incorrect responses such as “vaccination and good government policy” for supporting labour in agriculture production in part (c) (iv). Extracts 8.1 and 8.2 are the samples of good and poor responses respectively.

## Extract 8.1

8.	-8-
(a) i	Fixed costs Are costs of an inputs which are constants do not vary with level of production. Example <del>Costs</del> Cost of Land, machines permanent labour, buildings
(ii)	Variable costs are costs of an inputs which vary with level of production are not permanent. Example: Cost of fertilizers, Layer mash, Casual labour, Seeds, Medicine.
8.	(b) i Gross margin = $\frac{\text{variable}}{\text{Value of Output}} - \frac{\text{variable}}{\text{Value of input}}$ per unit output.
	Variable output. 15 litres @ 100/- = $1500 \times 20 = 30,000/-$ 30000 X 30
	Variable inputs.
	10 bags of meal @ 2000 - - - - 20,000/-
	5 bags of mackie salt @ 2000 - - - - 10,000/-
	A derwormer 3000 - - - - 3,000/-
	5 bails of hay @ 200/- - - - - 1,000/-
	A ton molasses 1000/- - - - - 1,000/-
	2 casual labour @ 7,500 - - - - 15,000/-
	Total input = 50,000/-
	Total output per month = $30,000 \times 30 = 900,000/-$

8.

-8-

i) The gross margin for one month

$$= 900,000 - 50,000$$

ii) Gross margin = 850,000 per month

But there are 20 cows.

$$850,000 \div 20 = 42,500/\text{cow}.$$

iii) The gross margin of the school farm for one month is 42,500 per cow.

c) i) Labour productivity is the presence or availability of labour in performing different farm activities.

Labours may be skilled or unskilled both may involve in production purpose.

ii) Effects of HIV/AIDS on labour productivity in agriculture.

i) HIV/AIDS cause death to people who may engage in production so reduce labour productivity due to most of able people especially youths die because of HIV/AIDS.

ii) HIV/AIDS deteriorate health of labours, people who suffering from HIV/AIDS cannot not do heavy work thus lower the production so labour productivity decrease.



8.C (ii)

- 8 -

(i) HIV/AIDS affects resource allocation in agricultural production in the following ways.

(i) Due to HIV/AIDS cause death to people especially farmers so they fail to allocate their resources which can help them to obtain more profit.

(ii) People suffering from HIV/AIDS spend much time for finding medicine such as ARV in behalf of involving in production and also use some of their resource in buying balanced diet and buying medicine for other diseases because HIV/AIDS lower immunity of the body.

8. C (iv) Measures to be taken to control HIV/AIDS among the vulnerable groups so that labour productivity in agricultural production is not affected are as follows,

(i) Education to people.

People must be provided education concerning with HIV/AIDS on how to transmit from one person to another and how to control it. Some people get HIV/AIDS because they don't have the knowledge on it. Many people especially in rural areas they don't know exactly about HIV/AIDS.

C. iv)

(ii) Faithfulness and Abstinence. The couples must be faithful and the youth who have no partners must be taught on how to abstain without engaging in sex intercourse before marriage.

(iii) Eliminating bad customs and traditions which may lead to spread of HIV/AIDS. These are like Female Genital Mutilation (FGM) this custom contribute much on spread of HIV/AIDS because a single tool may used to many people and lower labour productivity.

(iv) Religious Teachings. These also can help to reduce the spread of HIV/AIDS because people may be taught to be faithful and obedient so they may prevent themselves from unsafe sexual intercourse.

(v) People may be taught to use Condoms. If they fail to be faithful, may use condoms during sexual intercourse and also must taught on how to use them.

(vi) Blood transfusion must be conducted in safe way to avoid transmission of HIV/AIDS to people. Only safe blood must be transfused.

Extract 8.1 is a sample of candidate's good responses. The candidate managed to respond correctly in most of the parts of the question except for part (c) (i) and (c) (iii). In (c) (i), the candidate wrote the meaning of labour productivity as "presence of labour in performing different farm activities." In part (c) (iii) he/she wrote that "due to death caused by HIV/AIDS to people especially farmers there is failure to allocate their resources which can help them to obtain more profit." All these were incorrect responses.

## Extract 8.2

8 (i) fixed costs is the cost that incurred in the farm even if no any production example cost for insurance taxes

(ii) Variable cost = is the cost that incurred in the farm for input used

(b) (i) Data

Variable cost

10 bags @ 2000/- = 20000

5 blocks @ 2000/- = 10000

1 deewer @ 3000/- = 3000

5 bags @ 200/- = 1000

molasses 1000/- = 1000

2 casual labourers @ 7500/- = 15000

50000

Output

15 litres of milk @ 100/- = 1500

20 cows @ 1500 = 30000/-



8 (b) (i) Gross margin = Variable cost - output.

$$\begin{aligned}\text{Gross margin} &= 50000 - 30000 \\ &= 20000\end{aligned}$$

The gross margin of the school for one month =  
20,000/- dairy cow

(ii) Data

variable cost =

10 bags @ 2000 = 20000

5 blocks @ 2000 = 10000

Deewer 3000 = 3000

5 balls @ 200 = 1000

mclases 1000 = 1000

2 casual labour @ 75000 = 15,000

$$= 59000$$

out put.

15 litres of milk @ 100 = 1500

G.m = variable cost - out put.

Gross margin per cow = 59000 - 1500

$$= 48,500$$

∴ The gross margin is 48,500/- per cow

(C) (i) Labour productivity in agriculture

~~is the production of~~

is the ability of producing the crop which are quality and high quantity in agriculture production through labour.

(ii) (a) lower quantity of production in agriculture and quality.

(b) lower the profit during selling that production

8	(c) (iii) The HIV and AIDS affect resource allocation in agricultural production through
	→ wind by transmitting from one plant to another.
	→ Through water contaminated during spraying <del>to</del> such as by using sprinkle sprayer the wind cause virus like HIV/AIDS.
	(iv) → To stop cultivation for two or one year in agriculture production.
	→ To change the crop such as crop rotation from year to year or season to season.
	→ To plant resistance crop to HIV/AIDS in labour productivity of agriculture production.
	→ To apply the chemical which can measure the productivity of crop in agriculture production.

Extract 8.2 shows a sample of a response of a candidate who scored low marks. The candidate failed to answer correctly most of the parts except for part (a) (i) and (ii) where the candidate managed to define fixed costs and variable costs respectively.

### 2.1.9 Question 9: Introduction to Agricultural Prices and Fundamentals of International Trade

The question was composed of four parts (a), (b), (c) and (d). The question required the candidates to: (a) distinguish between market and marketing functions (b) briefly explain the importance of the marketing in agriculture (i) storage (ii) processing (iii) grading (c) (i) give the meaning of international commodity agreements as used in international trade (ii) state five possible objectives of international commodity agreements (d) account for five factors that cause price fluctuations in agricultural products. The question carried twenty (20) marks.

The question was attempted by 53.2 percent of the candidates, of which 1.1 percent scored 00 mark, 20.6 percent scored from 1 to 5 marks, 33.4 percent scored from 5.5 to 9 marks, 43.4 percent scored from 9.5 to 15 marks and 2.6 percent scored from 15.5 to 17 marks. The candidates' general performance in this question was good.

The majority of the candidates who scored high marks in this question were able to answer all the parts correctly. On the other hand, a few candidates who scored low marks failed to distinguish properly between market and marketing in part (a). In part (b), the candidates failed to explain the importance of the marketing function (i) storage (ii) processing and (iii) grading, instead they provided incorrect responses such as keeping for future use when the prices are high (for storage), reducing the bulkiness of goods for easy transport (processing), and improving the quality of goods (grading).

In part (c) (i), the candidate failed to explain the meaning of the international commodity agreements as they wrote that "they are agreements signed by producers of primary goods so as to ensures common markets and to have comparative advantages among them" instead of "the assigned agreement between countries that are major producers and countries which are major consumers of a certain commodity with the aim of controlling frequent changes in the price of commodity." The candidates responded poorly in part (d), where they were required to account for five factors which cause price fluctuation on agricultural products such as environmental factors, incubation period, agricultural production equipment are fixed in nature, demand for agricultural products has low elasticity of income and most of agricultural product cannot be stored easily. Instead they wrote change in population, change in price of other commodity, change in production, while other wrote such wrong responses as "annual price fluctuation," "long term price fluctuation," "seasonal price fluctuation" etc. This implies that many candidates had no sufficient knowledge on the concept of rural economy in particular marketing and international trade. Extracts 9.1 and 9.2 are samples of good and poor responses respectively.

### Extract 9:1

9 (a) Market in Agriculture is the situation where by there is a sufficient contacts between the sellers and buyers of agricultural goods for the exchange of goods between them to take place. Hence market simply means exchanges of agricultural goods between buyers (consumer) and sellers (producers and middlemen) where by Marketing of ~~agricultural~~ <sup>agricultural</sup> goods as applied in Agriculture refers to all performance activities involved in the flow of <sup>agricultural</sup> goods and services from the point of initial point until they reach the hands of the final consumer(s).



9) Hence storage ensure the Constant supply

Importance of the following marketing functions-

(i) Storage-

Storage is very important for ensuring supply of goods or commodities to be constant throughout the year. Most agricultural produce in most cases is seasonal because of most of agricultural crops grow only during the rainy seasons (wet season) only. This make the presence of high yields and excess surplus during the wet seasons and presence of shortage of goods agricultural goods during dry and at the end of dry seasons. Hence storage enable the surplus to be preserved for use during shortage of agricultural goods in wet dry season hence ensuring constant supply of agricultural goods throughout the year since the consumption is constant throughout the year.

(ii) Processing-

This is the process of changing goods to some ways before selling. Processing is done by people called processors. This lead to conversion of raw materials into the desired goods hence make the consumers receive the desired services timely and effectively. - Example changing raw mangoes into mango juices and concentrates enables consumers to get the juices



9 b(ii) Grading

Normally consumers have different preference on the characteristics of the good produced. Hence grading is necessary for putting goods in grades according to some characteristics. This sorting of goods make the preference of different consumers on goods to be successfully as goods are present in different grades with different characteristics. Also grading enables classifying goods according to their prices hence each consumer is able to buy the goods since grading result to lower-price goods and higher price goods.

(c) International commodity agreements as used in International trade is the trade agreement signed by representatives of countries which are major producer of particular product and the representative of countries which are the major consumers of that good held in series of meeting.

(i) Objectives of International commodity agreement.

- i) Protection against the excessive competition among the producer countries.
- ii) Protection against the excessive production in producer countries which may result price fluctuation of goods.
- (iii) To stabilize world price of the particular goods.

9 a(ii) (iv) To set overall output level of the commodity in the world.

(v) Allocation of the quota shares of particular good among the producer and consumer countries of that good.

(d) Factors that cause price fluctuations in agricultural products.

(i) The biological nature of agricultural production.

The agricultural production in most cases is seasonal. This causes the plenty of agricultural goods during the wet season when there is plenty of rainfall hence causing price of goods to fall as the result of increase in supply. During dry season there is no production of agricultural goods hence goods are scarce causing shortage of goods hence causing the price to rise since the supply decreases.

(ii) Most of agricultural goods can not be stored easily.

Some agricultural goods in most cases such as fruits usually go bad in short periods of time after harvest. Even if there is storage facilities may not be adequate or may be more expensive. This makes the producers to sell the goods at the lower price soon after harvest when there is high supply. This period is followed by dry periods accompanied with scarcity.

2	<p>i - scarcity of goods since nearly all goods sold during the harvesting period - this causes rise in supply and since there is low supply of such commodities.</p> <p>(iii) Most of Agricultural equipments are fixed in nature. This causes low elasticity of income in agricultural products causing price fluctuation.</p> <p>(iv) The demand for agricultural products has low elasticity of income. The demand for agricultural goods do not change easily relative to supply. For example if the price of tea, there is high supply of tea people who used to drink 2 cups of tea will not increase the consumption since the tea is plenty. The same occurs when there is shortage of the tea. This causes some surplus to experience loss of market hence price fluctuation.</p> <p>(v) Biological nature of some plant products.</p>
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Extract 9.1 shows a sample of a response of a candidate who scored high marks. The candidate explained well all parts of the question, however he/she wrote an incorrect importance of processing as “the conversion of raw materials into desired goods hence make the consumers receive the desired services timely and effectively” instead of “processing and preservation ensure that the product is constantly available to consumers throughout the year.”



### Extract 9:2

i)	Market is the process selling and buying products while
ii)	Marketing price is the process whereby buyer and seller are in contact of their commodities hence they place what better price to be exchanged.
b)	Storage: is the process where by producers sell products to certain organization example KNEU and store them or sell to the store of government and hence during the period of scarcity of food they sell such food at the same price <del>lower</del> as they sold bought <del>earlier</del> , earlier.
iv)	Processing is the process where by producer sell products to consumer hence the process it is them and be used for future use example produce sell tomato and then tomato are processed and be used for another use and for along period be used.
iii)	Grading is the process of determining the price of certain commodity to be sold to the buyer hence both are sufficient with the price of such commodities.

9(c)	
i)	International Commodity agreement is the provision by a producer is in contact with processors and guide him/her what amount of product to be produced and how much will be paid.
9c (ii)	A producer is able to be paid even if the product was destroyed.
ii)	producer is able to get prices at willing because
iii)	A processor is able to give all necessary thing which are needed for producer example supply of chemicals.
iv)	Producer is able to get capital even though no products produced.
(v)	
9d	i) Annual price fluctuation.
ii)	Long term price fluctuation.
iii)	Seasonal price fluctuation.
iv)	Cyclic price fluctuation.
v)	Perennial price fluctuation.

Extract 9.2 shows a sample of a response of a candidate who scored low marks. The candidate provided incorrect responses in all parts. For example, he/she wrote five factors that cause price fluctuation as “annual price fluctuation”, “long term price fluctuation,” “seasonal price fluctuation,” “cyclic price fluctuation” and “perennial price fluctuation.”



## **2.2 134/2 AGRICULTURE 2**

### **2.2.1 Question 1: Plant Diseases and Crop Pests**

The question was composed of three parts (a), (b) and (c). Candidates were required to: (a) describe the mode of action of the six categories of insecticides (b) outline twelve safety guidelines to be taken when spraying insecticides (c) (i) name one crop attacked by false codling moth and blue bug (ii) describe the type of damage caused by false codling moth and blue bug on the plant (iii) briefly describe two suitable methods of controlling the false codling moth and blue bug. The question carried twenty (20) marks.

The question was attempted by 30.7 percent of the candidates, of which 22.9 percent scored from 1 to 5 marks, 38.6 percent of the candidates scored from 5.5 to 9 marks and 38.5 scored from 9.5 to 13.5 marks. Candidates' general performance in this question was good.

Most of the candidates answered correctly most of the parts with part (b) being the highly scored part since it is an applied part in day to day candidates' life. The candidates were able to outline the twelve safety guidelines to be taken when spraying insecticides such as "read well the labels present on the pesticides before starting spraying, follow all instruction given on the label of the pesticides and use only the correct dosage during dilution of the pesticide."

However, in part (a) very few candidates failed to describe the mode of the six categories of insecticides, instead they gave a classification of herbicides based in selectivity and formulation. In part (c) (i) to (iv), the candidates failed to name the crop, describe the type of damage and suitable method of controlling the named pest. Extracts 1.1 and 1.2 are samples of good and poor responses respectively.

### Extract 1.1

1.	(a). Mode of action of Pesticides.
	4/ Stomach pesticides, These are pesticides which they are taken in the stomach of the pest and they get harm the pest in the stomach. They affect the digestive system. This is for chemical mouth parts insects pest.
2.	Systemic pesticides, These they are applied on a plant and translocated in the Xylem vessels. When the insect suck juices from the plant they suck with the pesticides and they kill or affect the pest.

1. (a)

3. Contact pesticides, These are pesticides which kill the pest when comes into contact with the pest. These are applied on leaves or in the surface of the plant.

4. Aerosols, These they produce or form gases and when that gases are inhaled by the pest they affect the respiratory system hence the pest dies.

5. Dusts, These are the pesticides which are applied in the soil to control the pests who do live in soil and they affect the systems and harm the pest immediately after application.

6. Granules, These are pesticides where by the active ingredient is in form of granule and when the pest consumes such as eat granules it gets harmed and finally dies.

2. (b).

i. Read well the labels present on the pesticide before starting spraying.

ii. Follow all instructions given on the label of the pesticides.

iii. Use only the correct dosage during dilution of the pesticide.

4 (b).

iv/. Wear gloves and shields during spraying.

v/. Check the direction of wind.

Spray towards the direction of wind.

vi/. Do not smoke or eat anything when spraying.

vii/. Avoid becoming contact with the pesticide.

viii/. Store well the chemicals which remained after spraying.

ix/. Avoid to empty the sprayer in the water source or near water source.

x/. Wash your hands after spray well with detergents.

xi/. Remove all the clothes used during spraying and put them away from reach of children.

xii/. Have a thorough bath after spraying to remove all remained chemicals.

(c). False Codling Moth.

i/. Beans.

ii/. - They suck juices on the plant and inject toxins.

- Also they lower yields in the crop plant.



4	(c).
	ii/. - Through use of pesticides.
	- The use of resistant varieties.
	For Blue bug.
	i/. potatoes.
	ii/. - They bore into the plant and inject toxins to the plant.
	- They lower yields and products quality and quantity.
	iii/. - The use of pesticides.
	- The use of biological control such as the use of thrips and other animals which can feed on these bugs.

Extract 1.1 shows a sample of a response with good performance in this question. The candidate was able to give correct response for part (a), (b) and (c) but missed some parts. For example in part (c) candidate failed to respond correctly to describe damages, name crop attacked and methods of controlling False Codling Moth and Blue bug.

#### Extract 1.2

1.	
	(a).
	1. Herbicides; These are chemical which are used to controls weeds in the field. the herbicide can be applied as follows.
	i) Selective herbicides; Is the way or mode of action in which herbicides select weeds to the field, the chemical controls some of weeds.
	ii) Non selective herbicides; is the mode of action in which the herbicides control all the weed the indiscriminately.
	2. Nematocides; These are chemicals substances which are used to controls nematodes to the environment so as to reduce the distruption of environment.

1.	(a).
	3. Fungicides; These are chemical substance which are used to controls fungi from damage The crops and other facilities to the environment.
	i) Selective fungicides; kind of fungicides that select fungi to the crops.
	ii) Non selective; all the harmful and affected plants are controlled without selection.
	4. Molluscicides; These are chemicals substance which are used to controls mollusca from damaging the crops such as the snails and others.
	5. Vernicides; These are chemicals substance which are used to controls the harmful animals like snake to the environment.
	6. Insecticides; These are chemical substance that are used to control pests according to the place hence ensure their survival
	(b).
	1. Weather condition should be well so as to avoid interfere contamination to other organism.
	2. should consider the guide direction of the wind inorder transmit faster.
	3. The high of rain can also considered because the chemicals can be washed away with rain.
	4. Also the coverage of the number of insects according to the environmental.

1.	(b)
	5. They should be non-toxic to human and other useful.
	6. They should be soluble in water so as to facilitate the distribution.
	7. They should be effective and toxic to the targeted area.
	8. They should be easy to apply since it reduces the time to manage.
	9. The application should consider the amount of insecticides and insects to be efficient.
	10. They should not destruct the environment such as Air pollution.
	11. They should be specific to the environment coverage.
	12. They should be harmless to other species which are not required.
	(c).
	i).
	1. cotton
	2. sugarcane.
	ii)
	1. Roots; They mostly damage roots of the plants.
	2. leaves; They mostly damage leaves of the plants.

1.	(c).
	(iii).
	1. The chemical method of control pests;
	- This know as Insecticides where the chemical should be
	applied to the environment in order to control the pests
	from the destruction of the plants.
	2. The biological methods of control pest;
	- The pests can be controlled effectively by this method
	without causing effects to the environment the use of other
	pathogen which are effectively.

Extract 1.2 shows a script of a candidate who performed poorly. The candidate did not attempt part (a). In part (b) and (d) he/she managed to score some mark. This indicates that the candidate has lack of knowledge on the topic.

### 2.2.2 Question 2: Plant Diseases and Crop Pests

The question was composed of three parts (a), (b) and (c). In this question, candidates were required to: (a) (i) enumerate eight problems associated with the use of pesticides/insecticides when controlling pests (ii) give two examples of successfully biological control in agricultural fields basing on insects by insects (b) differentiate the given terms as applied in the field of plant pathology (i) a sign and a symptoms (ii) chlorosis and wilting (iii) stunting and wilting (c) state the disease transmitted and the type of crop affected by (i) *Xanthomorias ampestris* (ii) *Colletotrichum lindemuthianum* (iii) *Phytophthora infestans* (iv) *Helminthosporium maydis*. The question carried twenty (20) marks.

The question was attempted by 65.4 percent of the candidates, of which 32.8 percent scored from 1 to 4.5 marks, 1.3 percent scoring from 00 to 0.5 mark, 51.3 percent of the candidates scored from 5 to 9 marks, 15.9 percent scored from 9.5 to 13.5 marks. The general candidates' performance in this question was good.



Most of the candidates answered all parts as required. In part (a) (i), the candidates gave correct responses such as problems associated with the use of insecticides as the outbreak of secondary pests, poisons to humans and other beneficial organisms. In part (b), the majority of the candidates were able to differentiate chlorosis from wilting as well as stunting and wilting. They also responded well in part (c) (iii), where they wrote the disease as Potato Late Blight and crop as potato and tomatoes.

However, a few of the candidates responded poorly in part (a) (ii) by giving responses such as “cats to control rats” as example of successful biological control in agricultural fields basing on insects by insects which was incorrect. In part (b), the candidates failed to give the correct responses on the differences between a sign and a symptom. Part (c) was highly omitted except for a few candidates who got correct response in part (c) (ii) which required them to state the diseases transmitted by *Colletotrichum lindemuthianum*, they state the disease being “anthracnose” and the crop affected as “beans.” The candidates failed to give correct answers to parts (i) and (iv) which were *Xanthomias ampestris* and *Helminthosporium maydis*. Extracts 2.1 and 2.2 are samples of good and poor responses respectively.

#### Extract 2.1

2	problem.
I	Environmental pollution. during spraying the insecticide the equipment used through spraying are washed into water stream and some time the spraying is done near the water source also it lead to the air pollution.
II	Cause Residuals to the crop plants due to the weather condition since the weather is high temperature especially during the day.
III	Harmful effects on the human being during spraying when inhaled through the respiration due to its toxicity
IV	High Cost of production due to its value applicability in control of the insects when farmer has a large farm and it become attracted by insect he/she is incurred high cost of insecticide

2 V	Kills of the beneficial pest/insect on the farm example bees and other insect which lead to the pollination of the flowering plants since insecticide is applied they die.
VI	Secondary outbreak of the pest/insect during control of the pest on the farm because most of the pest survive due to the formulation of the pesticide.
VII	Occurance of the resistance pest. during the application of the pesticide the most of the pest become resistant to the pesticide because of their mode of adaptation in the environment.
	Biological Control
I	Wasp against leaf hopper
II	Locust against white flies
Q6	A sign - Is the specific symptom of the certain organism due to the deviation in its body.

2b	Symptoms - Are the visible phenomenon observed by either microscope or eyes due to the deviation and alteration of the normal state.		
i	Chlorosis	Is the appearance of the yellowish colours which are formed parallel to the plant leaves due to the destroyed chlorophyll	
	Wilting	Is the suddenly dry up of the plant due to the water soaked in the certain place especially - water logging.	
iii	Stunting	Is the dwarfing of the plant due to the growth abnormalities caused by either pathogen or physical condition like drought.	
	Wilting	Is the dry up of the plant due to the bacterial effect on the water soaked to the plants.	
(C)	Pathogen	Disease Transmitted	Crop affected
i	Xanthomonas Ampestris	Black leg.	Coffee
ii	Colletotrichum lindemuthianum	Beans Anthracnose	Beans



2c	Pathogen Phytophthora infestans.	Disease Transmitted potato late blight	Crop affected potatoes
	Helminthosporium Maydis	Maize wilt	Maize

Extract 2.1 is a sample of a response from a script of a candidate who scored high marks. The candidate managed to give correct responses in most of the parts. However, in part (b) he/she failed to give the difference between a sign and a symptoms also in part (c) (i) the candidate failed to state the disease transmitted by *Xanthomonas ampestris* and the crop it attack, he/she gave incorrect response which was "Blackleg disease in coffee."

#### Extract 2.2

2 (c)	
(i) <i>Xanthomonas ampestris</i> .	
The disease transmitted is	
The crop affected are Beans.	
(ii) <i>Colletotrichum lindemuthianum</i>	
The disease transmitted tobacco mosaic	
The crop affected are tobacco.	
(iii) <i>Phytophthora infestans</i>	
- The disease transmitted is,	
- The crop affected	
(iv) <i>Helminthosporium maydis</i> .	
- The disease transmitted is	
- The crop affected.	
2. (a) (i) problems associated with the use of pesticides/insecticides	



2	<p>(i) The successful biological control in agricultural field basing on insects by insects .</p> <p>(ii) High yield of the products . (ii) High quality of the products .</p> <p>(b) (i) A sign and symptoms .</p> <p>- A sign is the symptoms which occur to the plants but symptom are the visible sign which show the plant for example <del>choloris</del> wilting, chlorosis .</p> <p>(ii) Chlorosis and wilting . - Chlorosis is the removal of the chlorophyll this means that the green colour to the plant leaves, stems so the plant become yellowing while wilting is the process where by leaves are being falling down the tree and the plant become with no leaves eventually die .</p> <p>(iii) Stunting and wilting . - Stunting is the symptoms of plant disease where by the plant does not grow while wilting is where the tree lacking leaves and become dry hence die .</p>
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Extract 2.2 shows a sample of a response of a candidate who scored low marks. The candidate failed to answer correctly all three parts. For example, in part (b) (i) he/she wrote a sign – as a “visible indication of a disease” and a symptoms are the “characteristics of different diseases.”

### 2.2.3 Question 3: Introduction to Weed Science

The question was composed of three parts (a), (b) and (c). Candidates were required to: (a) give the meaning of (i) noxious weed (ii) notorious weed (b) (i) elaborate five ways in which herbicides work in controlling weeds (ii) briefly explain five environmental factors that affect the effectiveness of herbicides (iii) state three disadvantages of using herbicides in controlling weeds (c) give the botanical and life span of (i) Crows foot grass (ii) Double thorn (iii) Nut grass (iv) Wild finger millet (v) Sodom apple. The question carried twenty (20) marks.

The question was attempted by 91.5 percent of the candidates, of which 8 percent scored from 2 to 5 marks, 53.8 percent of the candidates scored from 5.5 to 10 marks, 36.7 percent scored from 10.5 to 15 marks and 1.5 percent scored from 15.5 to 18 marks. The general performance in this question was good.

The candidates who performed well adhered to the demand of the question. They demonstrated enough knowledge on the topic of Introduction to Weed Science as they managed to provide correct responses. In addition to that, the items asked in the question are found in day to day life of most people in the society.

However, the candidates who did not do well in the question had problem in several parts. In part (a) (i) and (ii), the candidates failed to give correct meaning of the two terms of noxious weed and notorious weed. In part (b) (i), the candidates failed to elaborate five ways in which herbicides work in controlling weeds. In part (c), a few candidates failed to give correct botanical names and life spans of items (i) to (v). Extracts 3.1 and 3.2 are samples of good and poor candidate's responses respectively.

### Extract 3.1

30	(i) Noxious weed are weed that are difficult to control for example nut grass, oach weed and Couch grass.
	(ii) Notorious weed are weed that are known to cause bad effects to living organisms such as Thorn apple.
6	(i) The five ways in which herbicides work in controlling weeds are :- <ol style="list-style-type: none"><li>1. Inhibition of nitrogen metabolism in weeds. for example Triazines</li><li>2. Killing the cell. for example Dinoseb, Diquat and oils.</li><li>3. Inhibition of photosynthesis. for example Atrazine, Simazine, Duron, Linuron and Uacils herbicides.</li><li>4. Causing abnormal tissue development in weeds. For instance phenoxalactic acids, Benzoic acids, 2,4-D and MCPA.</li><li>5. Inhibition of respiration of the weeds for example Dinoseb herbicides.</li></ol>
	(ii) The five environmental factors that affect effectiveness of herbicides are :- <ol style="list-style-type: none"><li>1. Wind. During strong wind herbicides may not work satisfactory to the targeted plants as it may be directed by wind to unwanted areas.</li><li>2. Soil. Some soils are resistant to herbicides.</li></ol>



3(b)	herbicides penetration so as to reach the target area of weeds especially those which are pre-emergence herbicides.
	3. Temperature. Too much temperature in an area may affect the efficiency of herbicides due to the effect of evaporation.
	4. Rainfall. Also during the rain season herbicides may not work efficiently as they are washed away by water.
	5. Pressure. Also too high pressure in an area reduces the efficiency of herbicides in controlling weeds.
3(c)	(i) The three disadvantages of using herbicides in controlling weeds are:-
	1. they are expensive
	2. they cause environmental pollution which may affect health of living organisms.
	3. they need high skills for instance in mixing them and applying at correct rate.
3(c)	(i) Crows foot grass - <u>Tagetes minuta</u> Life span - Annual
	(ii) Double thorn - <u>Oxygonium strictum</u> life span - Annual
	(iii) Nut grass - <u>Cyperus rotundus</u> life span - Perennial
3(c)	(iv) Wild finger millet - <u>Eleusine indica</u> life span - Annual
	(v) Sodom apple - <u>Solanum incanum</u> life span - Perennial

Extract 3.1 shows a sample of a response of a candidate who performed well in this question. The candidate was able to give correct responses to section (a) (i) and (ii), (b) (i) to (iii). The candidate missed a point in part (b) (ii) and failed to write the scientific name for Crows foot grass.



### Extract 3.2

3(a) i/Noxious weed- These are plants which are very poisonous to the animal as well as crops plant example Tick berry, opuntia species which cause injuries to animals.

ii/Notorious weed - These are weed which occur in the place permanently.

(b) Ways in which herbicides work in controlling the weed.

(a) Solution form. herbicides work efficiently when dissolved in solution form.

(b) Concentration. Herbicides work efficiently when dissolved in correct concentration.

(c) Date of expiry. Herbicides work efficiently when are applied in correct date.

(d) Time where is applied.

Herbicide work efficiently if it is applied at correct time and age to the plant.

3b)ii/ Environmental factor that affect the effective ness of herbicides.

① Time of application.

The herbicides must be applied in the morning where there is cool condition.

② Climate condition.

The herbicides should be applied where there is no wind.

iii/ Rainfall

The herbicides work efficient where it is applied when there is no rainfall.

iv/ Misleading of the instruction. The farmer should consider the instruction given in order the herbicides to work efficiently.

v) Concentration.

In order the herbicides to work efficiently when there is correct concentration.

3b)iii/ Disadvantage of using herbicides in controlling herbicides are:

① herbicides cause soil sterlant. Excessive application of herbicides cause less productivity of the soil.

② Herbicides cause disease.

When herbicides are applied in the field and

3c	Common name	Botanical name.
i/	Crows foot grass	
ii/	Double thorn	<u>Oxygonium sinuatum</u>
iii/ <del>iii</del>	Nut grass	<u>Cyperous rotundus</u>
iv/	Wild finger millet	<u>Elaeusine indica</u>
v/	Sodom apple	<u>Solanum nigrum</u>

3b)iii)	rainfall rains the water which come from the
	field to the rivers where by people use that water
	they can get disease and aquitiz organism
	get death.

Extract 3.2 shows a sample of responses of a candidate who scored low marks. The candidate failed to respond correctly to all parts of the questions.

#### 2.2.4 Question 4: Plant Breeding

The question was composed of three parts (a), (b), and (c). The candidates were required to: (a) (i) explain the meaning of “Relative Fitness” as applied in the effect of selection on genetic variation, (ii) examine four characteristics to be considered when developing new varieties for sustainable crop improvement, (b) describe briefly the breeding methods of breeding self-pollinated crops (i) pure line selection (ii) pedigree selection and (c) (i) outline two principles which rest on the concept of natural selection (ii) state three importance of natural selection (iii) name the effects of natural selection. The question carried twenty (20) marks.

The question was attempted by 15.8 percent of the candidates, of which 51.8 percent scored from 1 to 5 marks, 46.4 percent of the candidates scored from 5.5 to 9 marks and 1.8 percent scored 10 marks. The general performance in this question was poor because 98.2 percent of the candidates scored below 10 marks.

Most of the candidates who attempted the question failed to explain the meaning of “Relation Fitness” in part (a) (i) which is the “relative ability of different genotypes to pass on their alleles to future generation,” instead of it, almost all candidates who attempted the question wrote, “is the ability of organism to be competitive and fit/adaptive to the environment.”

However, in part (a) (ii) almost all candidates who attempted this question were able to write the characteristics to consider when developing a new varieties for sustainable crop improvement such as “productivity, resistance, quality, adaptability and high growth rate/early maturity.” In part (b), they failed to describe pure line selection as they wrote

crossing closely related plants and described only the meaning of pedigree as the selection of progeny basing on the performance of their ancestors, they also failed to give examples. In part (c) (i) the candidates' responses were incorrect as they wrote struggle for existence and elimination of unfit. Others wrote Darwin principles and Neo-Darwism, instead of more organisms are produced than survived and reproduce, organism differ in survival and reproduction mainly due to difference in genotypes/genetic content and in part (c) (ii) and (iii) wrote the same response which was "enable the organism to adapt the environment hence high yield and resistant to diseases" which is incorrect response as a result they scored partial marks for adaptation. These responses indicate that the majority of the candidates had no sufficient knowledge on the concept of plant breeding. Extract 4.1 shows a sample of a poor response.

#### Extract 4

Qn 4.	@ if Relative Fitness is the Uniform appearance of animal that are better adopted in the environment. it Consider the Concept of natural selection where it show the frequency of only Fit animal to the environment.
	if 4 characteristics to be considered.
	→ External make up of the crop (Phenotype)
	one of the feature to be considere when developing new varieties for Sustainable Crop Improvement is by looking the appearance of the Specie phenotypically.
	Environment Selection. The Selected Variety Must be favoure by the environment present in order to Improve the growth of the plant
	Genetical make up of the Variety (Genotype)
	Another features to be considered is genetic constitution of the Variety this is done by crossing of parental genotypes.
	Gene frequency of the variety. Also when the developing new Varieties for Sustainable crop Improvement the Gene frequency must be considered
	①. if Pure line Selection is the choosing of Closely related plant Species which form homo



	Zygous gene to interbreed to form the off spring which is also homozygous. This method is done by the self pollinated crops where by fertilization takes place on the same flower. The flower contain Male homozygous gene and female homozygous hence the Zygote produced will be pure due to genetic composition of their parent.
	ii/ Pedigree selection is the system of family selection by considering the crossing of plant which are closely related by may be differ phenotypically while genotypically are related, they are <del>also</del> genetically related. The male is homozygous while the female is heterozygous <del>has</del> . This method is also used for breeding self-pollinated crops.
	© i/ → Darwin's theory of evolution → Neo-Darwinisms.
	ii/ 3 Importance of Natural selection - The nature is conserved - The Environment is protection against destruction by animal re Unfit
	iii/ Effect of Natural selection → Decrease in Number of population.

Extract 4 shows a sample of a response of a candidate who scored low marks. The candidate attempted all three parts (a) (b) and (c) and provided incorrect responses in all parts.

### 2.2.5 Question 5: Plant Diseases

The question was composed of four parts (a), (b), (c) and (d). The question required the candidates to state the causative agent, two typical symptoms and suggest two methods which farmers may apply to control each of the following plant diseases (a) Coffee berry (b) Covered kernel smut (c) Cassava mosaic and (d) Charcoal rot. The question carried twenty (20) marks.

The question was attempted by 14.9 of the candidates, of which 17 percent scored from 2 to 5 marks, 56.6 percent of the candidates scored from 5 to 9 marks and 26.4 percent scored from 10 to 14 marks. The candidates' general performance was good.

Most of the candidates who scored relatively high marks in this question were able to answer correctly most of the parts. However, the candidates failed to write correct responses in part (a), they wrote the causative agents for Coffee berry as *Hemeliae vastatrix*, others wrote fungi others just wrote bacteria etc while the correct response was *Colletotrichum coffeanum* and on the symptoms they wrote "falling of flowers and leaves and brown colour on leaves surfaces." In part (b), they also failed to write the causative agent of Covered kernel smut as *Ustilago maydis* instead of *Sphacelotheca sorghi* and totally gave wrong symptoms such as "black powder on the leaves surfaces and stunted growth." In part (c), most of the candidates were able to write the causative agents of cassava mosaic, but only a few wrote virus/white flies without specifying the type of virus. Moreover, they managed to mention correct symptoms and control methods. In part (d), the candidates totally failed to write the causative agents of charcoal rot as well as the symptoms and control measures. They wrote that the "charcoal rot is caused by fungi/bacteria and characterised by rotting of stems and roots." However, most candidates scored some marks on control methods for all parts as they wrote one of the control measures as growing resistant varieties which are correct for all plant diseases. Extracts 5.1 and 5.2 are samples of good and poor responses respectively.

### Extract 5.1

5	@ coffee berry disease is a disease which attacks coffee. <del>Causative agent: Colletotrichum</del> causative agent: Fungi called <u>Colletotrichum coffeanum</u> .
	Symptoms
	(i) Brown patches occur on leaf margins (ii) Dark brown blotches or streaks occur on flowers.
	Control
	i/ By using fungicides ii/ By using resistant varieties.
	(b) covered kernel smut is a disease which attacks sorghum. causative agent: <u>Sphacelotheca sorghi</u>
	Symptoms
	i/ The grains of sorghum plant are replaced

	by spores.
	(ii) Diseased grain breaks more easily.
	Control
	i/ Through crop rotations
	ii/ Using resistant varieties.
	(c) cassava mosaic is a disease which affects cassava plant.
	causative agent: cassava mosaic virus.
	Symptoms
	i/ yellowing and mottling of leaves
	ii/ stunted growth
	Control
	i/ By using mosaic free planting materials
	ii/ By using resistant varieties.
	(d) Charcoal rot - is a disease which attacks Tea crop.
	causative agent: Fungi namely Armillaria
	Symptoms
	(i) Rotting of the crop.
	(ii) wilting.
	Control
	(i) use of fungicides
	(ii) use of crop rotation practices.

Extract 5.1 shows a sample of a response of a candidate who scored high marks. The candidate gave correct responses to parts (a) and (c) but provided incorrect responses in part (d) and some parts of (b) where, for example, 'diseased grain breaks more easily' is not the symptom of Covered kernel smut.



## Extract 5.2

5	(a) Coffee berry
	Causative agent - Bacteria
	Symptom - Yellowing of leaves:
	-
	Method of control - apply insecticides
	to the coffeees
	- <del>Part</del> remove affected
	Part of plant.
	(b) Covered Kernel Smut
	Causative agent - Fungi for example.
	<del>Puccinia</del> <del>Sporidig</del> <del>ulig</del> <del>se</del>
	Symptoms:
	- It <del>cause</del> retarded growth
	of plant.
	- Poor production yield and appear
	<del>Smut</del> Smut on leaves.
	Method of control:
	- Cutt the affected plant
	and remove it to the field
	- Use of chemical which
	affect the fungi diseases.
	(c) Cassava Mosaic:
	Causative agent: Virus.
	Symptoms
	- It <del>cause</del> poor production
	of cassava crop.
	- It <del>cause</del> Retarded grow
	poor crop yield.
	Control measure:
	- find the chemical or medicine
	which are appropriate in
	controlling the disease.
	- Remove affected plant
	(d) Charcoal rot:
	Causative agent: - Bacterial.

Extract 5.2 shows a sample of a response of a candidate who scored low marks. The candidate provided incorrect responses in all parts except for part (c), where he/she managed to mention the symptom of cassava mosaic.

### **2.2.6 Question 6: Fundamental and Technological Challenges in Agricultural Development**

The question was composed of three parts (a), (b) and (c). The candidates were required to: (a) explain (i) pesticides threat (ii) overgrazing threat (iii) deforestation threat and (iv) fertilizer threat to sustainable agricultural production (b) explain the meaning of the term genetic modification (GM) (c) (i) suggest six key characteristics of organic farming (ii) briefly describe the principle of health as applied in organic farming. The question carried twenty (20) marks.

The question was attempted by 15.5 percent of the candidates, of which 30.9 percent scored from 0.5 to 5 marks, 43.6 percent scored from 6 to 9 marks, 16.4 percent scored from 10 to 15 marks and 9.1 percent scored from 16 to 18 marks. This question was attempted by very few candidates and its performed was good.

Many candidates who attempted the question scored high marks because they had sufficient knowledge on the topic. However, some candidates failed to give correct responses because they failed to understand the requirements of the question. For example, one candidate gave the meaning of pesticide, deforestation and fertilizer instead of explaining the threat of pesticide, overgrazing, deforestation and fertilizer as required. Some candidates also wrote the importance of organic farming instead of its characteristics. Extract 6.1 and 6.2 show sample of good and poor responses respectively.

### Extract 6.1

6 (a) Sustainable agricultural production is the ability of the farm to produce soil, plant and livestock and fishing along with/without cause any damage to the ecological health of the environment.

i) Pesticides threat.

- Pesticides is chemical which used to kill pest and insects in the farm.

-> Application of the pesticides may kill both harmful pest and potential pest in the soil and other some microbial soil organism. These cause the destruction of soil ecological environment which cause soil to be less fertile to support plant growth hence lead to fall of sustainable agricultural production.

ii) Overgrazing threat - Overgrazing is the grazing of large number of animals in area.

- These cause the loss of crop cover and cause soil erosion which cause the soil to lose its ability to supply nutrient to the plants.

6 which lead to the destruction of environment due to the soil erosion hence should be avoided so as to enhance the sustainable agriculture.

### III/ Deforestation Threat -

deforestation is cutting of forest for the economic activities or industrial

These cause following

i) destroy natural rainfall cycle which may lead to the lack of enough rainfall to an area so these affect the sustainable agriculture production cause the

ii) Also may cause soil erosion and lose its natural ecological of the soil hence cause the soil to have low nutrient

### IV/ Fertilizer Threat -

Fertilizer is chemical compound which supply nutrients to the plants which cause the following threat

i) Fertilizer some cause acidic to the soil which kill natural microbial of soil cause the soil to fall to back in its normal ecologically



6 iv) ii) Also fertilizer may be washed and carried by rainfall water and transported to the water system example river or pond.  
ii) which may affected the living organism in water and discourage its ecological environment of water example may kill and affected fish due to the direct or oxygen denage increase  
So the use of fertilizer should be careful and proper controlled in order to enhance the sustainable agriculture

(b) Genetic Modification (GM) - Is the technology of alter the genetic make up of living organisms either plants or animal in order to enhance different survival advantage, like resistance to disease and productivity  
Example - Modification of animal genetic to enhance high productivity of milks

## 6 C ① Six key characteristics of organic farming

(I) Nutrient is supplied indirectly by using organic material like Manure and Compost

(II) Nitrogen fixation is sufficient by using nitrogen fixation organisms from the roots of Leguminous plants

~~(III) Pest and disease control~~

(III) Disease in organic farming is controlled by cultural method like crop rotation, early planting

(IV) Pest control is by using natural Enormity of living organism and another cultural method

(V) Organism are kept on based on its natural evolutionally and its environment

(VI) Soil is long fertility stable without need of fertilizer from industrial,

6	C (11) Principle of health - In organic farming the health of different things involved as follow
	1) health of soil - It means the ability of soil to stay with its productivity and fertility to the all time when farming activities take place
	II) health of living organism in the soil also enhanced to be good all the time when the farming activities conducted
	III) health of ecological plants and goods ecological during the production.
	IV) enhance health of people who use organic farming product and animal without cause any effect into their body

Extract 6.1 shows a sample of a response of a candidate who scored high marks. The candidate answered the question correctly but failed to define the principle of health as applied in organic farming.

#### Extract 6.2

6	(a) p-esticide Threat.
	Is the process of applying or spreading the pesticide in the crops in order to improve the quality of the crops to prevent the crops from the pest.
	(ii) Overgrazing Threat.
	This is the process of controlling the process of keeping large number of animal in a small area in order to improve the change for production of Agricultural crops in the field.



	(iii) Deforestation Threat. Is the process of controlling the cutting of the trees in the production process because the trees are important in preventing or wind directly to the crops in the field.
	(iv) Fertilizer threat Is the process of breeding the fertilizer in order to apply in the form to improve the growth of the crops because in order for the crops to grow they need fertilizer which improve the nutrient to the soil for plant growth.
6(b)	Genetic modification is the process of improving the production of crops due to using of knowledge in combination of different varieties in order to produce the one character which are genetically modified compare to that varieties combined together.
	C(i) Characteristics of organic farming. (i) Increase the yield of production. (ii) Improve the soil fertility. (iii) Improve the soil structure. (iv) Improve the quality of crops. (v) Increase the activity of micro organisms. (vi) Reduce the spread of pest and disease on the field.
6	C(ii) Must not Contaminated (i) Must be free from disease infection. (ii) It must not be a carrier of disease to the livestock.

Extract 6.2 shows a sample of a response of a candidate who scored low marks. The candidate provided the definitions of deforestation, fertilizer, overgrazing and pesticide instead of explaining the threats as required. The candidate also wrote the importance of organic farming instead of the characteristics of organic farming.



### **2.2.7 Question 7: Livestock Reproduction, Breeding and Improvement**

The question was composed of three parts (a), (b) and (c) where by candidates required to: (a) (i) briefly describe how semen is collected by using artificial vagina in cattle (ii) enumerate six advantages of frozen semen (b) (i) explain the term selection how is used in livestock breeding and improvement (ii) differentiate natural selection from artificial selection (iii) outline four genetic consequences of selection (c) explain two advantages and two disadvantages of selection based on pedigree. The question carried twenty (20) marks.

The question was attempted by 65.9 percent of the candidates, of which 15.4 percent scored from 2 to 5 marks, 44 percent scored from 5.5 to 9 marks, 37.6 percent scored from 9.5 to 15 marks and 3 percent scored from 15.5 to 17 marks. The general performance in this question was good.

The majority of the candidates were able to explain the whole process of semen collection using artificial vagina correctly therefore they got good marks. In part (a) (ii) the candidates were asked to enumerate advantages of frozen semen. Most of the candidates responded correctly because they related it with the advantages of artificial insemination. Part (b) (i) and (ii) were also answered correctly by most of the candidates.

However, in part (a) (i), the candidates failed to explain accurately how the process of semen collection is done by using artificial vagina. Some candidates failed to apply technical terms as mounting instead of the word planting was used. In part (c), the candidates responded incorrectly by giving irrelevant answers. Extracts 7.1 and 7.2 are samples of good and poor responses respectively.

### Extract 7.1

Qn 7:	i/ Process of Jemen collection using artificial vaginal in artificial insemination in cattle
	A Bull with desirable characteristics is chosen, then the cow is brought into the crush in order for a bull to mount it, then the artificial vaginal is filled with pressure in order to be full and filled with warm water in order to stimulate the secretion of Jemen from the bull when placed to reproductive organ of the bull, also the artificial vaginal is splashed with oil in order to avoid
Qn 7:	friction when the reproductive organ of the bull is inserted to it. After that the bull is brought to the crush with a cow, when the bull start to mount the cow the artificial vagina is placed to the reproductive organ of the bull hence secretion of Jemen which enter to the artificial vagina, so from there the Jemen are already collected by using artificial vagina.
	ii/ Six advantages of frozen Jemen
	a/ They can be used to produce offspring with desirable characteristics
	b/ They can be used to inseminate the cow, even if its lame, can not mount the cow
	c/ They can be used from one area to another because the bull is not involved hence easy to be transported
	d/ Also they are useful even after the death of the bull
	e/ They are useful when the animals fail to mate due to different purposes such as large body size of the bull.
	f/ They can be used to inseminate large number of cows at a short period
	b/ Selection is the process of choosing the animal with desirable characteristics to mate in order to produce offspring with desirable characteristics example adaptive to local area, resistance to diseases and large body size.
	iii/ Different between natural selection and artificial selection
	Natural selection is the type of selection in which animals are randomly selected in order to mate so as to produce offspring while artificial selection is the selection where by animals are with desirable characteristics

Qn 7:	Which are chosen in order to mate so as to produce offspring with highly desirable characteristics.
	iii) Four genetic consequences of selection
	a) Producing animals with high resistance to diseases
	b) Producing animals with large body size
	c) Producing animals adaptive to local conditions
	d) Producing animals with milk production.
	c. Two advantages of Pedigrees
	i) Producing offspring with desirable characteristics due to known ancestry.
	ii) Increasing breeding unit.
	Two disadvantage of Pedigrees
	i) The records may be <del>absent</del> absent or lost hence the characteristics of past ancestry can be unknown
	ii) Its time wasting

Extract 7.1 shows a sample of a response of a candidate who scored high marks. The candidate elaborated well in parts (a) (i), (b) (i), (ii) and (iii) but gave some incorrect responses in part (c).

### Extract: 7.2

7	a) Artificial insemination - is the process whereby semen from the male animal are introduced into the reproductive tract of female cow.
	(ii) advantage of frozen semen
	(i) semen from one bull can serve many cows
	(ii) It is easy to transport semen than transporting cows
	(iii) The problem of inbreeding are controlled.
	(iv) frozen semen are not with disease keep only a bull
	(v) control disease such as contagious abortion
	(vi) sick animal can serve the area that have minimized by keep semen.
	b) Selection - is allowing animal to be a parent of next generation. The selected animal are known as breeding stock and must have desirable characteristics
	(ii) Natural selection - is the natural selection of selecting better adapted and eliminate unfit
	Artificial selection - is the selection imposed on species by man

17	(ii) genetic inheritance of selection
	(a) It means heritable trait and because undesirable characteristic (traits)
	(ii) It increase or maintain better performance of animal
	(iii) It increase animal production in farm animal
	(iv) It maintain highly heritable characteristic
	(b)
	C) Advantage of pedigree
	(i) It better in selection because of known ancestor
	(ii) It can applied whereby the record are not yet known
	<u>Disadvantage Advantage</u>
	(i) Not all progeny get the right combination from the past relative (ancestor)
	(ii) It take time since it based on past ancestor

Extract 7.2 shows a sample of a response of a candidate who scored low marks. The candidate responded incorrectly in all parts with exception of (b) (i) where he/she managed to explain the term ‘selection’ and in part (a) (i) where he/she gave two advantages of frozen semen as “one bull can serve many cow and it is easy to transport semen than cows.”

## 2.2.8 Question 8: Introduction to Animal Health

The question was composed of two parts (a) and (b) where by candidates were required to: (a) (i) elaborate three physical appearance and two morphological conditions that show animal is in a good health (ii) explain briefly five pre-disposing factors of livestock diseases (b) (i) give four importance of keeping animals healthy (ii) explain briefly five preventive measures and three routine management practices that are used to control livestock disease. The question carried twenty (20) marks.

The question was attempted by 62.8 percent of the candidates. Among these candidates, 10.3 percent scored from 2 to 5 marks, 58.3 percent scored from 5.5 to 9 marks, 30.5 percent scored from 9.5 to 15 marks and 0.9 percent scored from 15.5 to 16.5 marks. The general performance of this question was good.

The majority of the candidates who attempted this question responded well. For part (a) (i) the candidates managed to elaborate three physical appearance signs and two morphological conditions that show the animal is in a good



health and in part (a) (ii) the candidates provided correct responses. For part (b) (i), almost all candidates provided the importance of keeping animals healthy. For part (b) (ii), many candidates provided correct preventive measures.

On the other hands, in part (a) (i), some candidates responded incorrectly because they included other signs of the disease that are not morphological such as body temperature, urine colour, and pulse rate. Some candidates failed to provide correct responses because they did not understand the requirements of the question, hence they wrote the appearance of animal when they are sick, example, coat become rough, loss of appetite and animal become dull. For part (a) (ii), most candidates failed to give pre-disposing factors of livestock disease although few candidates provided correct responses. The candidates who failed to give correct responses did not understand the questions and were writing symptoms of the disease instead of pre-disposing factors such as dullness, loss of appetite, colour of urine change and body temperature. In part (b) (ii), the routine management practices that are used to control livestock disease were not mentioned by the candidates. The candidates were mentioning preventive measures such as drenching, vaccination, dipping as routine management practices. Extracts 8.1 and 8.2 are samples of good and poor responses respectively.

### Extract 8.1

8 a) ① Physical appearance Sign: This means that these are signs observed physically, the following are the physical appearance signs that show that the animal is in good health.

① Movement of animal: the healthy animal should move in normal way, and if it moves while it limbs, this indicates ill-health.

(ii) Posture - the healthy animal should have a good posture while standing up or while is sleeping down, so this indicates the health sign to an animal.

(iii) General appearance of an animal: the healthy animal should be gentle, good in manner and docile. This also indicates that the animal has good health and is not excited. This indicates ill-health to an animal.

② Morphological condition: ~~this~~ this means that ~~how~~ how the animal is morphological. The following are the morphological conditions that show that an animal is in good health.

① Visible Mucous membrane: the mucous membrane of a healthy animal must be smooth, pale in colour, elastic. If yellow in colour, this indicates ill-health to an animal.

8.	(i) Skin coat of an animal: the healthy animal must have the skin which is smooth, flat with full of hair and if the skin is not smooth its rough this indicates the ill-health.
	(ii) Pre-disposing factors: these are factors which are inside or outside the animal body which lead to animal to be attacked by disease. The following are the predisposing factors.
	(1) Species of an animal: this means that there is disease which affects certain species of an animal. you may find pigs are affected by certain disease while and the cattle affected by certain disease.
	(ii) Sex of an animal: this also is a pre-disposing factor which means that there are certain diseases which affect certain sex of an animal. For example mastitis it affects female animal which oritis affects the male animal.
	(iii) Age of an animal: this means that disease affects the animal according to their age. For example anemia it most affects calves than adult cattle.

8	<p>(iv) <u>Breeding</u> of an animal. This there's certain disease which affect certain breeding of an animal. For example hereford it affect pig mostly.</p>
	<p>(v) The physiological of animal. This also can lead to the <del>disease</del> animal to be affected by disease. For example</p>
	<p>(ii) <u>Preventive measure</u> this are condition which taken in order to control livestock disease. the following are preventive measure used to control disease in livestock.</p>
	<p>(i) <u>Isolated</u> the animal which are sick from health ones. <del>this</del> this mean that you separate health animal from sick ones.</p>
	<p>b) (i) <u>Healthy animal</u> It grow fast and quiet to reach maturity.</p>
	<p>(ii) <u>Healthy animal</u> does not transmit disease either to other animal or human being.</p>
	<p>(iii) <u>Healthy animal</u> produce maximum product with good quality. For example <del>milk</del> Milk with high milk peak.</p>
	<p>(iv) <u>Healthy animal</u> are <del>decide</del> and have long span to live.</p>



(iii) Imposition of Quarantine: This means you restrict the movement of animal and their thing from or into the area with notifiable disease. Notifiable disease is the disease which must be reported to the government immediately.

(ii) Vaccination: This is the introduction of immunity to the animal body ~~and~~ artificially which later act as antibodies which prevent disease to attack the animal.

(iv) Use of Prophylactic Measure: This means use of drugs to prevent disease to the animal, ~~and~~ this can be done oral through mouth or by injection.

v) Slaughter: This also preventive measure that you isolate sick animal and you slaughter it. This will prevent the spreading of disease.

Routine Management: This also done to control livestock diseases. This means these are ~~require~~ requirements given to an animal daily. The following are the routine Management which control livestock disease.

① Proper Feeding and Nutrition: This means that if the animal is properly fed at correct amount of feed and with nutrition.

	Feed this will enable it to be resistance to the disease.
	(i) Proper breeding and Selection: If you want to breed and to select you have to select the animal who is resistant to disease.
	(ii) Proper housing and hygiene: the house of animal must be clean, with good ventilation, proper drainage, enough space for movement of animal, and leak proof to prevent animal from sun and rainfall also the animal itself must be kept clean.

Extract 8.1 shows a sample of a response of a candidate who scored high marks. The candidate wrote correct responses in many part of the question but provided incorrect responses in part (a) (i) and (ii).

#### Extracts 8.2

8.	(a) (i) To elaborate the physical appearance and morphological condition which show that animal is in good health
----	---

8

(a) (i)

- Body conformation -

The body conformation of animal is the one tool to indicate whether the animal is healthy or sick.

(ii) Feeding habit

- Animal with good health tend eat food with out any problem but if the animal is not health (sick) the animal will loss the appetite and it will not feed properly.

(iii) Temperature of the body

- The temperature of the body is also an ~~indiced~~ indicator of animal with good health but if the animal have health problem the temperature will fall or rise than the normal temperature.

(iv) Mucous membrane.

- The ~~health~~ health animal will not give out any ~~mucous~~ mucus from the opening. but if the animal is not health (sick) it mucus tend to discharge from the opening.

(v) Skin or coat.

- The skin or coat of health animal is ~~st~~ slip when some one touch it but if the animal is sick the skin hair will stand, look shine one.

8	(a) (ii)
	(i) Environmental factors.
	(ii) Mechanical factors.
	(iii) Chemical factors.
	(iv) Physical factors.
	(b) <del>important</del> important of keeping health animals
	(i) It increase the production of the animal example milk production, meat, or egg laying
	(ii) It increase the growth rate
	(iii) It increase the resistance to disease.
8	(b) (ii)
	(i) <del>factor</del> Vaccination
	(ii) Strict cleanliness.
	(iii)

Extract 8.2 shows a sample of a response of a candidate who scored low marks. However, the candidate managed to provide one correct point in part (a) and two correct points in parts (b).

### 2.2.9 Question 9: Introduction to Animal Nutrition

The question was composed of four parts (a), (b), (c) and (d) and candidates were required to: (a) (i) state the sources of calcium in animal's feed (ii) explain the effect of feeding insufficient amount of calcium in feeds to the high milking cow (iii) give reason why essential amino acids must be supplied in the animal's diet (b) point out two roles played by each of the following nutrients in farm animal (i) phosphorous (ii) magnesium (iii) vitamin A (c) examine six factors that have to be considered in formulating rations and (d) briefly explain five environmental factors affecting feed intake in ruminants. The question carried twenty (20) marks.



The question was attempted by 35.5 percent of the candidates, of which 2.4 percent scored from 1 to 5 marks for the question, 25.4 percent scored from 6 to 9 marks, 65.1 percent scored from 9.5 to 15 marks and 7.1 percent scored from 15.5 to 18 marks. The general performance of the question was good.

Most of the candidates who attempted this question managed to provide correct responses in parts (a), (b), (c) and (d), for example in part (c), the candidates managed to give correct responses such as “cost of the feed should be considered, availability of feed in the area and nutritive composition of the feed formulated” as factors to be considered in formulating rations.

However, a few candidates failed to give correct factors that have to be considered in formulating rations and factors affecting feed intake in ruminants in parts (c) and (d). Some of the candidates supplied the same answer in different parts as if the question required the same output while it was not. Some provided answers interchangeably for part (c) to part (d) and vice versa. The major reasons for such poor performance might be lack of exposure to the practicals of feed formulation and lack of knowledge on how to formulate feed. Moreover, the factor of “food availability” was supposed to be supplied to the former part, that is part (c) not part (d). Extract 9.1 and 9.2 are samples of good and poor responses respectively.

### Extract 9.1

9	(i) from bone meal
	(ii) from mineral supplied to animal which contain calcium
	(ii) Animal will be affected by Milk fever disease and reduction of milky prodn
	(iii) Why essential amino acid should supplied
	* These is because animal can not produce in its body so should be supplied from the feed
(b)	(i) <u>Phosphorus</u>
	— used in protein formation
	— used in the formation of bone in animal cell
	— used in

9 (b) Magnesium.

- (i) help in metabolic activities of the animal body as cytochrome
- (ii) help also in bone formation of animals

(iii) Vitamin A.

- help in the epithelial formation of animals
- help in normal vision of animals by formation of the retinal pig

e) factor which should be considered

(i) Cost of the feed should be considered,

(ii) Animal requirement there depend of the condition of animal

(iii) types of animal in which feed formulated for

(iv) Environmental condition of area where animal is found,

(v) availability of feed in area

(vi) nutritive composition of the feed formulated,

9	(d) five Environmental factors which affect food intake of the animal.
	(i) Temperature - these affect by the its effect in body metabolic activities in low temperature food intake is high due to the increase in metabolism
	(ii) Rainfall - affect the feed intake due to the effect in the body physiological which in rainfall animal require high amount of food for the generating body temperature
	(iii) Humidity of the atmosphere also affect the body physiological due to the its effects in the temperature loose from the body hence animal require small amount of food,
	(iv) Sun light also affect the intake of the food in ruminant due to the its effect in the loose of water and decrease intake of food
	(v) Wind also affect the uptake of food due to the change
9	In the Metabolic of an animal, which affect the utilization of food in animal.

Extract 9.1 shows a sample of a response of a candidate who scored high marks. The candidate managed to answer correctly in almost all parts except in part (d) where the candidate scored only three factors out of five. The two factors (sunlight and wind) mentioned were wrong.



## Extract 9.2

9.	i/ Source of Calcium
	i/ wandering jew
	ii/ Guatemala grass
	ii/ The animal affected with MILK FEVER
9	a) iii/ Amino acids supplied in the animal diet in order to be used in the formation of protein which help in body repair and growth of the animal.
	b) i/ Roles of phosphorus
	i/ Forming of bone and teeth
	ii/ Help in blood clotting.
	ii/ Roles of magnesium
	i/ Assist in digestion of food.
	ii/ Help in secretion of enzymes.
	iii/ Roles of vitamin A
	i/ It used in vision of the animal eyes
	ii/ It help in blood clotting.
	c) i/ physiological condition of animal. In formulating ration should consider physiological condition for example the animal is sick, pregnant
	ii/ Age. In formulating young animal and matured animal ration age are considered because young animal cannot digest lignin and cellulose well as matured one.
	iii/ Animal species. Some species of animal is not specific to the type of food so animal species

9. Should be Considered.

i/ physical activities. Animal which used in farm for example oxen should have a ration which it differ with animal which not used in the farm.

ii/ Environmental factor. Animal which found in the desert should have ration which differ with the animal which found in tropical condition for example should contain enough water.

iii/ Purpose of the food. in formulating a ration should know its purpose if it for egg production or milk production.

iv/ physical activities. when animal used in the farm should consume large amount of feed.

v/ Climatic factor. when found in the environmental which is cold

9.	should take large amount of food.
	iii) palatability of the feed, animal
	consume more if feed reach in palatable
	iv) Nutritive value of the feed, when
	feed contain high nutrient it how
	animal consume (intake)
	v) Availability of the feed, animal
	.. low intake feed according to the
	availability of food.

Extract 9.2 shows a sample of a response of a candidate who scored low marks. The candidate answered correctly only part (a) (iii) by stating the type of the disease caused by feeding a high milking cow a feed that is deficiency in calcium, the answer is milk fever. In part (b) the candidate was able to state correctly the roles of the three mineral elements given and in part (c) (iv) he/she stated the factors to consider in food formulation.

### 2.2.10 Question 10: Pasture Agronomy

The question was composed of three major parts (a) (b) and (c). In the question candidates were required to: (a) (i) examine five advantages of establishing improved pastures (ii) account for four reasons that make natural grasslands generally to be of low feeding value (b) state six criteria to be used in selecting grasses for establishing pastures (c) briefly describe the given grazing methods as ways of managing pastures including (i) continuous grazing (ii) zero grazing (iii) deferred grazing (iv) rotational grazing and (v) strip grazing. The question carried twenty (20) marks.

The question was attempted by 94.9 percent of the candidates and the performance was good. Among the candidates who attempted the question, 3.3 percent scored from 3 to 5 marks, 42.1 percent scored from 5 to 9 marks, 53.7 percent scored from 9.5 to 15 marks and 0.9 percent scored from 15.5 to 17.5 marks.

The majority of the candidates who attempted this question managed to give correct responses. The performance in part (a) and (b) of the question was good as some candidates

gave correct responses although some candidates provided brief responses, for example, compatibility, adaptability, nutrient content and establishment although the question required them to elaborate the responses. In part (c) (i) continuous grazing (ii) zero grazing, (iv) rotational grazing were well elaborated by the candidates. In part (a) (i), the candidates gave very brief responses contrary to the demands of the question that required them to elaborate in detail. Their responses were such as improve soil fertility, control erosion and control weeds. Part (a) (ii), was poorly answered by few candidates who failed to understand the demands of the question. Item (iii) deferred grazing and (v) strip grazing were poorly answered by the candidates who confused the two items with “tethering” and so failed to meet the demands of the question based on the two items. Extracts 10.1 and 10.2 are samples of good and poor responses respectively.

#### Extract 10.1

10/9/01	(i) Established pasture help to supply
	the <del>for</del> forage of ar feed livestock
	in large quantity and in required to
	mpartition
	(ii) Improved pasture help to
	control livestock disease, which <del>can</del>
	transmitted by parasites as it is
	highly managed
	(iii) Help to supply maximize



10 (a) the livestock production

(i) Improved pasture involves ~~at~~ leguminous mixture with grasses which aid in nutrients availability in the soil such as nitrogen in the soil.

(ii) It make the maximum availability of pasture throughout the year that there is no shortage of pasture in the throughout the year hence improve production.

10 (a) (i) (i) It is dominated mostly by grasses which have ~~low~~ low nutritive value, as there is no mixture with legumes.

(ii) The grasses contain only fibre while the animals needs both fibres and concentrates. That make it to be of low feeding value.

(iii) Grasses sometimes become dry in the different season of the year hence don't supply nutrients to animals as it required.

(iv) Grasses can grow even in the area where the soil has no ~~nutrients~~ ~~and~~ ~~nutrients~~ ~~that~~ ~~grasses~~ ~~can~~ ~~be~~ ~~of~~ ~~low~~ ~~nutritive~~ ~~value~~ ~~contents~~.

10 (b) (i) Grasses should be one with good regeneration soon after cut or grazed by livestock in the pasture land.

10 (C) (iii) They should be ~~go~~ the one which grow to the relative good height so that to make easy harvesting as well as for livestock to be grazing on it.

(iii) Grasses should be palatable to livestock; that they must be the one which are very palatable to livestock.

(iv) Productivity - The grasses should be the type which have high production as per harvest or as it grazed by livestock.

(v) Nutritive value - The grasses should be the one which have high nutritive value hence leads to ~~well~~ high production of live stock.

(vi) It should be grow faster and mature for short time; this should be ~~go~~ considered when selecting grasses to be grown in the field.

10 (C) (i) Continuous grazing - Is a grazing method where by livestock are grazed on the same area continuously. That livestock ~~go~~ sent to ~~to~~ grazed on the same area day by day.

(ii) Zero grazing - Is the method of grazing where by livestock are confined in the house or shed and



10	(C) (ii) both feed and water are supplied there. That animals are not allowed to go outside for grazing.
	(iii) Deferred grazing - Is the method of grazing in which an area is selected and managed for to pasture harvesting. That the area is conserved for the purpose of harvesting pasture for feeding animals.
	(iv) Rotational grazing - Is the method of grazing in which animals are grazed in the pasture land which is divided into paddock. That animals are <del>grazed</del> allowed to graze on one paddock after another paddock.
	(v) Strip grazing - Is the method of grazing in which animals are controlled by strip of wire, that animals are controlled low voltage electric wire hence aid in good pasture management.

Extract 10.1 shows a sample of a response of a candidate who scored high marks. The candidate managed to answer all parts though there were some incorrectness.

### Extract 10.2

- 10 (i)
- i) To solve the problem of the pasture scarcity
  - ii) To increasing the animal productivity
  - iii) To produce the pasture which nature friendly for feeding a livestock
  - iv) To produce the pasture with the high nutritive value
  - v) To produce the pasture which is strongly resistance in pest and diseases
- 10 (ii)
- i) Natural grassland have low nutritive value
  - ii) Natural grassland are highly affected by pest and diseases
  - iii) Natural grassland have low palatability value
  - iv) Natural grassland are very scarcity in



(ii).

10 iv/ in draught condition so it depend on the environmental condition.

(b)

ii Age of the pasture → The pasture should not mature completely because in the maturity the palatability of the pasture decrease.

iii Time of harvesting - It is suitable to harvest pasture during the day because at night the pasture is more succulent

iii/ Seasonal of harvesting → It is valuable to harvesting pasture during the dry season because at the wet season pasture it may decompose.

iv/ Type of the pasture → If you want to prepare hay the grass pasture is more suitable than the legume pasture

v/ Rate of decomposition → The pasture should partially decompose if it silage but if it is hay should not decompose.

10	
C	
i)	<u>Continuous grazing</u> → This is the method of grazing where by an animal is allowed to move freely in the field.
ii)	<u>Zero grazing</u> → This is the system of grazing where by an animal keep in a <del>hatted</del> and stall feeding
iii)	<u>Deferred grazing</u> → This is the system of certain a side to grazing and another to be grazing at a later to allow maximum grow of the pasture.
iv)	<u>Rotational grazing</u> → This is the method of grazing where by animal graze in alternation within the space of land by paddocking
v)	<u>Strip grazing</u> → This is the method of grazing in which an animal tied with the rope and allowed to graze

Extract 10.2 shows a sample of a response of a candidate who scored low marks. In part (a), the candidate stated only few correct points. In part (c), the candidate simply gave definitions of the methods of grazing instead of describing them as the question demanded.

## **2.3 134/3 AGRICULTURE 3**

### **2.3.1 Question 1: Agricultural Engineering and Land Planning and Soil Science**

The question consisted of two parts (a) and (b). In part (a) candidates were provided with sample A-sand soil, B-loam soil, and C-clay soil. The candidates were required to conduct the experiment and observe for 20 minutes and record the results of the observation in the table from it there were questions which demanded candidates to (i) suggest the aim of the experiment they have conducted (ii) identify each of the specimens A, B and C and give reasons for their identifications (iii) suggest from the observation in the experiment, which soil sample is considered to be the most suitable for crop production and give reasons (iv) suggest from the experiment, the soil sample which is to be considered to be least suitable for crop production. And with reasons, to suggest the agronomic practices to be taken in order to improve the soil so that it suits for crop production. In part (b), candidates were provided with specimens D (piston), E (disc of disc plough), F (file) and G (tractor fan belt). This part of question demanded the candidates to: (i) briefly explain how specimen D operates during intake stroke and compression stroke in a four stroke engine (ii) state the use of specimen E and briefly explain three ways of maintaining the specimen (iii) state five precautions to be observed when using specimen F (iv) explain briefly the effects of not having specimen G in water cooled engine and state how the specimen can be maintained. The question carried twenty (20) marks.

The question was attempted by 98.9 percent of the candidates, of which 16.2 percent scored from 4.5 to 9 marks, 61.3 percent scored from 9.5 to 15 marks and 22.5 percent scored from 15.5 to 19.5 marks. The performance of the candidates in this question was good.

The majority of the candidates performed well in part (a) (ii), (iii) and (iv). However, a few candidates did not know the least soil sample for crop production; some suggested clays as the least since it hold more water. The candidates failed to state the five precautions to be observed when using specimen F (file) as required in part (b). Extracts 1.1 and 1.2 are sample of good and poor responses respectively.

### Extract 1.1

1. (c)				
Soil Sample	Volume of water added	Rate of infiltration	Amount of water retained in the soil	
A	$100\text{ cm}^3$	$3.75\text{ cm}^3/\text{minute}$	$25\text{ cm}^3$	
B	$100\text{ cm}^3$	$3.1\text{ cm}^3/\text{minute}$	$38\text{ cm}^3$	
C	$100\text{ cm}^3$	$2.5\text{ cm}^3/\text{minute}$	$50\text{ cm}^3$	

(i) The aim of experiment is to measure rate of infiltration in different types of soil.

(ii) Specimen A → Sand soil because have higher infiltration rate than specimen B and C which is  $3.75\text{ cm}^3/\text{minute}$

Specimen B - Loam soil because have moderate infiltration rate between A and C which is  $3.1\text{ cm}^3/\text{minute}$

Specimen C is Clay soil because - have low infiltration rate ( $2.5\text{ cm}^3/\text{minute}$ )



1 a(iii) Soil sample B (Loam soil) is most-suitable for crop production because have moderate infiltrate rate, moderate water holding capacity.  
→ More fertile.  
- Allow aeration moderately.

(iv) Least suitable soil sample for crop production is sample A (Sand soil) because:-  
- Have high infiltration rate. Hence loose water easily so may be faced by drought condition.  
- Poor fertility. Sand soil is less fertile because there is no microbial activities to decompose organic matter.  
- Low water holding capacity. They become wet easily and dry easily.

Agronomic practices to be taken to -  
make it productive.

1) Addition of Manure and fertilizers to make it nutritive to plant.

1 (b)(i)

During intake specimen (Piston) move from top dead centre to bottom dead centre intake valves opens to allow mixture of fuel and air to enter while exhaust valves remain closed. Inlet valves allows air only - in diesel engine but in petrol allow - mixture of fuel and air.

Compression stroke.

The specimen (Piston) move from bottom dead centre to top dead centre and compress the mixture of air and fuel or petrol engine of air only in diesel engine. The compression occur in a combustion chamber where both inlet and outlet valves are closed.

(ii) specimen (E) disc or disc plough is used to cut, turn and invert furrows.

Maintenance of specimen E

1) Clean the specimen after use. This involves removal of muds from the specimen before storage.

2) Apply oil to avoid rust. Rust may make the specimen less efficient and break easily.

3) Sharpen the specimen using file when become brittle to make it efficient for cutting.



1 (b)(i)

During intake specimen D (Piston) move from top dead centre to bottom dead centre intake valves opens to allow mixture of fuel and air to enter while exhaust valves remain closed. Inlet valves allows air only - in diesel engine but in petrol allow - mixture of fuel and air.

Compression stroke.

The specimen D (Piston) move from bottom dead centre to top dead centre and compress the mixture of air and fuel or in petrol engine of air only in diesel engine. The compression occur in a combustion chamber where both inlet and outlet valves are closed.

(ii) specimen (E) disc or disc plough is used to cut, turn and invert furrows.

Maintenance of specimen E

1) Clean the specimen after use. This involves removal of muds from the specimen before storage.

2) Apply oil to avoid rust. Rust may make the specimen less efficient and broke easily.

(3) Sharpen the specimen using file when become brittle to make it efficient for cutting.

1	6(iii)
	(1) Don't apply oil to specimen f because it reduce surface tension.
	(2) Make sure you wash with brush - wire to make it efficient.
	(3) Don't handle many specimens at once - <del>be</del> to avoid breakage of handles.
	(4) Store the specimen in a dry are a to avoid rust.
	(5) Replace broken handles.
	(iv) Effect of not having specimen G in water cooled engine is that. Engine become overheated. Because without specimen G (fern belt) the fern can't be driven hence water can't be cooled so engine get heat and water become unable to cool because water also got heat hence - engine fail due to overheating.
	Maintainance of specimen G (fern belt)
	(1) Replace the specimen (fern belt) when - become too old.

Extract 1.1 shows a sample of a response of a candidate who scored high marks. The candidate provided correct responses in part (a) (i), (ii), (iii) and (iv) except in part (a) (i) where the candidate provide only one correct response.



### Extract 1.2

11b i/ Specimen D - Piston.

uses of the piston during power stroke intake and compression stroke in four stroke engine.

Piston during ~~int~~ intake of stroke piston move from the Top dead centre to the ~~po~~ Bottom dead centre and the inlet valve open and During compression stroke the piston compresses fuel and air mixture into the compression chamber whereby the inlet and out let valve are closed.

ii/ Specimen E Disc of ~~disc plough~~ disc plough.

→ It is used to plough the area where has hard soil and have thick ~~veg~~ vegetation where the disc harrow can not work.

Maintenance ways of disc of disc plough.

(i) Oiling:- This is rotary part there fore must be oiled to avoid friction.

(ii) Lubrication:- To avoid wearing and tearing.

(iii) Should be well tightened in order to work efficiently in hard soil pan.

iv) Should be operated at recommended work.

16)iii) Five precaution to be ~~used~~ observed when using specimen F

Ans

Specimen F is file.

→ Used for sharpening the farm tools such as axe, knife and hoes.

Precaution used or need to operate specimen F are

i) Protect it from contact with water or moisture to avoid ~~so~~ rust.

ii) Must be kept far from the children in order to avoid damage of ~~and it~~.

iii) Put in the place it self to avoid the damage of its edges.

iv) Use properly when using it to the directed way in order to ~~can~~ prevent

v) Arrange properly when arranging tools after being used.

16)iv) Effect of not having the specimen G in water cooling system (engine) and to state ~~the~~ how the specimen can be maintained

1(a)				
	Soil sample	Volume of water added	Rate of infiltration (minette)	Amount of water retained in the soil.
	A	100 cm <sup>3</sup>	20 <del>second</del>	18 cm <sup>3</sup>
	B	100 cm <sup>3</sup>	20	16 cm <sup>3</sup>
	C	100 cm <sup>3</sup>	20	98 cm <sup>3</sup>

a(i) Aims of the experiment is to determine the types of soil sample.

ii) Specimen

A - Sand soil

B = ~~loam~~ soil clay soil

C = ~~clay~~ soil loam soil.

iii) Specimen A - is sand soil because have poor water holding capacity.

- It is ~~very~~ very porous.

- Water pass at very ~~low~~ high rate because it take a short time.

Specimen B - is clay soil because have high water holding capacity.

Specimen C - is ~~loam~~ soil because have moderate water holding capacity.







### 2.3.2 Question 2: Crop Science and Production

The question was composed of four parts (a), (b), (c) and (d) and the candidates were provided with the specimen, (H) 2, 4-D, (I)-Couch grass, (J)-Potato leaf infected with late blight, (K)-Mango seed weevil, (L)-Army worm, (M) Tomato plant loosely tied up with a stake. Candidates were required to: (a) (i) briefly explain four important precautions to be taken when using specimen H (ii) explain why is specimen I difficult to control by cultivation especially when it appears in long-term crops, (b) (i) name the disease affecting specimen J and its causative agent, (ii) state two major observable symptoms of the disease in specimen J, (iii) suggest four measures to be taken to control the disease in specimen J, (c) (i) explain briefly how specimen K gets inside its host seed, (ii) state the damage caused by specimen K on its host, (iii) briefly explain why the control of specimen L is difficult, (iv) name management measures used to control specimen L, (d) describe briefly how field management practice in specimen M is carried out and what is the importance of management husbandry practice in specimen M? The question carried fifteen (15) marks.

The question was attempted by 98.9 percent of the candidates. Among these candidates, 13.4 percent scored from 2 to 5 marks, 57.3 percent scored from 5.5 to 9 marks and 29.3 percent scored from 9.5 to 13 marks.

The majority of the candidates who attempted this question managed to give correct responses based on the demand of the question. However, a few of the candidates failed to respond correctly in part (a) (ii) concerned with difficult of controlling specimen I. Moreover, candidates who performed poorly in this question in part (c) (i) and (ii) a candidates failed to explain how specimen K gets inside its host seed and to state the damage caused by specimen K on its host. In part (c) (iii), the candidates failed to explain correctly why the control of specimen L is difficult. Extracts 2.1 and 2.2 are samples of fairly good and poor responses respectively.

## Extract 2.1

2(a) (i) The following are important precautions to be taken when using Specimen H. Specimen H is 2,4-D herbicide. Its trade name is Fernesta or Fernime or phendeter.

Precautions:

(i) Read all manufacturers instructions written or labeled on the containers containing 2,4-D herbicide.

(ii) Wear protective clothes like Overall, long shirt, mask, boots and gloves during applying in the farm.

(iii) Do not suckle the nozzle when blockage to avoid inhalation of such herbicide.

(iv) During spraying the farmer should avoid smoking, eating during spraying the chemicals.

(ii) Specimen I which is couch grass is difficult to control by cultivation especially when it appears in long-term crops because it has underground structure like rhizomes which are more deep into the soil hence during cultivation the rhizomes are remained within the soil, hence emerge during rainy.

2(b) (i) The following is the disease affecting Specimen J which is Irish potato and its control.

2(b)	(i) The disease is Irish potato <del>leaf</del> leaves affected <del>to</del> by a <u>Late blight</u> .
	(ii) The major observable symptoms of the disease in Specimen J.
	(i) The leaves appear like scotching
	(ii) Withering and drying of the leaves.
2(b)	(iii) The following are measures to control the disease in Specimen J.
	(i) Use resistant varieties example Banga potato.
	(ii) Use of chemicals such as Metulaxy or mancozeb.
	(iii) Uproot and burn the infected crop plant.
	(iv) Crop rotation during land cultivation and planting.
2(c)	(i) The following is the way in which Specimen K gets inside the fruit seed.
	Specimen K is mango seed weevil <u>Aemnochetus mangiferae</u> .
	Adult is a dark in colour, the female adult <del>lar</del> deposits the eggs into the skin of developing mango fruit. After few days the eggs hatch into larvae which <del>gone</del> bore into the mango fruit. The larvae bore the seed and lead to the



2(c) (i) head white area inside the mummy fruits; hence the adults emerge and when fruit fall, the adults come out and start to deposit the eggs again.

(11). The damage caused by specimen K on the herb is

(1) It bore the mango seed and fruit which lead to the developing of hard white even inside the mango fruit.

(iii) The control of Specimen L is difficult because Specimen L which is army worm & the larvae produced are large in number occur occur as army and when the larvae emerge they bite make the big rows, and due to the ability of flying from for an favourable condition to favour the condition like in wet condition here the female lay many eggs on the leaves.

(iv) The following are management measures are used to control Specimen L. There are

① By ploughing and harrowing the grasses because most larvae of army worms - feed on grasses.

(11) Crop rotation. The ~~as cereal~~ crops such as maize, sorghum, millet should not be planted to the ~~area~~ where there is outbreak of army worm. Instead the



2(c) (i) broad leaves like Lenten's comes  
(ii) m and pig weed should be planted  
because army worm does not eat broad  
leaves much as narrow grass leaves.

(iii) Report the official of Ministry of  
Agriculture, if there is out break of army  
worm because are more destructive.

(iv) Use of pesticides to control the army  
worm by spraying.

2(d) Field management practice in specimen  
M is carried out by the following:

(i) Specimen M which is a Tomato plant  
is tied loosely with a stake. The staking  
in tomato is done by taking 2 the  
stick which have 2m, then firmly the  
stick into the soil. This is done before  
planting. Flowering, few day after the  
transplantation of tomato plant from the  
nursery into the seed bed... seed bed/field.  
Then to tie.

Then the tomato plant is tied with to  
gether with stick by using rope but the  
farmer should avoid tight tighten the  
rope very firm. This will cause damage.

2(c)	To the tre-tied plant should remain lately.
	The importance of management husbandry practice in specimen M is to provide strong support of the plant so that to produ- ce more fruits and to prevent the fruits from being attacked the soil, which will lead blossom and not disease in tomato.

Extract 2.1 shows a sample of a response of a candidate who scored high marks. The candidate responded correctly in part (a) (i) and (ii) but failed to respond correctly in part (b) (i) and (c) (iv).

## Extract 2.2

2.

@ (i). Importance precautions to be taken when using Specimen H.

i). Use the required dose in application.

ii). Wear protective clothes when you are working with Specimen H in the farm.

iii). Don't put the containers in the water channel or source of water.

iv). Don't drink or eat any thing when you are in application of Specimen H in the farm.

(ii). - Specimen J difficult to control by cultivation because it has rhizomes roots which are grow again after cutting in the soil.

b

i). Late blight disease.

Causative agent is FUNGI especially Phytophthora spp.

2

b.

i). Observable symptoms of the diseases in specimen 'J'.

i). Leaf yellowing.

ii). Yellow spot on the leaves.

ii). Control measures.

i). Planting the resistance varieties.

ii). Timely planting.

c.

i). Specimen K gets inside its host seed through the fruits of the plant and finally to the seed of the fruit.

ii). Damage caused by specimen K on its host is boring the fruit and destruction of the fruit seed.

iii). Control of specimen L is difficult because it has high reproductive potential when they are in the field.



2	
c.	
iv/	Management measures which are used to control specimen L are.
	i2. Use of insecticides.
	ii2. Biological control method by introducing bird in the field.
d/	
	• Field management of practice in specimen M is carried out by clipping the stick in the soil and tie the plant with it.
	• Importance of management husbandry practice in specimen M is to provide support of growing of the plant when it starts in provision of fruits.

Extract 2.2 shows a sample of a response of a candidate who scored low marks. In part (a), (c) (i), (ii), (iii) and (d) the candidate failed to give correct responses.

### 2.3.3 Question 3: Animal Science and Production

The question was composed of four parts (a), (b), (c) and (c). The candidates were required to: in part (a) (i) comment on the utilization of specimen N (Guinea grass), (ii) explain why specimen O (Stylo) is unpalatable to animals (iii) state two useful properties of specimen O (b) (i) briefly explain why specimen P (Cotton seed cake) when used for poultry it has to be supplemented by animal protein (ii) explain why specimen Q (Straw grass) cannot be used as major ration component for high producing animals (c) state the use of specimen R (Cow's artificial vagina) and S (Gun/pipette) and briefly explain the mechanism of functioning of each

specimen in cattle (d) (i) identify two observable symptoms for the occurrence of disease in the specimen T (Cow milk affected by mastitis) (d) (ii) name the disease in specimen T (Cow milk affected by mastitis) and one specie of the disease causing organism (d) (iii) suggest two control measures for the disease in the specimen T (Cow milk affected by mastitis). The question carried fifteen (15) marks.

The question was attempted by 98.9 percent of the candidates. Among these candidates, 28.5 percent scored from 2 to 5, 68.7 percent scored from 5.5 to 9 marks and 2.8 percent scored from 9.5 to 12 marks. The general performance of the candidates in this question was good.

The majority of the candidates were able to answer correctly part (a) (i). In part (c) of the question every candidate had something correct to write because they had knowledge on the topic. In part (d) (i) many candidates answered correctly although a few mentioned about the symptoms on the udder and not that which were observed in the specimen. In part (d), almost every candidate answered correctly all parts.

On the other hand, the candidates who scored low marks in this question could not answer correctly all the parts. In part (a) (ii), they answered that the specimen O is usually unpalatable to animals because the plant has hairy which is incorrect. In part (a) (iii), most of the candidates did not know the useful properties of specimen O that the plant is a leguminous plant therefore it was expected to add nitrogen to the soil and not as they were convinced to write it control soil erosion which any other plant could do. In part (b) (i), very few candidates were able to answer this part correctly. Probably lack of understanding of the requirement of question made them so. Many of them thought the need of the question was to mention the anti-nutritional factor which is found in cotton seed cake while the demand of the question was to mention amino acid and calcium. In part (b) (ii), only a few candidates were able to mention about the amount of nutrients in the feed (straw grass) and its ability to be digested. Extracts 3.1 and 3.2 are sample of good and poor candidates' responses respectively.

### Extract 3.1

3	IDENTIFICATION OF SPECIMENS
	N = Guinea grass
	O = Stylo
	P = Cotton seedcake
	Q = Grass straw
	R = Artificial vagina
	S = Artificial insemination syringe
	T = Milk affected by mastitis
a(i)	Specimen N can be utilized directly by grazing the animals on it or it can be conserved as a hay or silage for future use. It contains much

Carbohydrate and high crude fibre.

(ii) This is because it contains high amount of unrequired chemicals, water and hence cause bloating.

(iii) - Adding Nitrogen into the soil because contains Nitrogen bacteria in its nodules in roots  
- Contains high amount of protein and TDN (Total digestible nutrients).

(b) This is because it contains 30-45% of protein only and contains mainly lysine and methionine amino acids, therefore other type of amino acids should be supplied from animal protein, this ~~lowers~~ <sup>increases</sup> hatchability.

(ii) This is specimen Q (grass straw) containing high crude fibre that lowers digestibility because of cellulose, hemicellulose, lignin and pectin, therefore when used as the major component of ration an animal will lack large amount of Total Digestible Nutrients (TDN).

(c) The use of specimens R and S and their mechanisms

Specimen R (Artificial vagina)

- for collecting sperms from a desired bulls that are used for artificial insemination.



### Mechanism of Specimen R

Specimen R contains a soft rubber inside and a continuous circulation of warm water and a graduated test tube at the end. When the bull mounts on the cow, the penis is diverted by the inseminator into specimen R (artificial vagina) and after a bull has ejaculated the sperms (semen) collect into the test tube. They are stored in liquid nitrogen at  $-196^{\circ}\text{C}$  for many days.

### Specimen S (disposable syringe)

Is used to introduce the semen into the cow or female animal reproductive system during artificial insemination.

### Mechanism

The paypets containing sperms (semen) are attached to specimen S and the hands of the inseminator locate the cervix (harder part) and one hand directs the syringe and when reaches the point where the uterus open to the cervix the semen is released by pushing on the back of the specimen S.

d①	- The milk contains pus, blood spots and clots - The milk turns watery.
②	Disease — MASTITIS
	Species — streptococcus species - staphylococcus species
③	Maintain hygiene - Use antibiotics

Extract 3.1 shows a sample of a response of a candidate who scored high marks. The candidate managed to respond correctly almost all parts of the question except part (a) (ii) where he/she failed to explain correctly the useful properties of specimen O (stylo).

### Extract 3.2

3@	N — Guinea grass
	O — stylo
	P — Cotton seed cake
	Q — Grass straws
	R — Artificial vagina
	S — inseminating gun or pipette
	T — milk affected with mastitis
3@ (i)	The guinea grass is being utilized by application of fertilizer to the pasture land, provide water point on the pasture land as well as controlling pest and disease so as to obtain the maximum yield and with high quality for feeding the animal.
3@ (ii) @	Add nitrogen into the soil because it contains the bacterial on its root nodules which fix atmospheric nitrogen into combined form.
(b)	It is very palatable to the animal as it is mostly preferred by animals.



Engineering and Land Planning and Soil Science (97.70%), Crop Science and Production (90.90%), Animal Science and Production (79.50%). The candidates' performance in each topic is summarized in the attached Appendix.

According to analysis, a topic was classified as poorly performed, averagely performed or well performed if the average number of candidates who scored 30 percent and above was 0-29, 30-49 and 50-100 respectively

Further analysis shows that the topics which were performed poorly were Workshop Technology (00.00%) and Plant Breeding (26.80%). The contributing factors towards poor performance of the candidates in these topics include failure to understand the demands of the questions and lack of subject matter knowledge in the topics.

#### **4 RECOMMENDATIONS**

In order to further improve candidates' performance in the subject, the following are recommended:

- (a) Agriculture workshops and laboratories should be built in all Agriculture biased schools in order to expose the agriculture students to practical skills of the subject.
- (b) Heads of school in the Agriculture biased schools should establish botanical gardens, school farms and other agricultural projects for practical purposes.
- (c) Programmes of having excursions and various study tours to various centres with agriculture activities should be promoted in Agriculture biased schools to be part of students' learning activities.
- (d) Teachers should conduct lessons on practical of agriculture rather than concentrating on theoretical parts only.
- (e) Heads of School should make sure that the syllabus is well and thoroughly covered by the subject teachers.
- (f) Students should prepare themselves well for the examination including putting more effort in English language proficiency.



## APPENDIX

### Students Performance Questionwise 134-AGRICULTURE

S/N	TOPIC	QUESTION NUMBER	PERCENTAGE OF CANDIDATES WHO SCORED AVERAGE OF 30 MARKS AND ABOVE	REMARKS
<b>PAPER 1</b>				
1.	Workshop Technology	1	00.00	Poor
2.	Farm Power	2	57.30	Good
3.	Farm Mechanization and Machinery	3	80.70	Good
4.	Introduction to Irrigation	4	34.80	Average
5.	Farm Structures	5	74.10	Good
6.	Introduction to Soil Chemistry	6	84.70	Good
7.	Introduction to Soil Chemistry and Introduction to Soil Science	7	71.40	Good
8.	Introduction to Agricultural Prices, Agricultural Production Economics and Farm Planning	8	90.10	Good
9.	Introduction to Agricultural Prices and Fundamentals of International Trade	9	73.50	Good
<b>PAPER 2</b>				
10.	Plant Diseases and Crop Pests	1	71.60	Good
11.	Crop Pests and Plant Diseases	2	49.60	Good
12.	Introduction to Weed Science	3	84.30	Good
13.	Plant Breeding	4	26.80	Poor
14.	Plant Diseases	5	69.80	Good

15.	Fundamental and Technological Challenges in Agricultural Development	6	63.60	Good
16.	Livestock Reproduction, Breeding and Improvement	7	75.20	Good
17.	Introduction to Animal Health	8	77.10	Good
18.	Introduction to Animal Nutrition	9	93.70	Good
19.	Pasture Agronomy	10	91.40	Good
<b>PAPER 3</b>				
20.	Agricultural Engineering and Land Planning and Soil Science	1	97.70	Good
21.	Crop Science and Production	2	90.90	Good
22.	Animal Science and Production	3	79.50	Good

