16.0 AGRICULTURE (443)

The year 2007 KCSE Agriculture examination tested a wide range of skills and the candidates' mastery of knowledge in various agricultural concepts, principles and practices as specified in the syllabus. This year's report analyses the performance of the candidates in the three papers paying special attention particularly to the poorly performed questions. The report further gives expected responses of those poorly performed questions and goes further to give advice to both teachers and candidates with the sole purpose of improving future performance in the subject. The Agriculture (443) examination consisted of three individual papers.

Paper 1 (443/1) is a theory paper divided into three sections, **A**, **B** and **C**. ***Section A*** consisted of compulsory short answer questions worth 30 marks, ***Section B*** consisted of questions which were also compulsory and covered applied practices in Agriculture. This was worth 20 marks. ***Section C*** consisted of three (3) essay type questions, from which candidates were to choose and answer two, each worth 20 marks. This paper comprised of questions drawn from ***Crop production, Agricultural economics, Soil science, Introduction to agriculture*** and ***factors influencing agricultural production.*** This paper was marked out of a total of 90 marks.

Paper 2 (443/2) is also a theory paper divided into three sections **A, B** and **C**. ***Section A*** consisted of compulsory short answer questions worth 30 marks. ***Section B*** consisted of questions which were compulsory and covered topics in applied practices in Agriculture and was worth 20 marks. ***Section C*** consisted of three (3) essay questions, from which candidates were to choose two, each of which is worth 20 marks. This paper comprised questions drawn from ***Livestock production and health, Agricultural engineering (covering farm tools and equipment, farm structures, farm power and machinery).*** This paper was also marked out of 90 marks.

Paper 3 (443/3) is a project paper which tests practical skills in livestock rearing and crop production. This paper comprised of two main agricultural projects from which the candidates were expected to select only one of the projects to carry out to completion. The projects given were on ***"Chicken rearing"*** and ***"the production of beans, sorghum or tomatoes".*** The schools in conjunction with the candidates were expected to make the right choice and then prepare materials for the project in good time.

It is worth noting that this was the second year of testing the new syllabus using a completely new format.

16.1 CANDIDATES' GENERAL PERFORMANCE

The table below shows the candidates' performance in the year 2007 KCSE Agriculture examination. Performance statistics for the year 2006 have also been provided for comparison. The candidates who were registered for the examination in the year 2007 was ***121,899*** comprising ***69,074*** males and ***50,825*** females.

Table 19: Candidates Overall Performance in Home Science in the years 2007 and 2006

Year	Paper	Candidature	Maximum Score	Mean Score	Standard Deviation
2006	1		90	32.67	11.99
	2		90	37.53	12.57
	Overall	**107,068**	**180**	**77.56**	**24.00**
2007	1		90	26.94	12.04
	2		90	53.98	16.89
	Overall	**121,193**	**180**	**87.34**	**28.00**

From the table above, the following observations can be made:

16.1.1 The mean score for ***paper 1 (443/1)*** drastically went down from ***32.67*** in the year 2006 to ***26.94*** in the year 2007, while that of ***paper 2 (443/2)*** went up from ***37.53*** in the year 2006 to ***53.98*** in the year 2007.

16.1.2 Candidates' overall performance improved as attested by the subject mean which rose from ***77.56*** in the year 2006 to ***87.34*** in the year 2007, an indication that generally the performance in 2007 was fairly good.

16.1.3 The overall standard deviation for the whole paper also drastically rose from 24.00 to 28.00 indicating that there was a much wider spread of scores around the mean in the year 2007 as compared to the year 2006.

This year's report attempts to analyze the candidates' performance and also to highlight the questions that were poorly performed and give advice to teachers on areas that they can improve in.

16.2 PAPER 1 (443/1)

Question 7

State three functions of boron in crop development.

Weaknesses

Most of the candidates did not respond to this question correctly due to the fact that this part of the syllabus dealing with the roles of micro-nutrients in the soil seemed to have been neglected during teaching.

Expected Responses

- Assists the development of meristematic tissues.
- Facilitates fruit setting.
- Helps in translocation of sugar, nitrogen and phosphorus.
- Facilitates nodule formation in legumes.
- Regulates carbohydrate metabolism.
- Facilitates the absorption of water.
- Facilitates formation of pollen tube.

Advice to Teachers

Teachers are advised not to ignore any part of the syllabus during teaching.

Question 8

Outline **four** observable indicators of economic development of a nation.

Weaknesses

Most of the candidates performed poorly in this question probably due to the fact that this topic was covered in form one (1) and most likely this area was neglected during revision for the examination. Another problem was that most of the candidates did not understand the theme of the question ***"observable indicators"*** hence

the poor performance. Their language competence in responding to the question and content mastery was poor.

Expected Responses

- Improved infrastructure.
- High per capita income/improved living standards.
- Increased recreational facilities.
- More and better social services/amenities provided to citizens.
- Better and efficient production methods and services/improved technology.

Advice to Teachers

Teachers should ensure that the syllabus coverage is thoroughly done and that revision of the covered work should also include form one (1) and two (2) work.

Question 21

The diagrams labelled D and E below are illustrations of coffee established using two different formative pruning systems. Study them and answer the questions that follow.

(a) Name the system of pruning illustrated in diagram D above.

(b) Outline how the pruning system illustrated in diagram E is carried out.

Weaknesses

Majority of candidates found this question to be difficult yet it required only the application of knowledge they had acquired on coffee tree management.

Expected Responses

(a) Single Stem pruning.

(b)

- The main-stem of seedlings is capped to encourage suckers to grow.
- Two or three healthy suckers are selected and allowed to grow while the rest are removed.
- The selected suckers should form a U shape between them to avoid splitting.

Advice to Teachers

Teachers should strive to organize practical activities based on coffee management and farm visits so that such areas of the syllabus are adequately covered.

16.3 PAPER 2 (443/2)

The performance of candidates in this paper was quite satisfactory compared to that of Paper 1 (443/1). This may be attributed to the fact that the candidates seemed to be adequately prepared in livestock production and farm mechanization topics as opposed to crop production and agricultural economics topics. However, the questions discussed here below seemed to have posed some degree of difficulty to the candidates.

Question 3

State two factors that could lead to failure to conceive in sows after service.

Weaknesses

Most candidates confused the factors that could lead to failure of conception with the specific causes of the problem such as disease infection and age of the sow leading to poor performance.

Expected Responses

- Poor nutrition.
- Infertility.
- Poor timing of service.

Advice to Teachers

Teachers are advised to make proper interpretation of the syllabus and try to cover the whole syllabus adequately.

Question 9

State three signs of anthrax infection disease observed in the carcass of cattle.

Weaknesses

Candidates were not adequately prepared for this question as indicated by the fact that they were unable to discern that there is a big difference between symptoms observed on a dead animal and those that appear on a live animal.

Expected Responses

- No rigormotise after death.
- Stomach swells/bloats.
- Darkened red blood oozes through the natural openings/orifices.
- Blood does not clot.

Advice to Teachers

Teachers should as much as possible try to cover the syllabus adequately and provide good practical guidance to the candidates.

Question 12

State **three** adjustments that should be carried out on a tractor - mounted mouldboard plough in preparation for ploughing.

Weaknesses

Students gave wrong and irrelevant responses.

Expected Responses

- Adjust the plough depth.
- Front furrow depth.
- Lowering/raising ploughing patch.
- Front furrow width.

Advice to Teachers

Teachers are advised to emphasize in their teaching areas covering farm power and machinery.

Question 13

(a) Name **four** breeds of dairy goats.
(b) Mention **two** distinguishing characteristics of the Bactrian camel breed.

Weaknesses

Poor performance by a number of candidates in this question was an indication that candidates were not exposed to practical activities and observations through planned visits to farms.

Expected Responses

(a)
- Saanen.
- Toggenburg.
- British Alpine.
- Anglo-Nubian.
- Jamnapari.

(b)
- Two humps.
- Hairy body.
- Absence of trap-nose.

Advice to Teachers

Teachers should be a bit more resourceful in that in the absence of realia they should improvise by using other teaching aids/resources such as photographs and pictures of livestock breed.

Question 16

State **three** maintenance practices that should be carried out on a feed trough.

Weaknesses

Although the question looks quite simple the candidates performed very poorly in it. This is attributed to the fact that they were not exposed to practical activities.

Expected Responses

- Clean regularly.
- Repaint the base if necessary especially wooden troughs.
- Repair cracks on concrete /wooden troughs.
- Replace broken parts.

Advice to Teachers

Teachers should organize and expose candidates to practical activities and also use project work to cover some of these areas.

16.4 PAPER 3 (443/3 – PROJECT)

Paper 3 (443/3) is the Agriculture project paper whose purpose is to provide an opportunity for the candidates to develop their practical skills independently. Here the candidates are tested in practical skills in growing of a selected crop from land preparation to harvesting or rearing selected livestock to maturity. Besides these, the candidates are also exposed to manual skills in construction of items such as beehives, feed troughs and rabbit hutches among others. Occasionally, they may also be exposed to making or preparing of compost manure.

According to the instructions given to schools, the candidates were expected to carry out the project work on their own after the school has provided the necessary inputs required. The project takes eight months, running from February to September of the given year. The agriculture teacher this time was expected to objectively assess and evaluate the entire candidates' work at all stages.

This paper aims at testing the practical skills that the candidates' acquire during the four year period in secondary school. In the year 2007, the candidates had to choose between rearing chicken and either producing beans, sorghum or tomatoes. Most schools chose to grow the crops with beans being the most popular choice.

16.5 GENERAL ADVICE TO TEACHERS

16.5.1 Teachers should make concerted efforts to ensure that the syllabus is adequately and effectively covered. The reason for this is because the questions in the examination will be drawn from all parts of the syllabus ranging from topics covered in form one (1) to those covered in form four (4). No part of the syllabus should be neglected or left out.

16.5.2 It is also important to note that correct interpretations of specific objectives in the syllabus will enhance effective teaching of the respective topics. Teachers should therefore attempt, all the time, to use the syllabus for guidance, rather than using textbooks even if they are recommended as class texts.

16.5.3 Teachers should strive to carry out all suggested practical activities in the syllabus in order to prepare the learners adequately for the examination.

16.5.4 Teachers should also strive to use a variety of teaching methods and resources to effectively deliver the content. In case the teacher feels that a specific topic, from the syllabus, requires a field trip or a visit, it is important that such a trip is arranged to enhance understanding of the topic.

16.5.5 Teachers should assist the candidates to obtain recommended textbooks and purchase also some relevant reference books. And as much as possible candidates should be involved in practicals.

23.14 AGRICULTURE (443)

23.14.1 Agriculture Paper 1 (443/1)

Name.....Index No...../.....

443/1
AGRICULTURE
Paper 1
Oct./Nov. 2007
2 hours

Candidate's Signature.....

Date.....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
AGRICULTURE
Paper 1
2 hours

Write your name and index number in the spaces provided above.
Sign and write the date of examination in the spaces provided above.
This paper consists of three sections: A, B, and C.
Answer ALL the questions in section A and B.
Answer two questions in section C in the spaces provided.

For Examiner's Use Only

Section	Question	Maximum Score	Candidate's Score
A	1 – 16	30	
B	17 – 21	20	
C		20	
		20	
		Total Score	

This paper consists of 16 printed pages

Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.

7061

Turn over

SECTION A (30 marks)

*Answer **ALL** the questions in this section in the spaces provided.*

1 Give **four** conditions of the land which may make it necessary to carry out reclamation practices. (2 marks)

2 List **three** physical weathering agents in the soil formation process. ($1^1/_2$ marks)

3 State **two** mechanical methods of separating soil particles according to size during soil analysis. (1 mark)

4 Give **two** benefits of possessing a Land Title Deed to a farmer. (1 mark)

5 Give **four** advantages of crop rotation. (2 marks)

6 State **four** factors that should be considered when classifying crop pests. (2 marks)

7 State **three** functions of boron in crop development. ($1^1/_2$ marks)

8 Outline **four** observable indicators of economic development of a nation. (2 marks)

9 Give **three** factors that may influence the price of an agricultural commodity. ($1^1/_2$ marks)

10 Name **three** examples of leguminous fodder crops. ($1^1/_2$ marks)

11 Give **two** factors that may determine the size of a pit for silage making. (1 mark)

12 Give **three** reasons for controlling weeds in pastures. ($1^1/_2$ marks)

13 State **six** characteristics of a productive soil. (3 marks)

14 State any **five** qualities that should be considered when selecting seeds for planting. ($2^1/_2$ marks)

15 (a) State **four** practices which encourage soil erosion. (2 marks)

(b) Name **two** forms of gully erosion. (1 mark)

16 (a) State **four** advantages of land consolidation. (2 marks)

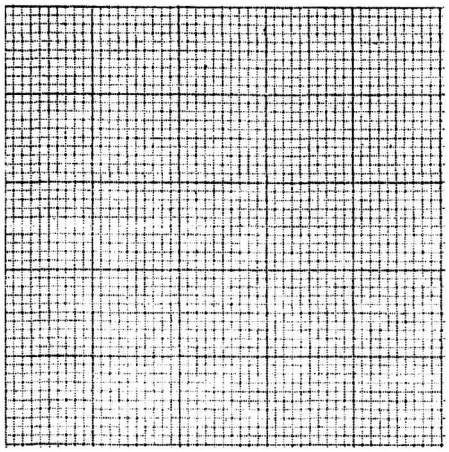
(b) Give **two** advantages of leasehold tenure system in farming. (1 mark)

SECTION B (20 marks)

*Answer **ALL** the questions in this section in the spaces provided.*

17 The table below shows the demand and supply of potatoes at **UKULIMA** market.

Price (Ksh)	Quantity Demanded (in bags)	Quantity Supplied (in bags)
1200	50	250
1000	90	200
800	150	150
600	225	70
400	335	0



(a) Using suitable scales, draw and label a graph showing the relationship between the demand and supply of the potatoes at **UKULIMA** market. (5 marks)

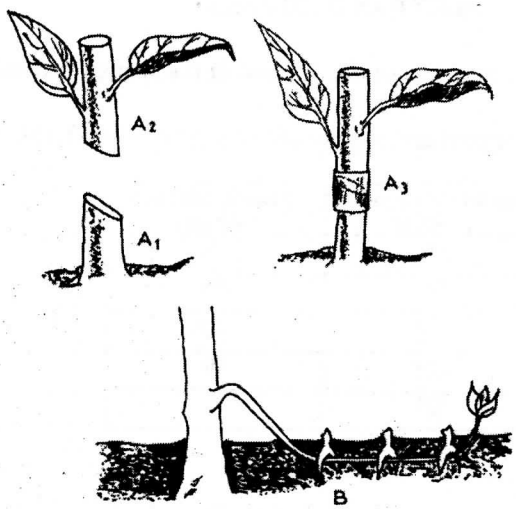
(b) What is the equilibrium price of the potatoes? (1 mark)

(c) From the graph determine:

(i) the number of bags of potatoes that would be bought if the price per bag is Ksh 900/=. (1 mark)

(ii) the price of a bag of potatoes if 180 bags are supplied. (1 mark)

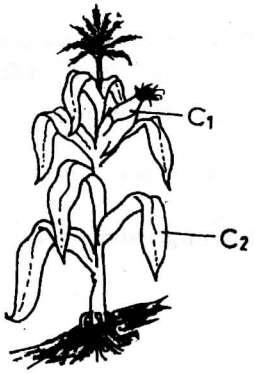
18 The diagrams labelled A_1, A_2, A_3 and B below illustrate materials and methods of vegetative propagation. Study them and answer the questions that follow.



(a) Name the parts labelled A_1 and A_2. (2 marks)

(b) Name the methods of propagation illustrated in diagrams A_3 and B. (2 marks)

19 Study the crop illustrated in the diagram below and answer the questions that follow.



(a) Name **one** insect pest which attacks the part labelled C_1 and **one** disease which attacks the part labelled C_2. (2 marks)

20 A member of Young Farmers' Club was advised to apply a complete fertilizer 30:20:10 in a tomato plot measuring 10m long by 5m wide at the rate of 300kg per hectare.

(a) State the percentage of P_2O_5 in the complete fertilizer. (1 mark)

(b) Calculate the amount of fertilizer the member would require for the plot. (2 marks)
(Show your working)

21 The diagrams labelled D and E below are illustrations of coffee established using two different formative pruning systems. Study them and answer the questions that follow.

(a) Name the system of pruning illustrated in diagram D above. (1 mark)
(b) Outline how the pruning system illustrated in diagram E is carried out. (2 marks)

SECTION C (40 marks)

Answer any TWO questions in this section in the spaces provided after question 24.

22 (a) Describe the field production of irrigated rice under the following sub-headings:

(i) land preparation (7 marks)
(ii) water control. (6 marks)

(b) Describe the management of trees grown under various agro-forestry systems. (7 marks)

23 (a) Describe the problems of marketing of agricultural produce. (10 marks)

(b) Discuss the importance of budgeting in agricultural production. (10 marks)

24 (a) Discuss the importance of irrigation in farming. (12 marks)

(b) Explain the factors that influence the type of irrigation to be used in a farm. (8 marks)

23.14.2 Agriculture Paper 2 (443/3)

Name ..... **Index No**...../.....

443/2
AGRICULTURE
Paper 2
Oct. /Nov. 2007
2 hours

Candidate's Signature .....

Date .....

THE KENYA NATIONAL EXAMINATIONS COUNCIL
Kenya Certificate of Secondary Education
AGRICULTURE
Paper 2
2 hours

INSTRUCTIONS TO CANDIDATES

Write your name and index number in the spaces provided.
Sign and write the date of examination in the spaces provided above.
*This paper consists of **three** sections: **A**, **B** and **C**.*
*Answer **all** the questions in sections **A** and **B**.*
*Answer **two** questions from section **C**.*
*Answers to **ALL** questions **must** be written in this booklet.*

For Examiner's use only

Section	Questions	Maximum Score	Candidate's Score
A	1 - 19	30	
B	20 - 23	20	
C		20	
		20	
		Total Score	

This paper consists of 12 printed pages

Candidates should check the question paper to ascertain that all the pages are printed as indicated and no questions are missing.

SECTION A (30 marks)

*Answer **ALL** the questions in this section in the spaces provided.*

1 Give **two** reasons for using litter in a poultry house. (1 mark)

2 Name **two** diseases of poultry that are controlled by vaccination. (1 mark)

3 State **two** factors that could lead to failure to conceive in sows after service. (1 mark)

4 Give **two** causes of scouring in calves. (1 mark)

5 State **three** factors that would determine the amount of concentrate fed to dairy cattle. ($1\frac{1}{2}$ marks)

6 Give **three** ways of stimulating milk let-down in a dairy cow. ($1\frac{1}{2}$ marks)

7 State **two** reasons for dehorning cattle. (1 mark)

8 List **two** equipment used in handling cattle during an agricultural exhibition. (1 mark)

9 State **three** signs of anthrax infection disease observed in the carcass of cattle. ($1\frac{1}{2}$ marks)

10 Give **three** effects of external parasites that are harmful to livestock. ($1\frac{1}{2}$ marks)

11 State **four** factors to consider when siting a fish pond. (2 marks)

12 State **three** adjustments that should be carried out on a tractor - mounted mouldboard plough in preparation for ploughing. ($1\frac{1}{2}$ marks)

13 (a) Name **four** breeds of dairy goats. (2 marks)

(b) Mention **two** distinguishing characteristics of the Bactrian camel breed. (1 mark)

14 State **five** methods of maintaining good health in livestock. ($2\frac{1}{2}$ marks)

15 List **four** sources of farm power which are environmental friendly. (2 marks)

16 State **three** maintenance practices that should be carried out on a feed trough. ($1\frac{1}{2}$ marks)

17 Name **four** systems of a tractor engine. (2 marks)

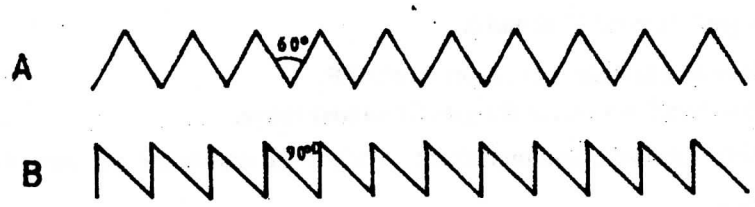
18 List **three** types of calf pens. ($1\frac{1}{2}$ marks)

19 State **four** conditions that would encourage hens to eat eggs in poultry production. (2 marks)

SECTION B (20 marks)

*Answer **ALL** the questions in this section in the spaces provided.*

20. The diagrams labelled **A** and **B** below show the teeth arrangements in hand workshop tools.

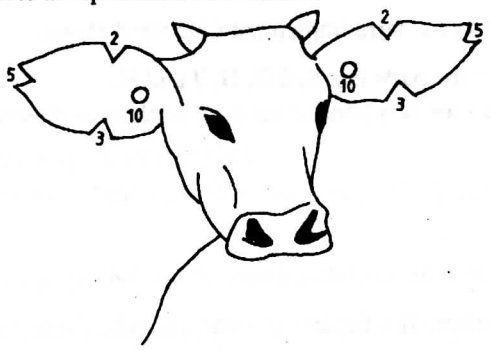


(a) Identify the tools represented with by the teeth arrangements **A** and **B.** (1 mark)

(b) State **one** functional difference between tools represented by the teeth arrangements **A** and **B.** (2 marks)

(c) Give **two** maintenance practices for the tools represented by the teeth arrangements shown above. (2 marks)

21 (a) The diagram below illustrates a method of identification in livestock production. Study the diagram and answer the questions that follow.



(i) Name the type of identification illustrated above. (1 mark)

(ii) Give the identification number of the animal illustrated in the diagram above. (1 mark)

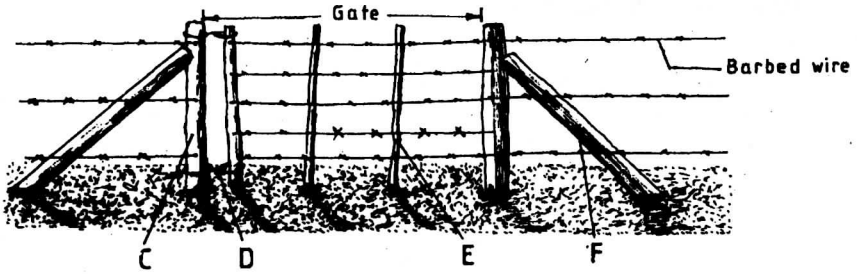
(iii) Using diagrams illustrate how you can identify animals Nos 24 and 36 using the above method. (2 marks)

Animal No. 24

Animal No. 36

(b) If a sow was successfully served on 27th September, 2006, state the date she is likely to have farrowed. (1 mark)

22 The diagram below shows a type of a farm gate. Study the diagram and answer the questions that follow.



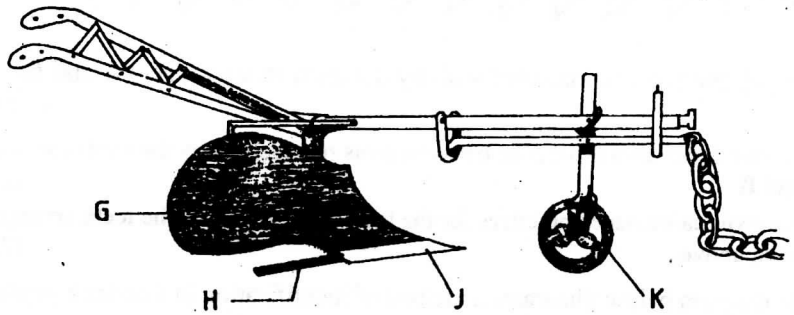
(a) Identify the type of gate shown. ($^1/_2$ mark)

(b) Name the parts labelled **C, D** and **E**. (1½ mark)

(c) (i) State **one** function of the part labelled **F**. (1 mark)

(ii) State **two** functions of the gate illustrated above. (2 marks)

23 The diagram below shows a farm implement. Study it and answer the questions that follow.



(a) Identify the farm implement illustrated above. (1 mark)

(b) Name the parts labelled **G, H, J** and **K**. (2 marks)

(c) State **four** functions of the farm implement illustrated above. (2 marks)

SECTION C (40 marks)

*Answer any **TWO** questions in this section in the spaces provided after question 26.*

24 (a) Describe the advantages of the battery system of rearing layers. (10 marks)

(b) Outline the factors to consider when selecting livestock for breeding. (10 marks)

25 (a) Name the strokes in a four stroke engine and describe how each operates. (12 marks)

(b) Describe the functions of the gear box in a tractor. (8 marks)

26 (a) Name and describe the features of an ideal calf pen. (9 marks)

(b) Discuss pneumonia in calves under the following sub-headings:

(i) predisposing factors (3 marks)

(ii) symptoms (5 marks)

(iii) control measures. (3 marks)

24.14 AGRICULTURE (443)

24.14.1 Agriculture Paper 1 (443/1)

1.
- Swampy / water logged areas.
- Stony ground.
- Steep areas.
- Aridity/dryness.
- Eroded/bare land.
- Tsetse fly infested areas.
- Bushy land.

(Any 4 x $^1/_2$ = 2 marks)

2.
- Wind.
- Glaciation / Ice.
- Temperature.
- Running water.

(Any 3 x $^1/_2$ = $1^1/_2$ marks)

3.
- By mixing soil with water, shaking/stirring and allowing the particles to settle/ sedimentation.
- By the use of a series of sieves with different mesh sizes. *(2 x $^1/_2$ = 1 mark)*

4.
- Minimises land disputes with neighbours/ensures ownership.
- Used as security to obtain loans.
- Encourages the farmer to carry out long term investment on the land.
- The farmer can lawfully lease all or part of the land to earn extra income.

(Any 2 x $^1/_2$ = 1 mark)

5.
- Controls weeds.
- Controls crop pests.
- Controls crop diseases.
- Maximises use of soil nutrients.
- Reduces soil erosion/improves soil structure.
- Improves N – status in the soil, when legumes are included in the programme / maintains soil fertility.

(Any 4 x $^1/_2$ = 2 marks)

6.
- Where the pest is found.
- Feeding habits/types of damage.
- Scientific/biological classification.
- Crop attacked.
- Stage of development of the pest at which it causes damage.
- Stage of growth at which the crop is attacked.
- Part of the crop attacked.

(Any 4 x $^1/_2$ = 2 marks)

7.
- Assists the development of the meristematic tissues.
- Facilitates fruit setting.
- Helps in translocation of sugar, nitrogen and phosphorous.
- Facilitates nodule formation in legumes.
- Regulates carbohydrate metabolism.
- Facilitates the absorption of water.
- Facilitates formation of pollen tubes.

(Any 3 x $^1/_2$ = $1^1/_2$ marks)

8.
- Improved infra-structure.
- High per capita income / improved living standards.
- Increased recreational facilities.
- More and better social services/amenities provided to citizens.

- Better and efficient production methods and services/ improved technology.

(Any 4 x $^1/_2$ = 2 marks)

9.

- Demand for the commodity.
- Supply for the commodity.
- Price of the related commodities.
- Cost of producing the commodity.
- Tastes and preferences for the commodity.

(Any 3 x $^1/_2$ = $1^1/_2$ marks)

10.

- Lucerne/Alfalfa.
- Clover/Kenya white clover/Louisiana white clover/subterranean clover.
- Desmodium/green desmodium /silver leaf desmodium.
- Sunn hemp.
- Calliandra.
- Sesbania.
- Leucaenia.

(Any 3 x $^1/_2$ = $1^1/_2$ marks)

11.

- Number of animals one intends to feed.
- Length of dry season the material is intended to cater for.
- Amount of plant materials available for ensiling.
- Bulkiness of the material.

(Any 2 x $^1/_2$ = 1 mark)

12.

- To ensure higher quality/palatability of forage.
- To ensure higher quantity of foliage.
- Minimises the incidence of poisonous weeds to livestock such as thorn apple.
- Minimises competition for light, water and nutrients.
- Minimises the spread of pests and diseases.
- To minimise the cost of production.
- To minimise spread of disease.

(Any 3 x $^1/_2$ = $1^1/_2$ marks)

13.

- Proper soil depth.
- Well aerated soil.
- Good water holding capacity.
- Adequate supply of plant nutrients.
- Good cation exchange capacity.
- Well drained soil/ good infiltration rate.
- Absence of soil pests/disease/weeds.
- Appropriate soil pH range.

(Any 6 x $^1/_2$ = 3 marks)

14.

- Should have a high germination percentage/ should be viable.
- Should have high vigour.
- Should be free from pests/diseases/ should be healthy.
- Should not have any physical damage.
- Should be clean/physically pure/ not mixed with other impurities.
- Should be uniform in size, colour and shape.

(Any 5 x $^1/_2$ = $2^1/_2$ marks)

15. (a)

- Digging up and down the slope.
- Overstocking/ overgrazing.
- Lack of ground cover/bare land.
- Clean weeding/ deforestation/ burning vegetation.
- Cultivating along river banks.
- Cultivating on steep slopes.
- Over irrigation/ uncontrolled irrigation.

(Any 4 x $^1/_2$ = 2 marks)

(b)

- **V:** shaped gullies.

- **U:** shaped gullies. *(2 x $^1/_2$ = 1 mark)*

16. (a)

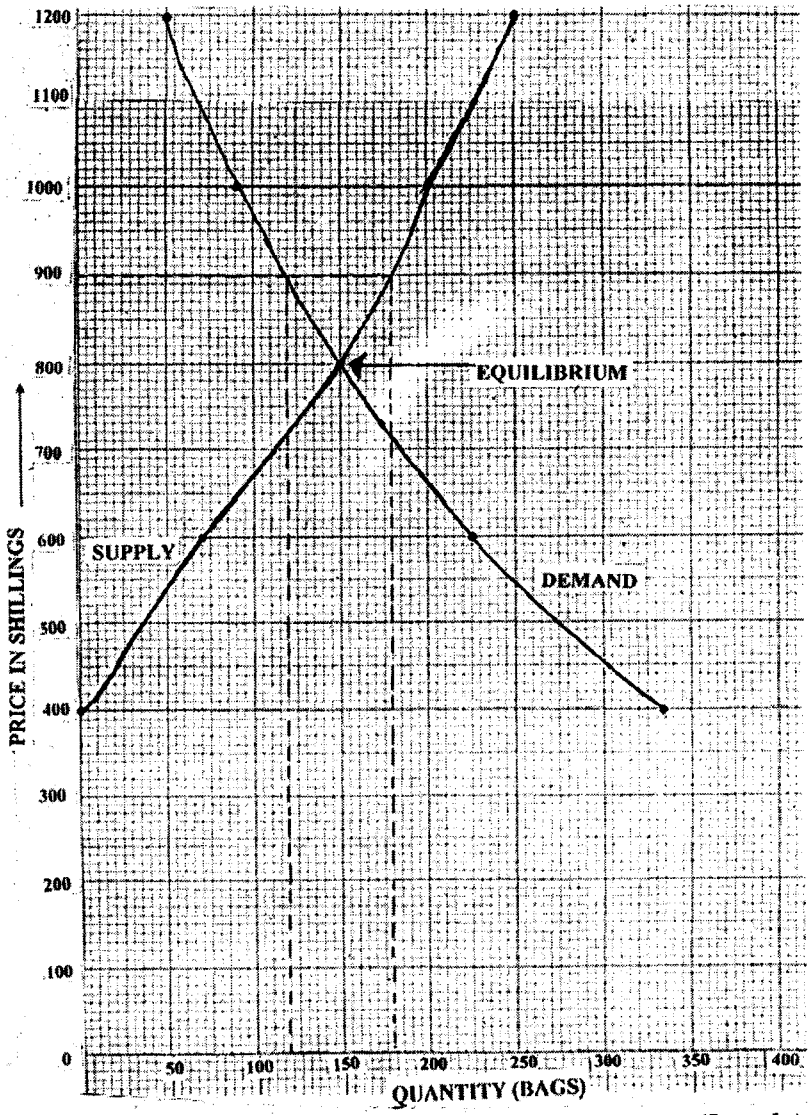
- Good farm planning.
- Rotational programmes can be easily effected.
- Mechanization is possible because the areas are large.
- Cheaper to register the land.
- It saves on farm operations/ cost of operation.
- Agricultural extension officers can easily inspect the whole farm and give advice.
- It encourages the farmers to invest on land / carry out long term projects.
- Ensures effective supervision by the farmers;
- Saves on time spent in movement. *(Any 4 x $^1/_2$ = 2 marks)*

(b)

- Enable the land-owner/landlord to earn income from the land.
- Enables people who have no land to have access to farming land.
- Land that would otherwise be idle is put into productive use.
- Enables the tenant to increase or decrease the acreage of land leased depending on profitability. *(Any 2 x $^1/_2$ = 1 mark)*

17.

(a)



(5 marks)

(b) The equilibrium price of the potatoes is Ksh 800/=. *(1 x 1 = 1 mark)*

(c) (i) 120 bags of potatoes would be bought. *(1 x 1 = 1 mark)*

(ii) The price would be Ksh 900/=. *(1 x 1 = 1 mark)*

18. (a)

- A_1: Root stock. *(1 x 1 = 1 mark)*
- A_2: Scion. *(1 x 1 = 1 mark)*

(b)

- A_3 : Grafting/whip grafting. *(1 mark)*
- **B** : Ground layering/ trench layering. *(Any 1 x 1 = 1 mark)*

19.

- C_1: Maize weevil, Maize stalk borer, Pink bollworm. *(Any 1 x 1 = 1 mark)*
- C_2 : White leaf blight, Maize streak, Rust. *(Any 1 x 1 = 1 mark)*

20. (a) $P_2O_5 = 20\%$ *(1 x 1 = 1 mark)*

(b) 10,000 m^2 require 300 kg fertilizer.

$\therefore$ (10 x 5) m^2 would require $\frac{50 \times 300}{10,000}$

= 1.5kg/1500g fertilizer *(2 marks)*

21. (a) Single stem pruning. *(1 x 1 = 1 mark)*

(b) The mainstream of seedling is capped to encourage suckers to grow. 2 or 3 healthy suckers are selected and allowed to grow while the rest are removed. The selected suckers should form a "U" shape between them to avoid splitting. *(2 x 1 = 2 marks)*

22. (a) (i) ***Land preparation***

- Clear the land.
- Divide the land into plots of 0.4 ha.
- Construct/repair the banks/bunds.
- Construct/repair inlet and outlet channels.
- Flood the field 4 days before rotavation/ digging.
- Flooding should be done until water level is about 7.5 - 10 cm above the soil surface.
- Carry out primary cultivation/ digging/ rotavation.
- Puddle the soil to the required tilth.
- Heap the weeds/trash along the bunds/banks.
- Level the field by dragging a board/use a jembe to obtain a level seedbed. *(Any 7 x 1 = 7 marks)*

(ii) ***Water control***

- Introduce water into the field to a depth of 7.5 – 10 cm before primary cultivation.
- Leave the field submerged for 4 days.
- At the time of transplanting, leave a thin film of water for about 1 week.
- Introduce water gradually into the field as the crop establishes.
- Maintain the water level at $^1/_3$ the height of the crop up to 3 weeks before harvesting.
- Water should be changed every 2-3 weeks or when cold.
- Remove / drain water 3 weeks before harvesting.
- Water should flow slowly through the field. *(Any 6 x 1 = 6 marks)*

(b)

- Regular watering of young seedlings.
- Control of weeds.

- Thinning of young trees and felling of older trees to allow adequate space for growth.
- Pruning of dead wood and branches obstructing access areas.
- Controls of pests.
- Control of diseases.
- Protection against forest fires by digging trenches/clearing land round the farm.
- Construction of structures to protect trees from damage by animals.
- Construction of water micro-catchment structures around the trees.
- Provision of shade and mulch after transplanting.
- Grafting / budding of old trees.
- Application of manure/ fertilizers. ***(Any 7 x 1 = 7 marks)***

23. (a)

- Statutory interference by the Government in agricultural marketing causing artificial shortages.
- Poor training for people involved in marketing leading to heavy losses to farmers.
- Bulkiness of most agricultural produce making transportation difficult and expensive.
- High perishability of most agricultural produce leading to low quality.
- Seasonality of agricultural produce leading to price fluctuations.
- Inadequate storage facilities leading to heavy losses of produce.
- Poor infrastructure leading to high transport costs and spoilage of agricultural produce.
- Change in market demand due to time lag between production and marketing.
- Change of supply of agricultural produce leading to fluctuation of market prices.
- Inadequate market information to farmers leading to selling of farm produce when the prices are low.
- Lack of capital to finance various marketing functions, for example: advertising and transportation.
- Competition with synthetic products leading to loss of market.

(Any 10 x 1 = 10 marks)

(b)

- The farmer can be able to predict the profitability of an enterprise.
- It enables the farmer to detect problems easily so that correction is done in good time before losses are incurred.
- Assists the farmer to make management decisions especially when comparing two alternative projects.
- Helps the farmer in making effective changes in the organisation.
- Ensures a periodic analysis of the farm business.
- Helps in estimating the required production resources such as labour and capital.
- Helps in deciding the viability of an enterprise.
- Assists the farmer when negotiating for agricultural credit.
- Encourages the farmer to be efficient with the aim of meeting the projected targets.
- Helps in controlling various aspects of production in the farm.
- Acts as a record which can be used for the future. ***(10 x 1 = 10 marks)***

24. (a)

- It makes it possible for crops to be produced during the dry season.
- It makes it possible to reclaim land for agricultural production.
- It supplements rainfall in crop production.
- Sustains proper growth of crops which require plenty of water, for example: rice.
- Creates favourable temperature for proper plant growth.
- Facilitates supply of fertilizer in irrigation water/ fertigation.
- Facilitates the production of crops in arid and semi-arid areas where without irrigation, crop production would be impossible.
- It makes it possible to grow crops in special structures, for example: green houses

(Any 6 x 1 = 12 marks)

(b)

- The nature of the land (steep or flat) / topography.
- The type of soil.
- The availability of water to be used.
- The type of crop to be irrigated because some crops need larger amounts of water while others need little and others need moderate amounts of water.
- The distance of the water source from the field to be irrigated.
- The technology available.
- The cost of the system to use.
- The climate of the area.
- Availability of skilled manpower. ***(Any 8 x 1 = 8 marks)***

24.14.2 Agriculture Paper 2 (443/2)

1.

- Gives comfort and warmth to the birds.
- Helps in drying droppings.
- Keeps birds busy scratching, thus reducing cannibalism. ***(2 x $^1/_2$ = 1 mark)***

2.

- Newcastle.
- Fowl pox.
- Fowl typhoid.
- Gumboro.
- Marek. ***(2 x $^1/_2$ = 1 mark)***

3.

- Poor nutrition.
- Infertility.
- Poor timing of service. ***(2x$^1/_2$ = 1 mark)***

4.

- Overfeeding with ordinary milk/ colostrum.
- Feeding milk at wrong temperatures.
- Feeding milk in dirty containers/feeding contaminated milk.
- Feeding young ones at irregular intervals ***(2 x $^1/_2$ = 1 mark)***

5.

- Quality of roughages.
- Availability of the concentrates.
- Level of production.
- Economic factors/cost of concentrates.
- Quality of concentrates. ***(3 x $^1/_2$ = 1$^1/_2$ marks)***

6.

- Presence of calf/milkman/milking parlour.
- Washing/massaging udder.
- Feeding.
- Sounds associated with milking. ***(3 x $^1/_2$ = 1$^1/_2$ marks)***

7.

- Reduces injury of other animals/handlers.
- Makes cattle docile/easy to handle.
- Creates more space for feeding/other animals. ***(2 x $^1/_2$ = 1 mark)***

8.

- Halter.
- Rope.
- Nose ring and a lead-stick. ***(2 x $^1/_2$ = 1 mark)***

9.

- No rigormotise after death.

- Stomach swells/bloats.
- Dark red blood oozes out through the natural openings/orifices.
- Blood does not clot. ***(Any 3 x $^1/_2$ = $1^1/_2$ marks)***

10.
- Transmit diseases.
- Cause anaemia.
- Cause irritation.
- Cause wounds on the skin that may predispose animals to secondary infection.

(Any 3 x $^1/_2$ = $1^1/_2$ marks)

11.
- Soil type.
- Topography.
- Sources of water.
- Closeness to homestead/accessibility.
- Closeness to the market centre.
- Security. ***(Any 4 x $^1/_2$ = 2 marks)***

12.
- Adjust the plough depth.
- Front furrow depth.
- Lowering/raising ploughing pitch.
- Front furrow width. ***(Any 3 x $^1/_2$ = $1^1/_2$ marks)***

13. (a)
- Saanen.
- Toggenburg.
- British Alphine.
- Anglo-Nubian.
- Jamnapari. ***(Any 4 x $^1/_2$ = 2 marks)***

(b)
- Two humps.
- Hairy body.
- Absence of trap-nose. ***(Any 2 x $^1/_2$ = 1 mark)***

14.
- Proper sanitation/proper carcass disposal.
- Regular vaccination.
- Proper feeding/ nutrition.
- Imposing quarantine/isolation.
- Control of internal parasites/ deworming/ drenching.
- Timely treatment of the sick livestock.
- Control of vectors/dipping/spraying.
- Proper housing.
- Isolation of sick animals.
- Proper selection and breeding of animals. ***(Any 5 x $^1/_2$ = $2^1/_2$ marks)***

15.
- Man.
- Farm animals.
- Wind.
- Electricity.
- Solar energy.
- Water. ***(Any 4 x $^1/_2$ = 2 marks)***

16.
- Clean regularly.
- Repaint the base if necessary especially wooden troughs.
- Repair cracks on concrete / wooden troughs.
- Replace broken parts. ***(Any 3 x $^1/_2$ = $1^1/_2$ marks)***

17.

- Fuel system.
- Electrical system.
- Cooling system.
- Lubrication system.
- Transmission system.
- Ignition system.
- Hydraulic system. ***(Any 4 x $^1/_2$ = 2 marks)***

18.

- Raised pens with slatted floor.
- Permanent calf pens with concrete floors.
- Moveable calf pens.
- Temporary calf pens. ***(Any 3 x $^1/_2$ = $1^1/_2$ marks)***

19.

- Presence of broken or soft-shelled eggs.
- Bright light in the nests allowing birds to see the eggs.
- Idleness in the poultry house.
- Inadequate nests forcing some birds to lay eggs in the open.
- Lack of minerals such as calcium in the diet.
- Irregular egg collection. ***(Any 4 x $^1/_2$ = 2 marks)***

20. (a)

- **A**: Cross-cut saw.
- **B:** Rip saw. ***(2 x $^1/_2$ = 1 mark)***

(b)

- **A:** Cutting across the grain.
- **B**: Cutting along the grains. ***(2 x 1 = 2 marks)***

(c)

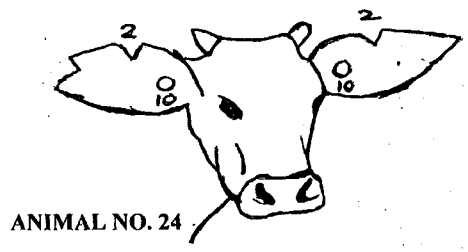
- Proper storage.
- Sharpening cutting edge.
- Oiling to prevent rusting.
- Repairing/ replacing worn out handles.
- Setting the teeth.
- Tightening loose screws.
- Cleaning blade after use. ***(2 x 1 = 2 marks)***

21. (a)

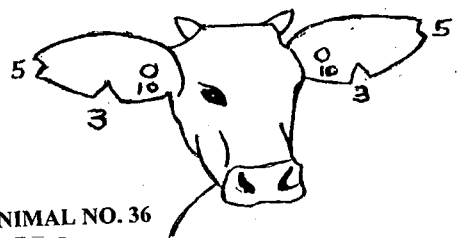
(i) Ear notching. ***(1 x 1 = 1 mark)***

(ii) Number 40 (forty). ***(1 x 1 = 1 mark)***

(iii)



ANIMAL NO. 24



ANIMAL NO. 36

(2 x 1 = 2 marks)

(b) Between 18-1-2007 and 20-1-2007. *(1 x 1 = 1 mark)*

22. (a) Barbed wire strands on droppers. *(1 x $^1/_2$ = $^1/_2$ mark)*

(b) **C:** Gate post.
D: Stiffener.
E: Dropper. *(3 x $^1/_2$ = $1^1/_2$ marks)*

(c) (i) Support the gate post. *(1 mark)*

(ii)
- Prevent intruders/wild animals into the farm.
- Prevent livestock from moving out of the farm.
- Used as entrance into/exit from the farm. *(2 x 1 = 2 marks)*

23. (a) Ox-drawn mouldboard plough. *(1 x 1 = 1 mark)*

(b)

G: Mouldboard.
H: Landside.
J: Share.
K: Land wheel/wheel *(4 x $^1/_2$ = 2 marks)*

(c)
- Ploughing.
- Furrowing.
- Ridging.
- Weeding.
- Harvesting root crops. *(4 x $^1/_2$ = 2 marks)*

24. (a)
- Easy to keep individual production records.
- Controls cannibalism and egg eating.
- No contamination of water and feed.
- Birds are not exposed to predators, parasites and diseases.
- Facilitates culling and handling.
- Easy to collect eggs.
- Egg losses are reduced.
- Many birds are kept in a given area/high stocking rate.
- Eliminates broodiness.
- Birds still have tender meat at culling due to confinement.
- Facilitates mechanisation.
- Keeps eggs clean.
- Sick birds can be detected easily for isolation.
- Low labour requirement.
- Higher egg production due to less energy spent. *(10 x 1 = 10 marks)*

(b)
- Body conformation.
- Fertility/breeding ability.
- Adaptability of the breed to the area/hardiness.
- Mothering ability in case of females.
- Production potential/ yielding capacity.
- Temperament/behaviour, for example: cannibalism egg eating
- Deformities/ abnormalities, for example: one eye, lameness.
- Health.
- Offspring performance.
- Age of animal.
- Growth rate.
- Lifespan/ reproductive life.

- Disease resistance ***(10 x 1 = 10 marks)***

25. (a)

- ***Induction stroke***: The piston moves down the cylinder causing the inlet valve to open and draw in fresh supply of petrol vapour and air into the cylinder.
- ***Compression stroke:*** The inlet valve closes and the piston moves up the cylinder. This compresses the fresh fuel mixture into the combustion chamber.
- ***The power stroke:*** Fully compresses the fresh fuel mixture and as a result a spark is produced at the spark plug. This causes the fuel mixture to ignite and expand resulting in pressure that forces the piston down the cylinder.
- ***The exhaust stroke***: The piston moves up the cylinder to eliminate the burnt fuel mixture through an open exhaust valve. ***(Total 12 marks)***

(b)

- Helps the driver to select any forward or reverse gear.
- Adjusts speed of the drive from the engine crankshaft to the drive shaft.
- Helps to alter the speed ratio.
- Enables the power from the engine to be more easily applied to the work done by the tractor.
- Enables the driver to stop the tractor movement without stopping the engine or without foot pressing on the clutch all the time. ***(4 x 2 = 8 marks)***

26. (a)

- *Concrete / raised slatted floor:* The pen should always be clean. The pen should be easy to clean.
- ***Dry litter***: Should have dry litter on the floor. The roof should be leak proof.
- ***Adequate space:*** The pen should be large enough to allow for exercise/ feeding/ watering.
- ***Proper lighting*:** Should have good supply of natural light/ sunlight.
- ***Proper drainage***: Should have good drainage in and around the pen.
- ***Draught free:*** The structure should stop strong winds from blowing into the calf pen.
- ***Proper ventilation*:** Structure should allow for fresh air circulation.
- ***Security*:** Should be strong enough to keep away intruders/ wild animals.

(Any 6 x $1^{1}/_{2}$ = 9 marks)

(b)

(i)

- Overcrowding of calves in the pen.
- Dampness/chilliness in the pen.
- Poor ventilation.
- Age/ younger calves are more prone to pneumonia than order calves.

(3 x 1 = 3 marks)

(ii)

- Rough hair coats/ruffled hair.
- Loss of appetite.
- Abnormal lung sounds, for example: whizzing.
- Emaciation.
- Frequent coughing.
- Nasal discharge.
- Fluctuating body temperature.
- Rapid / laboured breathing.
- Dull and reluctant to move. ***(5 x 1 = 5 marks)***

(iii)

- Treating the sick calves with antibiotics.
- Providing warmth in pens.
- Maintaining good sanitation in pens.
- Isolating sick calves to avoid spread of the disease. ***(3 x 1 = 3 marks)***

24.14.3 Agriculture Paper 3 (443/3)

PROJECT A: CHICKEN REARING

1. ***Feeding***
   - Feeders: consider cleanliness of feeder.
   - Economy of feed use: consider the type, the level and wastage of feed.
   - Freshness of feed: consider presence of foreign materials and if feed is stale.
   - Position of feeder: check the height at which feeder is put in relation to the age of the chicken. ***(5 marks)***

2. ***Watering***
   Waterers
   - Cleanliness of waterer.
   - Position of waterers in relation to age of chickens

   Water
   - Cleanliness of water.
   - Amount of water in waterer. ***(4 marks)***

3. ***Health of chicken***
   - Signs of good health.
   - Weight gain of birds in relation to their recorded initial weight.
   - Control of ectoparasites. ***(7 marks)***

4. ***Management of droppings***
   - Birds kept on wire cages/ slatted floors.
   - Level of accumulation/absence of droppings on floor.
   - Level of accumulation/absence of droppings on the cage.

   OR

   - Birds kept on wooden floor cage.
   - Level of accumulation/ absence of droppings on litter.
   - Dryness of litter/ wetness. ***(2 marks)***

5. ***General cleanliness of cage:*** Consider level of accumulation/absence of dirt, for example: dust or cobwebs ***(2 marks)***

6. ***Records***
   - Availability of records.
   - Accuracy of information kept. ***(4 marks)***

7. ***Initiative/Originality*:** Consider unique practices carried out by the candidate which promote proper growth and health of chicken. ***(4 x 2 =8 marks)***

Note: Except for initiative/originality, all the other aspects of the project will be assessed three times. During each assessment the project should be scored out of a maximum of 24 marks, as shown in the marking scheme. The sum of three assessments added to the score of initiative/originality will be out of 80 marks.

Guidelines for Marking Candidates' Project Reports

The project report should be assessed out of 20 marks. The guidelines below should be followed to arrive at an objective score.

	Aspects of the project report	*Maximum marks*
1.	Project title: Clearly written.	*(1 mark)*
2.	Introduction: ▪ Stating aim of project. ▪ Type of birds kept.	*(1 mark)*
3.	Housing ▪ Description of the cage. ▪ Site of the cage.	*(2 marks)*
4.	Feeding ▪ Feeder used and placement. ▪ Type of feed. ▪ Quantity of feed given daily. ▪ Supplementary feeds.	*(3 marks)*
5.	Watering ▪ Waterer and placement. ▪ Supply of water.	*(2 marks)*
6.	Health ▪ Disease control. ▪ Parasite/pest control.	*(3 marks)*
7.	Observation: Achievements made, problems encountered and action taken.	*(2 marks)*
8.	Illustrations: Tables / drawings.	*(2 marks)*
9.	Results: Consider results in relation to the aim and management of project.	*(2 marks)*
10.	Conclusion: Consider consistency of the conclusion with the aims and operations.	*(2 marks)* *(Total: 20 marks)*

PROJECT B: PRODUCTION OF BEANS OR TOMATOES

1.	***Seedbed/ land preparation:***	
	▪ Timeliness of preparation.	*(3 marks)*
	▪ Appropriateness of tilth/ fineness.	*(4 marks)*
	▪ Extent of weed control.	*(2 marks)*
	▪ Uniformity of seedbed/land preparation.	*(1 mark)*
	▪ Straightness of edges.	*(1 mark)*
	▪ Appropriateness of depth.	*(1 mark)*
	▪ Correctness of plot dimensions.	*(2 marks)*
		(Total: 14 marks)
2.	***Crop establishment***	
	▪ Timeliness of planting with respect to moisture availability.	*(2 marks)*
	▪ Depth of planting.	*(1 mark)*
	▪ Correctness of crop spacing.	*(2 marks)*
	▪ Crop stand/coverage.	*(3 marks)*
	▪ Crop appearance/vigour.	*(2 marks)*
	▪ Correctness of number of plants per hole as recommended.	*(2 marks)*
	▪ Straightness of rows.	*(1 mark)*
		(Total: 13 marks)
3.	***Weed control:***	
	▪ Timeliness of weeding operation in relation to growth of crop.	*(4 marks)*

- Thoroughness of weeding. *(4 marks)*
- Effect of weeding on the crop, for example: injury, burying of some foliage or exposure of some roots. *(3 marks)*
- Maintenance of edges of the plot. *(1 mark)*

(Total: 12 marks)

4. ***Pest and disease control:***
   - Effectiveness of pest control considering symptoms, presence or absence of pests. *(5 marks)*
   - Effectiveness of disease control considering symptoms, presence or absence of diseases. *(5 marks)*

   (Total: 10 marks)
5. ***Other cultural practices*:** Consider any other appropriate cultural practices applied to the crop, for example: staking, pruning and gapping. *(5 marks)*

   (Total: 5 marks)
6. ***Soil and water management*:** Appropriate and effective soil and water management measures taken considering topography, climate and soil, for example: terracing, contour planting and ridging. *(4 marks)*

   (Total: 4 marks)
7. ***Harvesting and handling:***
   - Avoidance of wastage during harvesting. *(3 marks)*
   - Timeliness of harvesting. *(2 marks)*

   (Total: 5 marks)
8. ***Yield obtained:*** Quality and quantity harvested compared to other candidates in the class. *(5 marks)*

   (Total: 5 marks)
9. ***Initiative/ originality*:** Consider other unique practices carried out by a candidate aimed at improving the growth and performance of the crop. This aspect should be assessed any time during the course of the project. *(4 x 3 = 12 marks)*

   (Total: 12 marks)

(Total maximum marks: 80 marks)

PROJECT B: PRODUCTION OF BEANS OR TOMATOES

Guidelines for Marking Candidates' Reports

The project report should be assessed out of 20 marks. The guidelines below should be followed to arrive at any objective score.

	Aspects of the Project Report	*Maximum Marks*
1.	Project title: clearly written.	*(1 mark)*
2.	Introduction: stating the aim of the project.	*(2 marks)*
3.	Seedbed preparation: clearing the land using pangas/ slashers.	*(1 mark)*
4.	Preparing the land to appropriate tilth using jembes/ fork jembes.	*(1 mark)*
5.	Planting ▪ Application of manures/fertilizers. ▪ Application of pesticides. ▪ Appropriate preparation of planting materials. ▪ Details of planting procedure appropriate to the crop.	*(2 marks)*
6.	Weed control ▪ Time of weed control. ▪ Types of weeds identified. ▪ Methods of weed control.	*(1 mark)*
7.	Pest control ▪ Types of pests identified. ▪ Types of damage caused. ▪ Control measures taken.	*(1 mark)*

8. Disease control
   - Symptoms of diseases identified.
   - Names of chemicals used.
   - Method of application. ***(1 mark)***

9. Other crop management practices
   - Mulching, thinning, gapping and watering.
   - Soil and water management. ***(2 marks)***

10. Observation: achievements and problems experienced. ***(2 marks)***

11. Harvesting
    - Timeliness.
    - Method applied.
    - Tools and materials. ***(2 marks)***

12. Result/ yield: Considering quality and quantity obtained. ***(2 marks).***

13. Conclusion: consistency with the aim/management of the project. ***(2 marks)***

(Total 20 marks)