Name……School ……ADM No ……

# 443

AGRICULTURE

July 2026

2 hours

Kenya Certificate of Secondary Education

Agriculture

2 hours

Candidate's Signature…….

DATE……

## FORM III

**INSTRUCTION TO CANDIDATES**

a. *Write your name and index number in the space provided*
b. *Sign and write the date of examination in the space provided above*
c. *This paper consist of three sections A,B and C(100mks)*
d. *Answer all the questions in sections A and B*
e. *Answer any two questions from section C*
f. *All answers should be written in the spaces provided*
g. *Candidates should check the question paper to ascertain that all the pages are printed as indicated and that no question are missing*

**For Examiners' Use Only**

| Section | Questions | Maximum score | Candidates score |
|---|---|---|---|
| A | 1-18 | 30 | |
| B | 19-24 | 30 | |
| C | | 20 | |
| | | 20 | |
| | | 20 | |
| Total score | | 100 | |

This paper has 14 printed pages

## SECTION A (30 MARKS)

**ANSWER ALL QUESTION IN THE SPACE PROVIDED**

1. Name four activities carried out in agriculture as an art (2 mks)
   i. Tilling of land
   ii. Construction of farm structures
   iii. Measuring distances
   iv. Operating machinery
   v. Harvesting crops
   vi. Feeding livestock animals
   vii. Marketing of agricultural produce
   viii. Handling livestock animals ( ½ x 4=2mks)
1. Differentiate between pastoralism and aquaculture (1mk)
   Pastoralism is the rearing of livestock animals on natural pastures while aquaculture is the rearing of fish in fish ponds (1x1=1mk)
2. Name four physical agents of weathering (2mks)
   i. Wind
   ii. Water
   iii. Moving ice
   iv. Temperature (1/2 x4= 2mks)
3. State four characteristics of a fertile soil (2mks)
   i. Properly drained / properly aerated
   ii. Good water holding capacity
   iii. Adequate nutrient supply/ has nutrients in available form
   iv. Correct soil pH
   v. Free from excessive soil borne pests and diseases
   vi. Have good depth/adequate depth for root growth ( ½ x 4 = 2mks)
4. State four care and maintenance practices carried out on jackplanes (2 mks)
   i. Replace broken handle and knob
   ii. Replace worn out parts of the plane / plane iron/cap iron
   iii. Sharpen blunt plane iron on an oil store
   iv. Draw back the plane iron when not in use
   v. Place the plane on its side during storage ( ½ x 4 = 2mks)
5. State four reasons for keeping correct and accurate farm records (2mks)
   i. Give the history of farm
   ii. Help to detect losses and theft on the farm
   iii. Help to compare the performance of different enterprises within a farm amongst many farms
   iv. Help in assessment of income tax/avoid overtaxation /avoid undertaxation
   v. Enable proper sharing of profit and loss in partnership
   vi. Help to settle disputes amongst heirs where a will does not exist.
   vii. Provide labour information like terminal benefits
   viii. Support insurance claims on death ,theft, fire on the farm
   ix. Show the profitability of the farm thus obtain credit
   x. Determine the value of assets and liabilities in the farm
   xi. Enable proper planning and budget of farm operation, help during sale of asset or even the whole farm. ( ½ x 4= 2mks)

6. Name the breeds of the livestock animals with the following characteristics

Cattle with fluffy umbilical fold, large, dewlap produce 3000 kgs of milk per lactation and tolerates high temperatures

Sahiwal ( ½ mks)

Black pig, baconer, bear white colour on feet, nose and tail

Berkshire ( ½ mks)

White rabbit, ears, nose, paws/ and tail are black and very prolific

California white ( ½ mks)

Sheep that is white, bear pure blackhead, is polled with long legs and a fat tail

Blackhead Persian ( ½ mks )

7. State four uses fences in the farm (2mks)
   i. Fences demarcate one farm from another farm
   ii. Fences keep off intruders away
   iii. Fences separate crops field from pastures
   iv. Enabling mixed farming
   v. Fences demarcate pastures enabling controlled /rotational growing
   vi. Fences keep off wild/stray /sick animals from the farm controlling parasites and diseases
   vii. Fences demarcates pastures into padlocks controlling breeding
   viii. Fences control movement / prevent formation of unnecessary paths
   ix. Fences keep away thieves thus provides security (½ x 4=2mks)
8. State four importance of soil pH in crop production (2mks)
   i. pH determines the availability of certain minerals elements in a farm easily absorbed by plants
   ii. Low pH inhibits activity of microorganism that decompose organic matter
   iii. Low pH lowers plant resistance to pest attack like nematodes
   iv. High pH leads to prevalence of bacterial diseases in plants/low pH leads to high prevalence of fungal disease
   v. Soil pH affects the balance/biological balance between various organisms in the soil.
   vi. PH determines the type of crop to be grown in given area ( ½ x 4 = 2MK)
9. State four functions of water in the body of livestock animals (1mk)
   i. Form component of body cells / body fluids
   ii. Acts as a medium of of transport of various nutrients
   iii. Improved biochemical reactions in animals
   iv. Help in regulation of body temperature
   v. Help in excretion of waste products of metabolism
   vi. Forms part of animal product like milk and eggs
   vii. Help maintain size of animal cells (1/2 x 2=1mks)
10. List four factors that affect the digestibility of feeds (2mks)
   i. Chemical composition of the feed/ high cellulose in feeds increases digestability with high vitamin slow down the digestability
   ii. Forms of feed/crushed feeds are more digestable than whole grain.
   iii. Species of the animals polygastic animal have more digestability than monogastic animals
   iv. Ratio of energy to protein /high energy protein ration lower digestability
   v. Quantiity of feed in the digestive system /higher feed quantity in digestive system lowers digestibility. ( ½ x 4 =2mks)

11. Differentiate between essential and non-essential amino acids (1mk)

Essential amino acids must be supplied in livestock feed as they are not synthesized in the animal while nonessential amino acids need not to be supplied in livestock diet as they can be synthesized in the livestock body (mark as a whole [1x1=1mk])

12. State four characteristic of an effective acaricide (2mks)

a. Should have capability to kill ticks
b. Should be harmless to human and livestock
c. Should be stable/not affected by light
d. Should remain effective even after being footed by dung, mud, hair ( ½ x4 =2mks)

13. State four disadvantages of multiple stem pruning (2mks)

i. System results in increased breaking of stems and branches
ii. It is difficult to gather berries from the top points
iii. It is difficult to spray the tall bushes
iv. Rotting accurs with age ( ½ x 4= 2mks)

14. Give four advantages of row planting (2mks)

i. Mechanization of operation can be done between rows
ii. Easy to establish the plant population
iii. Low seed rate is used compared to broadcasting
iv. Easy to carry out cultural practices such as weeding, spraying and harvesting

(½ x 4 2mks)

15. State two effects of pathogens in crops (2mks)

i. Lower yields in crop production reducing earnings
ii. Lower quality reducing market value\
iii. Causes food poisoning in livestock and humans (1 x1=1mk)

16. Define the term rock catchment (1mk)

Rock catchment refers to the harvesting of rain water from large rocks and directing it through channels /concrete channels into a reservoir for use later. (1mks)

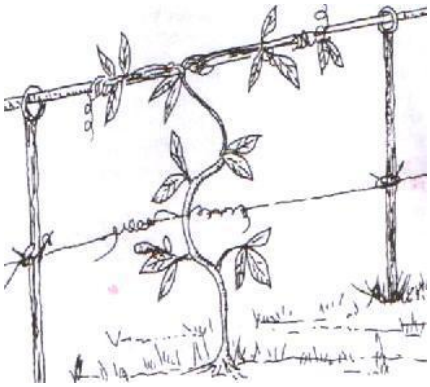
17. Name two cropping systems that promote conservation of soil and water in crop production (1mk)

i. Rotational grazing
ii. Crop rotation
iii. Intercropping
iv. Contour cropping
v. Use of manures and fertilizer (1/2 x 1 =1mk)

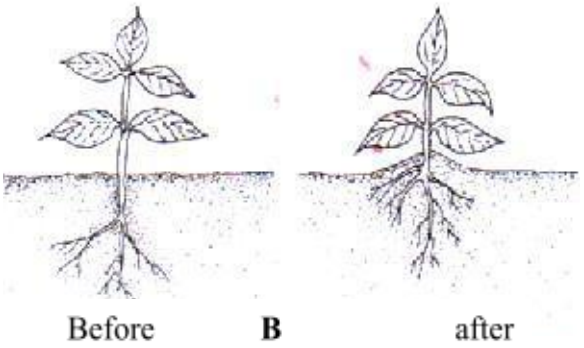
## SECTION B (30 MARKS)

**ANSWER ALL THE QUESTIONS IN THE SPACES PROVIDED**

18. Study the diagrams below carefully and answer the question that follow



**A**




a. Name the practice illustrated in A and B (1mk)

A

B

A – Trelishing ½ x 1= ½ marks

B - Earthing up ½ x 1= ½ marks

b. State two other importance practice B in irish potatoes other than providing support (2mks)

i. Promote tuberation/larger tuber formation/ tuber expantion

ii. Preventing greening of tubers/potatoes maintain quality

iii. Enable retention of water/ promote drainage

iv. Enable easy harvesting of the tubers/ potatoes ( 1 x2 = 2mks)

c. Name practices similar to that in A done in; (1mk)

i. Banana i. propping ½ x 1= ½ marks

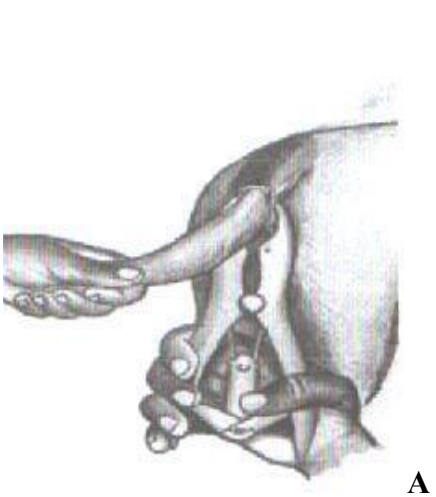
ii. Tomatoes ii. Staking ½ x 1= ½ marks

d. Define the term used to collectively refer to all the practices named in (a) and (c)

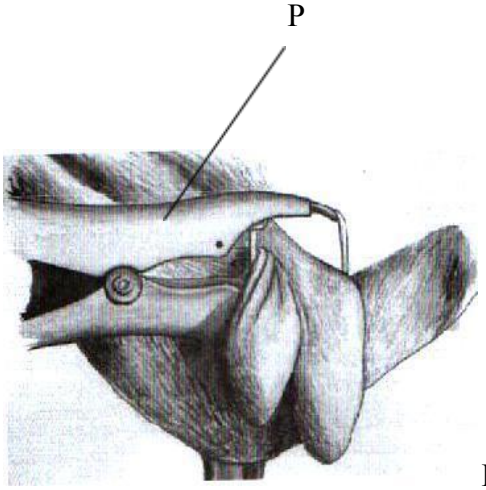
(1mk)

Training - practices of manipulating plants to grow in a designed/desired shape (1mk)

19. Study the diagram below and answer the question that follows



**A**




**B**

a. Name the practice being carried out in A and B (1mk)

A

B

A- Docking ½ x 1= ½ mks

B- Bloodless Castration ½ x 1= ½ mks

b. Give the timing when the practice should be done in lambs in A and B (1mk)

A- Before 48 hours (accept time range) ½ x 1 = ½ mks

B. Before 3 days old (accept time range ½ x 1 = ½ mks

c. State two importance for each of the practices A and B (2mks)

A.

i. To facilitate mating /tupping
ii. To allow even distribution of fat
iii. To prevent blowfly infestation (½ x2 = 1 mk)

B.

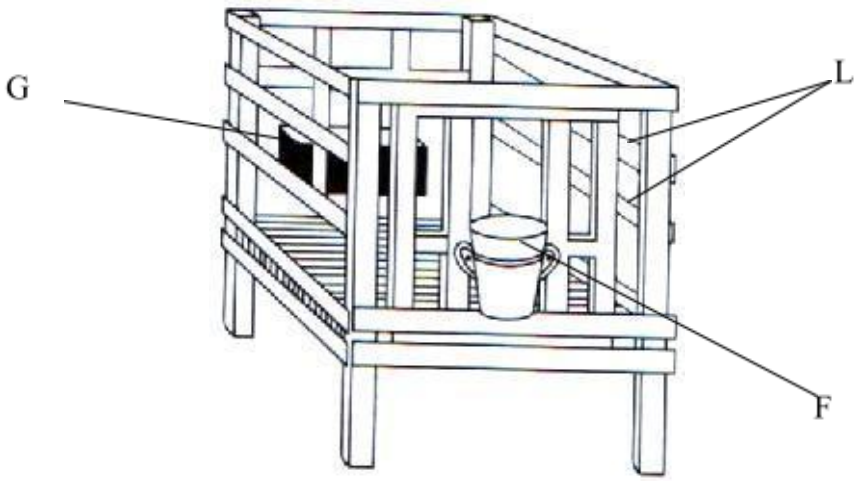
i. To control/ prevent breeding disease transmited by natural mating
ii. To control breeding/ prevent indiscriminate mating
iii. To ensure faster growth rates
iv. Increase the quality of meat/ remove unpleasant smell in meat. (½ x2 = 1 mk)

d. Name the livestock production tool and equipment labeled P above (1mk)

i. Elastrator and rubber ring

(1 x1 =1mk)

20. The diagram below shows farm structures used in livestock production




a. Name the structure illustrate above (1mk)

Calf pen (1x1= 1mk)

b. State one routine practice carried out in part G and F respectively (1mk)

G- Feeding /provision of feed ½ x 1 = ½ mks

F – Watering /provision of clean water ½ x 1 = ½ mks

c. With a reason state two structural requirement of the above structure to ensure better production (2mks)

i. Draught free to avoid cold wind/ prevent infection like pneumonia
ii. Leak/proof to avoid wetness/ prevent infections like pneumonia, naval illness
iii. Have slatted floor to drain urine/maintain dryness
iv. Single housing to prevent licking each other / parasite spread/ prevent formation of hair balls.
v. Adequate space/ 1.8m x 1.5m to provide room for exercise
vi. Well lit to enable calf to synthesise vitamin D
vii. Build raised on concrete floor for easy cleaning
viii. Slanted concrete floor to facilitate drainage

(½ stating, ½ reason = 1x 2 = 2mks)

d. List down two maintenance practice carried out on the part labeled L in the structure (1mk)

i. Repair broken parts/ timber rails
ii. White wash the timber rails instead of painting to avoid lead poisoning

½ x 2 = 1 mk

21. Prepare 200kg sow and weaner meal 30% DCP using maize germ 10% DCP and fish meal 35% DCP. Show all your working (DCP-digestible crude protein) (3mks)

a. Maize germ 10% ——— 5 parts of maize germ ( ½ mk)

30% ( ½ mk)

Fishmeal 35% ——— 20 parts of Fishmeal ( ½ mk)

25 total parts ( ½ mk)

~~5~~ $^{1}$ x ~~200~~ $^{40}$ = 40 kg of maize germ ( ½ mk)

~~25~~$^{5}$

~~20~~ $^{4}$ x ~~200~~ $^{40}$ = 160 kg finished ( ½ mk)

~~25~~ $^{5}$ 200kg of sow and weaner meal

a. A suckling sow weighs 100kilogram (kg) body weight and she has 10 piglets. For every kilogram of body weight the sow receives 25 grammes of feed and for every piglet the sow receive 500grammes of the feed ,calculate the quantity of ration given in equal portions in the morning and the afternoon per day (2mks)

100kg bodyweight x 25gm = 2500gm ( ½ mk)

= 2.5kg of the ration

10 piglets x 500gm = 500gm

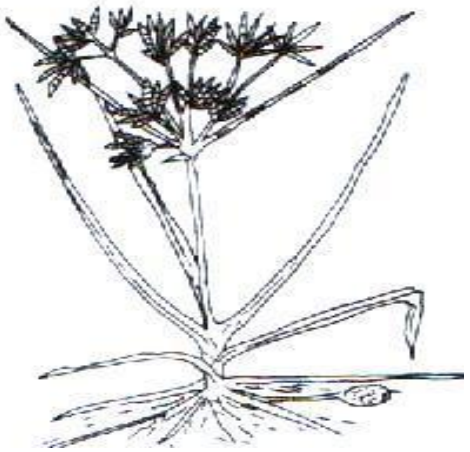
= 5kg ( ½ mk)

Total = 2.5 kg +5kg = 7.5kgs ( ½ mk)

7.5kg= 3.75 kgs per feeding ( ½ mk)

2

22. Study the following diagrams of weeds and answer the question that follows

**A**  **B** 

a. Name the weeds A and B (2mks)

A

B

A- Stinging neetle / *Urtica massaica* (1mk)

B – Nut grass / sedge /*Cyperus rotundas* *(1 mk)*

b. (i)State the class of weed A based on plant morphology (1 mk)

A- Broad leafed (1mk)

(ii) State the class of weed B based on growth cycle (1 mk)

B- Perennial (1mk)

c. What is the effect of weed A to farmers during crop production

Irritate the workers making it difficult to handle and control/irritates reducing efficiency to handle and control

(1mk)

d. Why is it difficult to control weed B

Has underground / perennating organs that regrow even after removal of leafy part

(1mk)

23. Study the crop pest shown below

**F**  **G** 

(a) name pests F and G (1mk)

F

G

F- Squirrel ( ½ MK)

G- Weevil /maize grain weevil

( ½ MK)

(b) Classify the pests according to their habitat (1mk)

F

G

F- Field ( ½ MK)
G- Storage ( ½ MK)

(c) State the effect of the pest in crop production (2mks)

F
G

F- Unearth and eat sown seeds reducing plant population and yield
- Dig up and eat root and tubers
- Climb up maize stalks and eat grains ( ½ x 2 = 1MK)

G - Destroy/eat maize in store reduces stored quantity
- Bore maize grain reducing quality ( ½ x 2 = 1 MK)

(d) State two control measures of pest G to reduce damage

Apply insecticides to kill the pest ( ½ x 1 = ½ MK)
Store grains in air tight bags ( ½ x 1= ½ MK)

**SECTION C (40 MARKS)**

**Answer any two questions in the space provided**

24. (a)State and explain four importance of high level of education and technology in agriculture (8mks)

i. High level of technology increase efficiency thus minimizes cost of production/use of machinery increases efficiency/reduces drudgery/fatigue /tiredness thus minimizes costs of man-days
ii. High education enable selection and use of right type and amount of input thus proper economic level in production
iii. High level of education enable application of inputs to crops at the right places preventing damage/ application away from plant parts for inputs that can scorch a plant
iv. Education enable data capture , recording, interpretation thus enable correct decisions based on proper observation/education enable making of right decisions based on proper observations (State 1mk explain 1mk - 2x 4= 8mks )

(b)State and explain four importance of using drainage in land reclamation (8mks)

i. It increases soil aeration by removing excess water around plant roots promoting root growth
ii. Remove excess water increasing soil volume around the root zone that provides more nutrients for plants growth.
iii. Raises soil temperature /increases soil temperature thus better root development /metabolism for roots development
iv. Increase microbial activities as oxygen is supplied for their respiration
v. Reduces soil erosion by increasing soil water holding capacity /increase water filtration rate/ reduce surface run off as water infiltrates.
vi. Removes toxic substance/mineral salts in the soil as they penetrate, move to lower levels in the soil that retains roots growth.

(State 1mk explain 1mk, = 2x4=8mk)

(c )State four advantages of drip irrigation (4mks)

i. Uses little amount of water compared to other methods reducing cost of production
ii. Uses water under low pressure so long as it can flow in the pipes
iii. Method does not wet the leaves thus discourages fungal diseases
iv. Restricts water to base of plant thus discouraging growth of weeds between rows

(1 x4 = 4mks)

25. State and explain five factors considered when selecting replacement stock in a breeding program (10mks)

i. Age- breeding efficiency decreases with increased age thus younger animals are selected for as they have a longer productive life than older animals
ii. Level of production- animals with high level of production are selected for while those with low level are selected against and culled.
iii. Quality of the product- animals that produce high quality product are selected for as the product fetch high returns
iv. Health- healthy animal are economical to keep on a farm thus are selected for as they have lower treatment cost
v. PHysical fitness- animals without physical deformities are selected for while that that limp or lacks some teats /other parts are selected against and culled.
vi. Prolificacy- animals that give many offspring per partulation help increase the breeding stock faster thus are selected for
vii. Mothering ability- animals that raise their young ones up to weaning tend to have good natural instinct thus are selected for.
viii. Adaptability- animal well adapted to local ecological and condition experience less stress thus produce more and are selected for even in adverse condition
ix. Temperament – docile animals that shows no sign of aggression , vices and cannibalism cause less losses thus are selected for
x. Body confirmation- animals with desirable body shapes for the required characteristics are selected for

(State 1, explain 1, 2 x5 = 10mks )

b. Explain five factors considered during site selection for construction of farm structures (10 mks )

i. Location of the homestead should enable the farmer to have a good view of all the farm structures to enhance security
ii. Security- site should be safe from predators, thieves and trespassers
iii. Drainage of the site should be good to avoid dumpness /destruction by flooding
iv. Direction of prevailing wind – structure should be sited on the leeward side of the homestead to avoid bad smell
v. Farmers taste and preferences - farmers' orientation to have secluded/opened up homestead determines siting of the structure.
vi. Proximity/near social anemities such as water and electricity to reduce the cost of installation
vii. Slope / the topography of the land structure should be sited on gently sloping land to reduce cost of construction during leveling.
viii. Relation with other structures, the site should be selected to provide space for future expansion/ convenience in farm activities

(State 1, explain 1= 2 x5 = 10mks )

26. (a) Define the term land tenure (2mks)

Land tenure means possession of the rights to the use of land /rules and regulations that govern the ownership of land in a given area (mark as a whole 2mks)

(b) Explain five problems brought about by land fragmentation and subdivision (10mks)

i. A lot of time is wasted moving from one holding to another instead of engaging the time in agriculture production
ii. It is difficult to control, weeds, pests, parasites and diseases as neigbouring farmers may have neglected their holdings.
iii. Results in poor farm planning due to land distance from the holdings to the farmstead
iv. Low level of supervision as the plot are scattered
v. Difficult to conserve soil and water as farmers of the neighbouring holdings may not be cooperative.
vi. Easily results in communal land use as it is difficult to restrict livestock to specific small holdings leading to soil denudation.
vii. Difficult to receive agricultural extension services and advice as the holdings are scattered away from each other.

( State 1, explain 1,2 x5 = 10mks)

(b) State and explain four advantages of having a land title deed. (8 marks)

i. Title deed can be used to obtain / secure credit facilities to develop land promoting commercial farming.
ii. Title deed encourages farmers to invest in long term and permanent project thus achieve higher agricultural production
iii. Title deed give security of tenure thus minimize land dispute
iv. Title deed enable one to lease all or part of the land to get extra income

(State 1, explain 1, 2 x4 =8 marks)

**END**