443/1 MS
AGRICULTURE
Paper 1
MARKING SCHEME

March 2021

THE KENYA NATIONAL EXAMINATIONS COUNCIL

KENYA CERTIFICATE OF SECONDARY EDUCATION

AGRICULTURE

Paper 1

MARKING SCHEME
(CONFIDENTIAL)

THIS MARKING SCHEME IS THE PROPERTY OF THE KENYA NATIONAL EXAMINATIONS COUNCIL AND IT MUST BE RETURNED AT THE END OF THE MARKING EXERCISE.

This marking scheme consists of 11 printed pages.

SECTION A (30 marks)

1.	i) Date first symptoms were noticed; ii) Symptoms noticed; iii) Disease diagnosed/suspected; iv) Drugs used to treat the diseases; v) Cost of treatment; vi) Remarks; vii) Animal affected; viii) Date of treatment 4 x ½	(2 marks)
2.	i) Increase soil aeration; ii) Improve water holding capacity; iii) Increases soil nutrient content; iv) Provides food and shelter for micro-organisms; /provides humus v) Binds soil particles together; /improve soil structure/control soil erosion vi) Buffers soil pH; vii) Reduces toxicity of plant poisons; viii) Improves soil temperatures; ix) Increase water infiltration; 4 x ½	(2 marks)
3.	i) Sprinklers; ii) Water pumps; iii) Pipes; iv) Filters; 4 x ½	(2 marks)
4.	i) Holds competitive agricultural shows/exhibitions; ii) Encourages breeding and importation of pure breeds of livestock; iii) Encourages and assists in official milk recording scheme; iv) Organizing national ploughing contests; v) Publishing a monthly journal/Kenya farmer vi) Organizing the running of young farmers clubs; vii) Awarding bursaries for local and overseas students; viii) Organizing tours for its members; ix) Organizing national tree planting x) Publishes the studbook. xi) Organizing local and international exchange programmes 4 x ½	(2 marks)

5.	Information found on delivery note. i) Date of delivery; ii) Quantity ~~and type~~ of goods delivered (~~quantities~~); iii) Item(s) delivered/Type of goods delivered (particulars) iv) Person who receives the goods/~~signature~~ stamp of receiver; v) Conditions in which goods are received; vi) Delivery note serial number; vii) Person who deliver/from whom viii) Signature of the receiver. 4 x ½	(2 marks)
6.	Implements for primary cultivation. i) Jembe ~~or fork-jembe~~/hoe; ii) Ox-plough; iii) Disc plough; iv) Mouldboard plough; v) Forked Jembe/Forked hoe vi) Rotavitor/Rotary cultivator vii) Subsoiler viii) Chisel plough 4×½	(2 marks)
7.	Factors influencing soil formation. i) Parent rock/bedrock. ii) Climate; iii) Topography/Slope iv) Time; v) Living organisms/Biotic factors 4×½	(2 marks)
8.	Importance of ridging in potato production. i) For expansion of tubers; ii) To conserve soil moisture; iii) For easy harvesting; iv) To prevent soil erosion; v) To improve soil drainage. vi) Prevent greening of Tubers. 4 x ½	(2 marks)
9. (a)	Thinning is the removal of excess seedlings from the seedbed while rogueing is removal and destruction of diseased or infected plants. (Mark as a whole)	(1 mark)

(b)	Nursery bed is a small piece of land where small seeds are raised into seedlings before transplanting while seedling bed is a special type of nursery which receives excess seedlings from the nursery bed after pricking out. OWTTE (Mark as a whole)	(1 mark)
10.	Methods of weed control. (i) Chemical method/use of herbicides; (ii) Uprooting; (iii) Biological method; (iv) Cultural method; eg: - clean planting materials - proper spacing - clean seedbed preparation v) legislative method vi) slashing / mowing - early planting - mulching - cover crops - crop rotation - flooding 4 x ½	(2 marks)
11.	Causes of crop disease. i) Fungi; ii) Virus; iii) Bacteria; iv) Poor weather conditions/physiological conditions v) Lack of essential elements/nutritional imbalance 4 x ½	(2 marks)
12.	Importance of land title deed. i) Used to secure credit facilities for land development; ii) Land disputes are minimized; iii) Encourage farmer to carryout long term investment on the land; iv) Enables owner to lease the farm and thus get extra income; v) Provide security of ownership; 4 x ½	(2 marks)
13.	Agents of erosion. i) Water; ii) Wind; iii) Human activities; iv) Living organisms/~~Pests plants~~ Animals = Rej. plants and microorganisms v) Ice 4 x ½	(2 marks)
14.	i) Forage has high dry matter content; ii) Has high cellulose content; iii) High lignin, tannin and silica which are indigestible; iv) Has low crude protein content;	

	iv) Has low leaf : stem ratio; / low palatability vi) Has low dry matter digestibility; 4 x ½	(2 marks)
15.	Agricultural practices that pollute water. (i) Use of inorganic fertilizers; (ii) Use of excess pesticides; (iii) Over cultivation / pulverisation of the soil (iv) Over grazing; / overstocking (v) Cultivation along river banks; vi) watering animals directly in the surface water sources. 4 x ½	(2 marks)

SECTION B (20 marks)

16.	(a) (i) Nitrogenous / straight fertilizer. (ii) Neutral (b) It neutralizes soil acidity; (i) top dressing	(1 mark)
	~~Neutral pH~~; acidity produced by ammonium ions is counteracted by calcium carbonate which is a liming material. (i) It raises /increase soil pH. (ii) It has a liming effect.	(1 mark)
	(c) If 20kg N ~~requires~~ is contained in 100kg CAN ✓ ∴ 50kg N ~~requires~~ is contained in: $\frac{100\text{kg of CAN} \times 50\text{kg N}}{20\text{kg N}} = 250\text{kg of CAN}$ ✓ $\frac{250\text{kg}}{50\text{kg}} = 5$ bags ✓ OR 100kg CAN contains 20kg N ✓ ∴ 1kg CAN contains $\frac{20\text{kg N} \times 1\text{kg}}{100\text{kg CAN}}$ ✓ $= 10\text{kg N}$ $10\text{kg N} = 1\text{kg}$ $\therefore 50\text{kg N} = \frac{50\text{kg} \times 1\text{kg}}{10\text{kg N}} = 5\text{kgs}$ ✓	(1 mark) (1 mark) (1 mark)
17.	(a) Shading;	(1 mark)
	(b) (i) Protects seedlings from direct sunlight; (ii) Protects seedlings from heavy rainfall which damage seedlings / prevents splash erosion iii) Conserves soil moisture / reduces rate of waterloss	(2 marks)
	(c) (i) Should be laid along North/South orientation; (ii) Should allow in sunlight early in the morning and late in the evening; 1 x 1	(1 mark)

	(d) Raised nursery bed/ Tree nursery/ conference of nursery 1 x 1	(1 mark)
18.	(a) Root nematode/ Eel worm 1 x1 (b) (i) Root swells/formation of root galls/ root knuckles (ii) Wilting of crop even when moisture is adequate; (iii) Retarded growth/ stunted growth of shoots/plants (iv) Discolouration of leaves 2 x1 (c) (i) Crop rotation; (ii) Use of nematicides; (iii) Fumigation of soil; (iv) Soil solarisation; (v) Closed season (vi) plant resistant crop varieties 2 x 1	(5 marks)
19.	(a) Consumable goods inventory. 1 x 1	(1 mark)

(b)

MWAMUZI FARM

RECEIPTS			ISSUES			
DATE	COMMODITY/ ITEM	QUANTITY	DATE	ISSUED TO	QUANTITY	BALANCE IN STOCK
7/7/18	DAP fertilizer	20 bags (~~50kg~~)				20
21/7/18	DAP fertilizer	20 bags (~~50 kg~~)				40
			28/07/18	Gardener	8 bags DAP	32

(3 marks)

(c) It provides information used for drawing Profit and Loss Account and Balance Sheet.

(1 mark)

SECTION C (40 marks)

20.	(a) Risks and uncertainties in farming. (i) Fluctuation of commodity prices. (ii) Physical yield uncertainty where the farmer does not know how much to expect. (iii) Ownership uncertainty. Farmer lose produce through theft fire, death or change in government policy. (iv) Outbreak of pests and diseases which affect expected outcome. (v) Sickness and injury uncertainty. Farmer affected lose ability to work due to sickness or injury. (vi) New production technique ~~and~~ uncertainty. The farmer may not be certain as to whether technology is as effective as the previous one. (vii) Farmer investing in machinery which may become outdated (obsolete) within a short time. (viii) Natural catastrophes. Things like floods, drought, earthquakes, storms and strong winds may destroy the crops. 7 x 1	(7 marks)
	(b) (i) (i) Results to failure in seed germination of ~~seeds~~; (ii) Results to restricted root development; (iii) Results to moisture stress which reduces fruit weight. and (iv) slows rate of growth Reduced rate of photosynthesis. 3 x 1 (ii) (i) Slow growth rate of crops due to slowed photosynthesis; (ii) High incidence of disease infection to crop e.g. late blight. (iii) Lowers the quality of tomato fruits. 3 x 1	(3 marks) 3 marks)

(iii)

i) Agent of soil erosion carrying top fertile soil reducing nutrients.

ii) Causes lodging and damage to crops.

iii) Increases rate of evaporation from soil leading to water loss.

iv) Increases spread of pests and disease attack. 3 x 1 (3 marks)

(c) Advantages of Tillage as a mechanical method of weed control.

i) Cheap therefore a good option for small scale farmers i.e. economical.

ii) Tillage opens up soil allowing infiltration of water to occur and thus minimize soil erosion.

iii) During tillage, earthing up is done which encourages root growth.

iv) During tillage, crop residue is incorporated into the soil to form organic manure.

v) Improves soil aeration.

vi) Exposes soil borne pests and disease agents. 4 x 1 (4 marks)

21. (a) Planting of maize in the field.

i) Plant suitable varieties; / Recommended seeds

ii) Plant early at onset of rain/dry plant;

iii) Plant at 2.5cm to 10cm depth;

iv) Spacing at 20cm to 30cm by 75cm to 90cm;

v) Apply DAP / inorganic fertilizer / well rotten manure at planting at ~~(100-150)kg/ha/manure~~; Time

vi) Plant at 25kg seed per hectare.

vii) Place one or two seeds per hole;

viii) Plant by hand or machine planter;

ix) Use well rotten organic manure at handful per plant.

x) Apply DAP at rate of 100-150kg/ha / 1 tea spoonful per hole.

xi) Mix phosphatic fertilizer / well rotten Manure well with soil.

xii) Cover seeds with soil 7 x 1 (7 marks)

(b) Factors determining spacing ~~crops~~ in bean production

(i) Type of machinery used; use of machines require wider space;

(ii) Soil fertility; fertile soil – closer spacing;

(iii) Type of beans/varieties of beans/ growth habit/indeterminate beans/sp spreading beans require wide spacing;

(iv) Moisture availability; High rainfall – closer spacing;

(v) Use of the crop – ~~forage crop~~ / green pod beans require closer spacing.

(vi) Pest and disease control; ~~wider~~ broke spacing control pest/ and disease spread.

~~(vii) Growth habit of the crop; indeterminate /spreading type requires wider spacing.~~

vii) Number of seeds per hole – more seeds per hole require wider spacing. (7 marks)

7 x 1

(c) -i) Facilitates production of many seedlings in a small area;

ii) Routine management practices are easily and timely carried out in a nursery than in the main seed bed;

iii) Makes it possible to provide the best conditions for growth such as fine tilth, levelled field and shade;

iv) Facilitates the planting of small seeds which develop into strong seedlings that are easily transplanted;

v) It ensures transplanting of only those seedlings that are healthy and vigorously growing;

vi) Excess seedlings from the nursery may be sold, thus become a source of income to the farmer.

vii) reduce time trees take in the main field to mature.

6 x 1 (6 marks)

22.	(a) Maintenance of plucking table in tea. (i) Cut back the tea bush to 5cm above the last pruning height after 2 – 5 years; (ii) Carry out tipping after 3 months; (iii) After many such pruning, tea bush is cut down to 45cm above the ground; (iv) Rehabilitation done after every 40 – 50 years; (v) Use a plucking stick to maintain plucking table during harvesting. 5 x 1	(5 marks)
	(b) Procedure for transplanting onions seedlings. (i) Water the nursery bed ~~one day~~ before transplanting; (ii) Selecting healthy and vigorous growing seedlings; (iii) Lift the seedlings using a garden ~~trowel and~~ put them into a container for transporting to the seedbed; (iv) Plant one seedling per hole at the same depth as it was in the nursery. (vii) Firm the soil around the base. (vi) This should be done preferably late evening or during a cloudy day. (viii) Mulch the seedlings and water them regularly. (xi) Put appropriate amount of fertilizers/manure into planting holes (xii) ~~Apply phosphate fertilizers/manure at planting holes and mix with soil.~~ (xiii) Mix phosphate fertilizer/manure with soil in the hole (xiv) Transplant when seedlings are about one month old (xv) Plant at spacing of 30cm between rows by ~~10cm~~ between plants. 7 x 1	(7 marks)
	(c) Micro-catchments (i) Negarim micro catchment; Are closed grid of diamond shape or open-ended "V"s formed by constructing small earth ridges with infiltration pits for purpose of collecting water. (ii) Contour bunds;	

These are earthen bunds constructed along the contours' and are spaced 5m to 10m apart.

(iii) Contour Ridges;

Are small earth ridges constructed along contours and are spaced 1.5m to 5m apart and are used to conserve water.

(iv) Semi-circular bunds;

These are semi-circular shaped earth bunds with tips, constructed along contour. Used in rangeland hence appropriate for pasture and tree planting.

(v) Trapezoidal bunds;

Are earth bunds which are trapezoidal in shape. They capture surface flow and allows the excess; water to overflow around wing tips.

(vi) Contour stone bunds;

Formed by heaping small stone~~bunds~~s along the contours to slow surface flow and filter eroded soil.

(vii) Rock dams;

Constructed across valleys to slow surface flow.

(viii) Water spreading bunds;

They are used to divert water from watercourse onto crops or pasture.

ix) planting pits; these are extra large planting holes where water from the surrounding collect around the plant base. 8 x 1 (8 marks)