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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.	<ul style="list-style-type: none"> 1 - Date first symptoms were noticed; 2 - Symptoms noticed; 3 - Disease diagnosed/suspected; 4 - Drugs used to treat the diseases; 5 - Cost of treatment; 6 - Remarks; 7 - Animal affected; 	<p>8. Date of treatment</p> <p>Method of treatment</p> <p>Remarks: <i>severity of disease on farm. Prescriptions, method & duration of treatment.</i></p> <p>(Type of animal e.g. Friesian $4 \times \frac{1}{2}$)</p> <p>(2 marks)</p>
2.	<ul style="list-style-type: none"> 1 - Increase soil aeration; 2 - Improve water holding capacity; 3 - Increases soil nutrient content; 4 - Provides food and shelter for micro-organisms; 5 - Binds soil particles together; 6 - Buffers soil pH; 7 - Reduces toxicity of plant poisons; 8 - Improves soil temperatures; 9 - Increase water infiltration; 	<p><i>provide humus</i></p> <p><i>improves soil structure (controls soil structure - erosion)</i></p> <p>4 x 1/2</p> <p>(2 marks)</p>
3.	<ul style="list-style-type: none"> 1 - Sprinklers; 2 - Water pumps; 3 - Pipes; 4 - Filters; 	<p>4 x 1/2</p> <p>(2 marks)</p>
4.	<ul style="list-style-type: none"> 1 - Holds competitive <u>agricultural shows/exhibitions</u>; 2 - Encourages <u>breeding</u> and importation of <u>pure breeds</u> of livestock; 3 - Encourages and assists in official <u>milk recording scheme</u>; 4 - Organizing national <u>ploughing contests</u>; 5 - Publishing a monthly journal; <u>Kenya farmer</u> 6 - Organizing the running of <u>young farmers clubs</u>; 7 - Awarding <u>bursaries</u> for local and overseas students; 8 - Organizing <u>tours</u> for its members; 9 - Organize for national <u>tree planting</u> 10 - Publishes a <u>study book</u> 	<p>(2 marks)</p>

Fertilizer
 Microbial activity
 Pumps
 Don't go for
 full credit
 or
 organize for
 score

5.	<p>Information found on delivery note.</p> <ol style="list-style-type: none"> 1 - <u>Date</u> of delivery; 2 - <u>Quantity</u> and type of goods delivered (<u>particulars</u>); 3 - Item(s) delivered; / <u>Type of goods delivered (particulars)</u> 4 - <u>Person</u> who receives the goods/<u>signature</u> of receiver; 5 - <u>Conditions</u> in which goods are received; 6 - <u>Delivery note serial number</u>; 7 - <u>Person who deliver</u> from; <u>from whom</u> 8 - <u>Signature of the receiver</u>. 	<p>4 x ½ (2 marks)</p>
6.	<p>Implements for primary cultivation.</p> <ol style="list-style-type: none"> 1 - Jembe or fork jembe / hoe; / hoe 2 - Ox-plough; 3 - Disc plough; 4 - Mouldboard plough; 	<p>5. Forked jembe / hoe 6. Rotavator / Rotary cultivator 7. Sub-soiler 8. Chisel plough.</p> <p>4 x ½ (2 marks)</p>
7.	<p>Factors influencing soil formation.</p> <ol style="list-style-type: none"> 1 - Parent rock/bedrock. 2 - Climate; 3 - Topography; 4 - Time; 5 - Living organisms/Biotic factors 	<p>4 x ½ (2 marks)</p>
8.	<p>Importance of ridging in potato production.</p> <ol style="list-style-type: none"> 1 - For expansion of tubers; 2 - To conserve soil moisture; 3 - For easy harvesting; 4 - To prevent soil erosion; 5 - To improve soil drainage. 6 - To prevent greening of tubers. 	<p>To conserve soil & ...</p> <p>4 x ½ (2 marks)</p>
9. (a)	<p>Thinning is the removal of <u>excess</u> seedlings from the seedbed while roguing is <u>removal and destruction</u> of diseased or infected plants.</p> <p>(Mark as a whole)</p>	<p>(1 mark)</p>

* Make use of good handwriting
 * Do not write down
 * Type of rock
 * Importance of ridging

(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. (OWTE) (Mark as a whole)	(1 mark)
10.	Methods of weed control. 1 - Chemical method/use of herbicides; 2 - Uprooting; 3 - Biological method; 4 - Cultural method; 5. Legislative method. 6. Slashing/mowing	(2 marks)
11.	Causes of crop disease. 1 - Fungi; 2 - Virus; 3 - Bacteria; 4 - Poor weather conditions; 5 - Lack of essential elements; Use of clean planting material / Proper seed bed preparation / Proper spacing / mulching / use of cover crop / Crop rotation / Flooding / early planting.	(2 marks)
12.	Importance of land title deed. 1 - Used to secure credit facilities for land development; 2 - Land disputes are minimized; 3 - Encourage farmer to carryout long term investment on the land; 4 - Enables owner to lease the farm and thus get extra income; 5 - Provide security of ownership;	(2 marks)
13.	Agents of erosion. 1 - Water; 2 - Wind; 3 - Human activities; Accept Human. 4 - Living organisms; Reject plants and micro-organs	(2 marks)
14.	1 - Forage has high dry matter content; 2 - Has high cellulose content; (CHO) 3 - High lignin, tannin and silica which are indigestible; 4 - Has low crude protein content;	

Poor ecological conditions
 Dam
 High soil fertility
 High soil fertility
 High soil fertility
 High soil fertility

Crop stress / Lack of
 Excess use of
 chemical / Nitrogen
 fertiliser
 Very dry hamper
 ownership to milk
 Pen...

5	- Has low leaf : stem ratio; /low palatability		
6	- Has low dry matter digestibility;	4 x 1/2	(2 marks)
15.	Agricultural practices that pollute water.		
(i)	Use of inorganic fertilizers;		
(ii)	Use of excess pesticides;		
(iii)	Over cultivation; / Pulverization of soil.		
(iv)	Over grazing;		
(v)	Cultivation along river banks	4 x 1/2	(2 marks)
(vi)	Watering animals directly in surface water source.		

Don't score cultivation along the slope spraying along drain score.

SECTION B (20 marks)

16.	(a) Nitrogenous / straight fertilizer. /Neutral		(1 mark)
	(b) It neutralizes soil acidity;		(1 mark)
	1 • Neutral pH; acidity produced by ammonium ions is counteracted by calcium carbonate which is a liming material.		
	2 • It raises /increase soil pH.		
	3 • It has a liming effect.		
	(c) If 20kg N requires 100kg CAN ✓ is contained in		(1 mark)
	∴ 50kg N requires = $\frac{100\text{kg of CAN} \times 50\text{kg N}}{20\text{kg N}} = 250\text{kg of CAN} \checkmark$ is contained in		(1 mark)
	$\frac{250\text{kg}}{50\text{kg}} = 5 \text{ bags} \checkmark$		
	Alternative method 100kg of CAN = 20kg N ✓ 50kg of CAN = 50kg N ✓ ∴ = 50kg N x 20kg of CAN 100 = 10kg of N ✓		(1 mark)
17.	(a) Shading;		(1 mark)
	(b) 1. Protects seedlings from direct sunlight;		
	2. Protects seedlings from heavy rainfall which damage seedlings; / prevent splash erosion.		(1 mark)
	3. Conserves soil moisture / reduce the rate of water loss.		
	(c) 1. Should be laid along North/South orientation;		
	2. Should allow in sunlight early in the morning and late in the evening;	1 x 1	(1 mark)

Accept Transcription

10kg of N = 1 bag.
∴ 50kg of N = $\frac{50 \times 1}{10} = 5 \text{ bags}$

Accepted Remains only
 withy
 yellow
 purchase
 Mr. J. J. J.
 Pump for budget, profit or loss balance sheet & close
 Done
 50
 20

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	(d) Raised nursery bed; Tree nursery; Containeised nursery	1 x 1	(1 mark)																																		
18.	(a) Root nematode; / Eel worm	1 x 1																																			
	(b) 1. Root swells/formation of root galls; / root nodes 2. Wilting of crop even when moisture is adequate; 3. Retarded growth / stunted. 4. Descolouration of leaves	2 x 1																																			
	(c) 1- Crop rotation; 2. Use of nematicides; 3- Fumigation of soil; 4. Soil solarisation, solarisation 5. Close season 6. Plant resistant varieties.	2 x 1	(5 marks)																																		
19.	(a) Consumable goods inventory.	1 x 1	(1 mark)																																		
MWAMUZI FARM																																					
<table border="1"> <thead> <tr> <th colspan="3">RECEIPTS</th> <th colspan="3">ISSUES</th> </tr> <tr> <th>DATE</th> <th>COMMODITY/ ITEM</th> <th>QUANTITY</th> <th>DATE</th> <th>ISSUED TO</th> <th>QUANTITY</th> <th>BALANCE IN STOCK</th> </tr> </thead> <tbody> <tr> <td>7/7/18</td> <td>DAP fertilizer</td> <td>20 bags (50kg)</td> <td></td> <td></td> <td></td> <td>20</td> </tr> <tr> <td>21/7/18</td> <td>DAP fertilizer</td> <td>20 bags (50 kg)</td> <td></td> <td></td> <td></td> <td>40</td> </tr> <tr> <td></td> <td></td> <td></td> <td>28/07/18</td> <td>Gardener</td> <td>8 bags DAP</td> <td>32</td> </tr> </tbody> </table>				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
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(c) It provides information used for drawing Profit and Loss Account and Balance Sheet.																																					
(1 mark)																																					

SECTION C (40 marks)

20.	<p>(a) Risks and uncertainties in farming.</p> <ul style="list-style-type: none"> (i) Fluctuation of commodity <u>prices</u>. (ii) <u>Physical yield</u> uncertainty where the farmer does not know how much to expect. (iii) <u>Ownership</u> uncertainty. Farmer lose produce through theft; fire, death or change in government policy. (iv) Outbreak of <u>pests and diseases</u> which affect expected outcome. (v) <u>Sickness and injury</u> uncertainty. Farmer affected lose ability to work due to sickness or injury. (vi) <u>New production technique</u> 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 <u>outdated (obsolete)</u> within a short time. (viii) <u>Natural catastrophes</u>. Things like floods, drought, earthquakes, storms and strong winds may destroy the crops. 	<p><i>Quantity to be produced</i></p> <p><i>Affects to farmer</i></p> <p>7 x 1 (7 marks)</p>
	<p>(b) (i) - Results to failure in <u>seed germination of seeds</u>;</p> <ul style="list-style-type: none"> 2- Results to <u>restricted root development</u>; 3- Results to <u>moisture stress</u> which reduces fruit weight. <i>and slows the rate of growth.</i> 4- <i>Reduces rate of photosynthesis.</i> <p>(ii) - <u>Slow growth rate of crops</u> due to slowed photosynthesis;</p> <ul style="list-style-type: none"> 2- High <u>incidence of disease infection</u> to crop e.g. late blight. 3- <u>Lowers the quality of tomato fruits.</u> 3 x 1 	<p>3 x 1 (3 marks)</p> <p>3 marks)</p>

Interpret. Any seven correct points.

writing

No marks

	<p>(iii)</p> <ol style="list-style-type: none"> 1 • Agent of <u>soil erosion</u> carrying top fertile soil reducing nutrients. 2 • Causes <u>lodging</u> and <u>damage</u> to crops. 3 • Increases rate of <u>evaporation</u> from soil leading to water loss. 4 • Increases spread of <u>pests and disease</u> attack. 3 x 1 <p>(c) Advantages of Tillage as a mechanical method of weed control.</p> <ol style="list-style-type: none"> 1 - <u>Cheap</u> therefore a good option for small scale farmers <u>life</u> i.e. economical. 2 - Tillage opens up soil <u>allowing infiltration</u> of <u>water</u> to occur and thus <u>minimize soil erosion</u>. 3 - During tillage, earthing up is done which <u>encourages root growth</u>. 4 - During tillage, <u>crop residue</u> is <u>incorporated</u> into the soil to <u>form organic manure</u>. 5 - Improves soil <u>aeration</u>. 6 - Exposes <u>soil borne pests</u> and disease agents. 4 x 1 	<p>(3 marks)</p> <p>(4 marks)</p>
<p>21.</p>	<p>(a) Planting of maize in the field.</p> <ol style="list-style-type: none"> 1 - Plant suitable <u>varieties</u>; 2 - Plant early at <u>onset of rain/dry plant</u>; 3 - Plant at <u>2.5cm to 10cm depth</u>; 4 - <u>Spacing</u> at 20cm to 30cm by 75cm to 90cm; 5 - Apply <u>DAP</u> at planting at <u>(100-150)kg/ha/manure</u>; 6 - Plant <u>at 25kg seed per hectare</u>. 7 - Place <u>one or two seeds per hole</u>; 8 - Plant by <u>hand or machine planter</u>; 9 - Use <u>organic manure</u> ^{well rotten} <u>at handful per plant</u>. 10. Apply <u>DAP</u> at <u>the rate of 100-150kg/ha/1</u> <u>teaspoon full per hole</u> 11. <u>Mix the fertilizer/manure well with the soil</u> 12. <u>Cover seeds with the soil.</u> 	<p>7 x 1 (7 marks)</p>

	<p>(b) Factors determining spacing crops</p> <ul style="list-style-type: none"> (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 of beans} spreading beans ^{require} wide spacing; (iv) Moisture availability; High rainfall – closer spacing; (v) Use of the crop ^{Green pod beans require} storage crop – closer spacing. (vi) Pest and disease control; ^{pre-pest} wider spacing control pest ^{and disease} spread. (vii) Growth habit of the crop; indeterminate ^{spreading type} requires wider spacing. ^{Number of seeds per hila. 7 x 1} ^{per hila - wider spacing} 	<p>(7 marks)</p>
	<p>(c)- Facilitates production of many seedlings in a small area;</p> <ol style="list-style-type: none"> 2- Routine management practices are easily and timely carried out in a nursery than in the main seed bed; 3 - Makes it possible to provide the best conditions for growth such as fine tilth, levelled field and shade; 4- Facilitates the planting of small seeds which develop into strong seedlings that are easily transplanted; 5 - It ensures transplanting of only those seedlings that are healthy and vigorously growing; 6- Excess seedlings from the nursery may be sold, thus become a source of income to the farmer. 7- ^{Reduce time trees take in main field to} ^{mature -} 	<p>(6 marks)</p>

22.	<p>(a) Maintenance of plucking table in tea</p> <p>(i) Cut back the tea bush to 5cm above the last pruning height after <u>2-5</u> years;</p> <p>3 (ii) Carry out tipping after 3 months;</p> <p>4 (iii) After many such pruning, tea bush is cut down to 45cm above the ground;</p> <p>5 (iv) Rehabilitation done after every 40-50 years;</p> <p><u>6. Use a plucking stick to maintain the plucking table during harvesting.</u></p>	3 x 1 (5 marks)
	<p>(b) Procedure for transplanting onions seedlings.</p> <p>1 (i) Water the nursery bed one day before transplanting;</p> <p>2 (ii) Selecting healthy and vigorous growing seedlings;</p> <p>3 (iii) Lift the seedlings using a garden trowel and put them into a container for transporting to the seedbed / transport carefully to the main field;</p> <p>5 (iv) Plant one seedling per hole at the same depth as it was in the nursery.</p> <p>7 (v) Firm the soil around the base.</p> <p>8 (vi) This should be done preferably late evening or during a cloudy day.</p> <p>9 (vii) Mulch the seedlings ¹⁰ and water them regularly. ^(phosphate) when necessary</p> <p>11 (viii) Put appropriate amount of fertilizers/manure into planting holes and mix with soil. ^{12. Apply phosphate fertilizer/manure during planting}</p> <p>14 (ix) Transplant when seedlings are about one month old. ^{13. Mix well with the soil.} <u>3-6 weeks old</u></p> <p>15 (x) Plant at spacing of 30cm between rows by <u>8-10cm</u> between plants.</p>	7 x 1 (7 marks)
	<p>(c) Micro-catchments</p> <p>(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.</p> <p>(ii) Contour bunds;</p>	<p>→ Contour alone don't score ✓ But ridges in between score</p>

	<p>These are earthen bunds constructed along the contours' and are spaced 5m to 10m apart.</p> <p>(iii) Contour Ridges; Are small earth ridges constructed along contours and are spaced 1.5m to 5m apart and are used to conserve water.</p> <p>(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.</p> <p>(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.</p> <p>(vi) Contour stone bunds; Formed by heaping small ^{stones} <u>stone bunds</u> along the contours to slow surface flow and filter eroded soil.</p> <p>(vii) Rock dams; Constructed across valleys to slow surface flow.</p> <p>(viii) Water spreading bunds; They are used to divert water from watercourse onto crops or pasture.</p> <p>9. Planting pits; These are extra large (8 x 1) (8 marks)</p>	
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Planting holes where water from surrounding collects around the plant.

Score bunds or ridges only