FORM 3 EXAMINATION, 2022

Kenya Certificate of Secondary Education

443/1 AGRICULTURE PAPER 1 (THEORY) TIME: 2 HOURS

1 To remove sediments of solid particl	les - Pests
such as solid particles such as soil, s	and - Weeds
and sticks	- Predators Any four $4 \times \frac{1}{2} = 2$ marks
_ To remove smell and bad taste	9. i) Coffee-berries/cherries
_ To remove chemical impurities such	as ii) Tea –leaves.
excess fluoride	iii) Irish potato-Tuber /stem tuber Rej Root
_ To kill disease causing micro-organi	sms. tuber.
2. (a) To provide nutrients to the micro-	10 Lead to prolonged maturity
organisms responsible for decompos	ition Leads to cracking of fruits before maturity.
(b) To improve the level of phosphorus	and - May cause blossom end –rot
potassium in the resulting manure	- Causes too much of vegetative growth
(c) To introduce micro-organisms neces	hindering fruit formation. Any $3 \times \frac{1}{2} = 1 \frac{1}{2}$
for the decomposition of the organic	11.
materials.	• Grass strips/filter strips
3. (a) Storage pest	Cover cropping
(b) Field pest 4 (i) Wind -may blow away spray wash t	Contour farming
unintended plants while decreasing	Mulching
chemical concentration on intended	Strip cropping
plants.	Grassed /vegetated water ways
(ii) Temperature: increases translocation	• Afforestation/reafforestation
therefore death of the plant	Agroforestry
(iii)Rain –May dilute or wash away the	Crop rotation
chemical to non-toxic level;/may ma	ke the Intercropping $Anv 4 \times \frac{1}{2} = 2 mks$
chemical to leach	12 a) I and fragmentation is a situation whereby
hence killing unintended plants.	a single former owne several percels of land
5. (a) Calcium	a single farmer owns several parcels of fand
(b) Magnesium	scattered over a wide area while land
(c) Iron	subdivision is the partitioning of a piece of
6 Provides breeding ground and hiding	g land into small portions.
places for pests that attack crops.	b) Undersowing is establishment of a pasture
- Traps light showers of rainfall hence	e not under a cover crop, usually maize while
reaching the soil	oversowing is establishment of pasture legume
- It is fire risk	in an existing grass pasture.
- Expensive to acquire, transport and a	apply. 13 - Application of lime
7. i) Apiculture refers to rearing of bees i	n a Application of a basis fortilizer
beehive while aquaculture refers to r	earing - Application of a basic fertilizer
of tish in a fish pond.	- Application of acidic fertilizer
ii) Olericulture refers to growing of	- Application of sulphur. $4 \times \frac{1}{2} = 2 \ mks$
vegetables while pomology refers to	
growing of fruits.	14 Good depth
8 Pathogens	- Properly drained
- Parasites	- Has good holding water capacity
	- mas good notaing water capacity

Agriculture paper 1 ms

Has correct P^{i1} If the transmitter of the proper of the set of the transmitter of the proper of the crop Ary $3 \times 1/2 - 1/2$ 15. Seed purity- Germination percentage. Spacing- Spacing. Number of seeds per hole- The purpose of the crop Ary $3 \times 1/2 - 1/2$. Number of seeds per hole- Use of containers. Approach grafting- Notch prafting. Approach grafting- Notch prafting. Number of seeds per hole- For diluting the house Approach grafting- Notch prafting. Number of seeds per hole- For diluting the house Helps to propagate clones that cannot be propagated in any of the top of tree from being undestriable to distrible roducts Plants with desirable root characteristics e.g. disease resistance, vigorous root system but with undestriable products may be utilized to produce desirable products (i) Capi soil (ii) Soil structure . Soil water holding capacity . Wheat . Soil structure . Soil structure . Soil water holding capacity . Wheat . Soil water holding capacity . Nota . Sub	- Has adequate nutrients supply	- Field hygiene $Any 2 \times 1 = 2mks$
Instruction $ X = 1 mk$ Free from excessive infestation of soil borne pests and diseases. $ X = 1 mk$ 15 Seed purity.16. Centrifugal /rotadynamic pumps.17. Commination percentage Spacing Number of seeds per hole The purpose of the crop $Any 3 \times 1/2 = 1/2$ 16. (a) Side grafting accept grafting Approach grafting Approach grafting Notch grafting decode to strate. Helps to propagate clones that cannot be propagated in any other way Helps to ropard damaged trees. Facilitates changing of the top of tree from being undesirable to desirable. Plants with desirable products may be utilized to produce desirable products. $Any 2 \times l = 1 l/2 mk$ 17 (i) Capillarity $1 \times l = lmk$ 17 (i) Capillarity $1 \times l = lmk$ 18 (a) Smut.(b) Loam soil (c) - Barley Soil eclour Soil acture Soil eclour Soil acture Soil acture Soil acture. <td< td=""><td>- Has correct P^H</td><td>19 (a) Piston /reciprocating nump</td></td<>	- Has correct P ^H	19 (a) Piston /reciprocating nump
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1.1. Control1.1. Control<	15 - Seed purity	- Semi rotary pump
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17 (i) Capitality $1 \times 1 - 1mk$ of investors.(ii) (a) Sandy soil(ii) (a) Sandy soil $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ (b) Loam soil(c) Clay soil $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ (iii) Soil c/clay soil $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ (iv) - Soil structureSoil textureSoil colourSoil acration $Any 2 \times 1 = 2mks$ Soil acration $Any 2 \times 1 = 2mks$ 18 (a) Smut(b) Ustilago spp(c) - BarleySorghumRye(d) - Hot water treatment	17 (i) Capillarity $1 \times l - lmk$	- The system anows for free movement
(i) (a) Sandy soli- The hald is left to fest for a while so as to allow pasture regeneration.(b) Loam soil $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ (c) Clay soil $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ (iii) Soil c/clay soil- No land disputes because the elders of the community will solve any local problems. $Any 4 \times 1 = 4mks$ - Soil texture- Soil texture- Soil colour- Soil aeration $Any 2 \times 1 = 2mks$ - Soil aeration $Any 2 \times 1 = 2mks$ - Inhibition of nitrogen metabolism - herbicide may interfere with the formation of nucleic acid /interfere with enzyme functioning.18 (a) Smut (b) Ustilago spp. (c) - Barley - Oats - Sorghum - Rye - Oats - Sugarcane - Wheat - Sugarcane - No land disputes because the elders of the community will solve any local problems. $Any 4 \times 1 = 4mks$ (d) - Hot water treatment - Use of certified seeds Crow rotation- Inhibiting photosynthesis –Herbicides interfere with chlorophyll formation.(d) - Hot water treatment - Use of certified seeds Crow rotation- Inhibiting respiration –Herbicides block movement of materials from the site of manufacture to other areas. Commut tarting limb	(i) (a) Sandy soil	The land is left to rest for a while so as
(b) Evaluation(c) Clay soll $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ (c) Clay soll $3 \times \frac{1}{2} = 1\frac{1}{2}mk$ - No land dispute regeneration.(iii) Soil c/clay soll- No land disputes because the elders of the community will solve any local problems. $Any 4 \times 1 = 4mks$ (iv) - Soil structure - Soil colour - Soil water holding capacity - Soil aeration $Any 2 \times 1 = 2mks$ (c) - Inhibition of nitrogen metabolism – herbicide may interfere with the formation of nucleic acid /interfere with enzyme functioning.18 (a) Smut (b) Ustilago spp. (c) - Barley - Wheat - Sorghum - Rye - Oats - Sugarcane- Killing the cell:- The cell wall is destroyed and chemical enters the cell cytoplasm killing it.(d) - Hot water treatment - Use of certified seeds Crop sectionAny $2 \times \frac{1}{2} = 1mk$ (d) - Hot water treatment - Use of certified seeds Crop sectionAny $2 \times \frac{1}{2} = 1mk$ (c) - Earley - Soighum - Rye - Sugarcane- Inhibiting photosynthesis –Herbicides interfere with chlorophyll formation.(d) - Hot water treatment - Use of certified seeds - Crop section- Inhibiting respiration –Herbicides block movement of materials from the site of manufacture to other areas.	(h) Loam soil	- The failer's left to rest for a while so as
(i) Carry soli $3 \times 1/2 = 1/2 mk$ (iii) Soil c/lay soliiiii Soil c/lay soli(iv) - Soil structureproblems Soil textureproblems Soil colour Soil colour Soil aeration $Any 2 \times 1 = 2 mks$ 18 (a) Smut(c) - Barley(b) Ustilago spp(c) - Barley Sorghum Rye Oats Sugarcane $Any 2 \times 1/2 = 1 mk$ (d) - Hot water treatment Use of certified seeds Crop proteine C	(c) Clay soil $3 \times \frac{1}{2} - \frac{1}{2} \frac{1}{2} mk$	- No land disputes because the elders of
(iii) Soli Creation(iii) Soli Creation(iii) Soli Creation(iv) - Soil structure-Soil textureproblems. $Any 4 \times 1=4 mks$ - Soil colour-Inhibition of nitrogen metabolism –- Soil colour-herbicide may interfere with the- Soil aeration $Any 2 \times 1=2 mks$ (c) -18 (a) Smut-Killing the cell:- The cell wall is(b) Ustilago sppKilling the cell:- The cell wall is(c) - Barley-Killing the cell:- The cell wall is- Sorghum-Causing abnormal tissue development: Sorghum-Causing abnormal tissue development: Rye-Inhibiting photosynthesis –Herbicides- Oats-Inhibiting respiration –Herbicides block(d) - Hot water treatment-Inhibiting respiration –Herbicides block- Use of certified seedsCorne retation Torp retation Sorghum SougarcaneAny $2 \times \frac{1}{2} = 1 mk$ - Oats Sub contract retation Use of certified seeds Corne retation Corne retation Corne retation Corne retation Oats Sorghum Songhum Sorghum Sorghum Sorghum Sorghum Sorghum	(iii) Soil $c/clay$ soil	the community will solve any local
(iv) - Son structure $Any + x + mxs$ - Soil texture Soil colour Soil colour Soil acration $Any 2 \times l = 2 mks$ 18 (a) Smut-(b) Ustilago spp(c) - Barley Wheat Sorghum Rye Oats Sugarcane $Any 2 \times \frac{1}{2} = 1 mk$ (d) - Hot water treatment Use of certified seeds This is interfere Convert station Convert station Sorghum Rye Sugarcane Use of certified seeds This is the of manufacture to other areas Convert station Convert station Song hom Can be be be block Convert station Song hom Sorghum Rye Sugarcane Sugarcane Song hom Convert station Song hom Subarcane Song hom Song hom Song hom Convert station Song hom Convert station Song hom Song hom Song hom Song hom Song hom- </td <td>(in) solicitation (in) solicitation (in)</td> <td>problems $A_{nv} A > 1 - A_{mks}$</td>	(in) solicitation (in)	problems $A_{nv} A > 1 - A_{mks}$
- Soil colour- Soil acative- Soil acative- Soil acative- Soil water holding capacity- Soil acation $Any 2 \times 1 = 2 mks$ - Killing the cell: - The cell wall is destroyed and chemical enters the cell cytoplasm killing it.18 (a) Smut (b) Ustilago spp. (c) - Barley - Wheat - Sorghum - Rye - Oats - Sugarcane- Killing the cell: - The cell wall is destroyed and chemical enters the cell cytoplasm killing it Causing abnormal tissue development:- Herbicide may cause twisting, gall formation Causing abnormal tissue development:- Herbicide may cause twisting, gall formation.(d) - Hot water treatment - Use of certified seeds Crop station- Any $2 \times \frac{1}{2} = 1 mk$ (d) - Hot water treatment - Use of certified seeds- Inhibiting respiration -Herbicides block movement of materials from the site of manufacture to other areas.	- Soil texture	(c) - Inhibition of nitrogen metabolism –
- Soin coroll- Reference with the formation of nucleic acid /interfere with enzyme functioning Soil aeration $Any 2 \times 1 = 2 mks$ 18 (a) Smut (b) Ustilago spp. (c) - Barley - Wheat - Sorghum - Rye - Oats - Sugarcane- Killing the cell:- The cell wall is destroyed and chemical enters the cell cytoplasm killing it Sorghum - Rye - Oats - Sugarcane- Kany $2 \times 1/2 = 1 mk$ (d) - Hot water treatment - Use of certified seeds- Inhibiting respiration –Herbicides block movement of materials from the site of manufacture to other areas.	- Soil colour	herbicide may interfere with the
Soil aeration $Any 2 \times I = 2 mks$ 18 (a) Smut (b) Ustilago spp. (c) - Barley - Wheat - Sorghum - Rye - Oats - Sugarcane- Killing the cell:- The cell wall is destroyed and chemical enters the cell cytoplasm killing it. - Causing abnormal tissue development:- Herbicide may cause twisting, gall formation.(d) - Hot water treatment - Use of certified seeds Cran rotation- Any $2 \times \frac{1}{2} = 1 mk$ (d) - Hot water treatment - Use of certified seeds Cran rotation- Inhibiting respiration -Herbicides block movement of materials from the site of manufacture to other areas.	- Soil water holding capacity	formation of nucleic acid /interfere with
18 (a) Smut- Killing the cell:- The cell wall is destroyed and chemical enters the cell cytoplasm killing it.(c) - Barley - Wheat - Sorghum - Rye - Oats - Sugarcane- Causing abnormal tissue development:- Herbicide may cause twisting, gall formation.(d) - Hot water treatment - Use of certified seeds- Inhibiting respiration -Herbicides block movement of materials from the site of manufacture to other areas.	- Soil aeration $Any 2 \times 1 - 2 mks$	enzyme functioning
To (a) binatThe cent wait is(b) Ustilago spp.destroyed and chemical enters the cell cytoplasm killing it.(c) - Barley- Wheat- Sorghum- Causing abnormal tissue development:- Herbicide may cause twisting, gall formation Rye- Oats- Sugarcane $Any 2 \times \frac{1}{2} = 1 mk$ (d) - Hot water treatment - Use of certified seeds- Inhibiting respiration -Herbicides block movement of materials from the site of manufacture to other areas.	18 (a) Smut	- Killing the cell: The cell wall is
(b) Costinge spp. $adsurble current enterindument enterindument enterindument enterindument enterindument enterindument enterindument enterindum enterindument enterindum ent$	(h) Ustilago spp	destroyed and chemical enters the cell
(c)DarkeyCousing abnormal tissue development: Wheat- Causing abnormal tissue development: Sorghum- Herbicide may cause twisting, gall- Rye- Oats- Oats- Inhibiting photosynthesis –Herbicides- Sugarcane $Any 2 \times \frac{1}{2} = 1 mk$ (d) - Hot water treatment- Inhibiting respiration –Herbicides block- Use of certified seeds- Inhibiting respiration –Herbicides blockComposite of certified seeds- Composite of the site of- Composite of the	(c) - Barley	cytoplasm killing it
- Sorghum- Bye- Herbicide may cause twisting, gall formation Oats - Sugarcane- Inhibiting photosynthesis –Herbicides interfere with chlorophyll formation.(d) - Hot water treatment - Use of certified seeds- Inhibiting respiration –Herbicides block movement of materials from the site of manufacture to other areas.	- Wheat	- Causing abnormal tissue development-
$\begin{array}{cccc} & - & \text{Rye} \\ & - & \text{Oats} \\ & - & \text{Sugarcane} & Any 2 \times \frac{1}{2} = 1 \ mk \\ \end{array}$ $(d) - & \text{Hot water treatment} \\ & - & \text{Use of certified seeds} \\ \end{array}$ $\begin{array}{ccccc} & - & \text{Inhibiting photosynthesis} -\text{Herbicides} \\ & \text{interfere with chlorophyll formation.} \\ - & \text{Inhibiting respiration} -\text{Herbicides block} \\ & \text{movement of materials from the site of} \\ & \text{manufacture to other areas.} \\ \end{array}$	- Sorghum	Herbicide may cause twisting, gall
a - Oats a - Inhibiting photosynthesis –Herbicides a - Sugarcane $Any 2 \times \frac{1}{2} = 1 mk$ a - Inhibiting photosynthesis –Herbicides(d) - Hot water treatment a - Inhibiting respiration –Herbicides block a - Use of certified seeds a - Inhibiting respiration –Herbicides block a - Use of certified seeds a - Inhibiting respiration –Herbicides block a - Use of certified seeds a - Inhibiting respiration –Herbicides block a - Use of certified seeds a - Inhibiting respiration –Herbicides block	- Rve	formation
- Sugarcane $Any 2 \times \frac{1}{2} = 1 mk$ (d) - Hot water treatment - Use of certified seeds Crop rotation - Sugarcane $Any 2 \times \frac{1}{2} = 1 mk$ - Inhibiting respiration –Herbicides block movement of materials from the site of manufacture to other areas.	- Oats	- Inhibiting photosynthesis –Herbicides
(d) - Hot water treatment - Inhibiting respiration –Herbicides block - Use of certified seeds - manufacture to other areas.	- Sugarcane Anv $2 \times \frac{1}{2} = 1 mk$	interfere with chlorophyll formation
(d) - Hot water treatment movement of materials from the site of - Use of certified seeds manufacture to other areas. Connect stating lmk		- Inhibiting respiration –Herbicides block
- Use of certified seeds manufacture to other areas.	(d) - Hot water treatment	movement of materials from the site of
Cron rotation Convect stating limb	- Use of certified seeds	manufacture to other areas.
- Clop Iolation Correct Stating - Titk	- Crop rotation	Correct stating -1mk

Correct explanation -1 mk	- To make subsequent operations possible such
$5 \times 2 = 10 marks$	as planting, fertilizer application, rolling,
(d) - They reduce the speed of running water	ridging
thus reducing its erosive power.	- To encourage water infiltration into the soil.
- They protect the soil below from rain drop	Any $6 \times 1 = 6$ mks
erosion by reducing the force with which	(d) - To prevent exposure of humus to adverse
it falls onto the ground.	conditions such as heat that cause
- They provide shade and reduce loss of moisture through evaporation	volatilization of nitrogen
- They act as wind breaks	- To prevent disturbance of roots and
- Tree roots bind soil particles together.	nitrogenous structures e.g. tubers and bulbs
- Their leaves decay to supply humus to the	- To conserve moisture by not exposing the soil
soil which improves infiltration rate of the	to sun heat hence reducing evaporation of
soil Any $4 \times l = 4$ mks	available moisture
21 (a) - Increase the rate of evaporation of	- To maintain soil structure by reducing number
moisture from the soil reducing water in	of cultivation
the soil for plant use	To reduce cost of cultivation or ploughing by
- Causes lodging in cereals and damage	reducing the number of operation
- Causes longing in cerears and damage	To control soil crossion when mulching and
Blows away rain bearing clouds causing	- To control son crossion when multilling and
- Blows away fail bearing clouds causing	22 (a) (i) Near the water source for each
A sta as agent of soil proving reducing soil	22. (a) (f) Near the water source for easy
- Acts as agent of son crosson reducing son	(ii) Type of acil, should be well, drained, door
Increase the rate of even strong institution	(ii) Type of soil –should be well –drained, deep
- increase the rate of evaporalispiration	
causing writing in crops.	(iii) I opography –should be gentle sloping to
- Increase the spread of pest and diseases	(in) Security should be used used from the f
From one crop to another	(iv) Security-should be well protected from their
- Destroy farm structures.	and destruction by animals and birds.
Any $3 \times I = 3$ mks	(v) Well sheltered place-10 prevents strong wind
(b) (1) Crop production –growing of crops on	which can uproot seedlings and cause
cultivated land	excessive evapotranspiration.
(ii) Livestock farming –keeping of animals	(vi)Previous cropping-Area where the same crop
(111)Agricultural engineering –Branch that	species had been planted should be avoided to
deals with use and maintenance of	prevent buildup of pest and diseases.
farm tools, machinery and structures.	(vii)Accessibility-should be where the farmer can
(iv)Agricultural economics –Branch that	reach easily.
deals with the utilistation of scarce	Mark as a whole (correct stating
resources to maximize output while	&explanation)
minimizing cost. $4 \times I = 4$ marks	Any $5 \times 1 = 5$ mks
(mark as a whole)	(b) (i) They are highly soluble in water
(c) - To kill weeds	(ii) They are easily leached
- To incorporate manure and other	(iii)They have short residual effect
organic matter into the soil	(iv)They have scorching /Burning effect on crops
	(v) They are highly volatile
- To destroy different stages of crop pest	(vi)They are hygroscopic /able to absorb moisture
e.g. eggs, larvae, pupae and adult	from the atmosphere.
- To aerate the soil	(vii) They are highly corrosive. Any $5 \times l = 5$ mks
- To encourage penetration of roots in the soil.	

- (c) Growth habit of the crop –spreading and tillering crop varieties require wider spacing than erect type.
- Pest and disease control –crops can be widely spaced to discourage pests and disease causing organisms from moving one crop to another.
- Use of crop –crop grown for forage or silage materials is planted at a closer spacing than for grain production.
- Moisture availability –Areas with a lot of moisture (higher rainfall) are capable of supporting a large number of plants hence closer spacing than areas of low moisture /rainfall.
- The size of the plant –Tall crop varieties require wider spacing while short varieties require closer spacing.
- Soil fertility –A fertile soil can support high plant population hence closer spacing is possible than less fertile soil.
- Type of machinery to be used –the space between the rows should allow free passage of the machinery which can be used in the field.

(Any 5 correctly stated and explained) Correct stating -1 mk Correct explanation -1 mk $5 \times 2 = 10$ mks