**MARKING SCHEME**

443/1

AGRICULTURE PAPER 1

March/April, 2020

Time: 2 hours

**AGRICULTURE PAPER 443/1**

**ARISE AND SHINE TRIAL 1 EXAM -2020**

**SECTION A (30 MARKS)**

*Answer all the questions in this section in the spaces provided*

1. **Give two ways that can be used to assess soil fertility (1 mark)**
* The vigour of growing crops
* Soil testing/Soil analysis
* The yield of crops
* Leaf stem testing
1. **List four methods that can be used to reclaim a water-logged land (2 marks)**
* By providing drainage
* Adding organic matter/manure
* Use of agricultural lime
* Planting eucalyptus trees which absorb a lot f water
* Use of cambered beds
* Use of open ditches
* Use of French drains
1. **State four reasons why subsoiling is important as an operation of land preparation. (2 marks)**
* Helps in breaking up of hardpans in areas where they have formed
* Improves drainage and aeration in the soil
* Brings to the surface minerals which might have been leached to the deep layers
* It leads to proper penetration and development of roots
* It pulls out deep rooted perennial weeds
1. **Give two factors that influence the quality of farmyard manure. (1 mark)**
* Type of animal used
* Type of litter used
* Method of storage
* Age of farm yard manure
1. **State four advantages of applying lime as a measure of improving soil condition (2 marks)**
* To raise the pH of the soil
* To improve fertility of soil
* To improve the structure of the soil
* To improve the process of nodulation in legumes (4x1/2=2mks)
1. **State three functions of Nitrogen in crops. (1 ½ marks)**
* Constituent of chlorophyll
* Promoted crop vegetative growth
* Protein synthesis
* Regulates availability of phosphorous and potassium in the soil
* Improves the quality of leafy crops
* (Any 3 x ½ = 1 ½ )
1. **Give four factors that can increase seed rate in crop production. (2 marks)**

* Seed impurity

Low –germination percentage

Close spacing

More seeds per hole/broadcasting

dry planting

(Any 4 x ½ = 2mks)

1. **State four uses of organic mulch in crop production. (2 marks)**
* Conserves water
* Reduces soil erosion
* Suppresses weeds/growth of weeds
* Improve soil structure upon decomposition
* Adds fertility of the soil upon decomposition
1. **List four characteristics of crops grown for green manure. (2 marks)**
* Should be highly vegetative or leafy
* They should have a fast growth rate
* They should have high nitrogen content thus leguminous plants are preferred
* The plants must be capable of rotting quickly
* The plants should be hardy i.e. should be capable of growing in poor conditions.
1. **List four advantages of timely harvesting of crops. (2 marks)**
* To get the desired concentration of chemical’s in the produce
* Helps the farmer to realize high profits
* To avoid harsh weather conditions
* To benefit from high market demand of the produce
* Attack by pests is avoided
1. **State two advantages of intercropping (1 mark)**
* Leads to high yield per unit area
* Soil erosion is reduced by better ground cover
* There is maximum utilization of nutrients
* It interrupts rapid spread of pests and diseases

It is an assurance against total crop failure

1. **State two conditions under which the opportunity cost is zero in a farming enterprise.**

 **(1 mark)**

* Free gift
* No choice/alternative
1. **Give four advantages of sprinkler irrigation. (2 marks)**
* Easy to install
* Easy to control the amount of water used
* It can be practiced in slope grounds
* Chemicals and fertilizers can be applied together with irrigation water.
* It Supply adequate amount of water to crops

14.  **State four disadvantages of weeds in crop production (2 marks)**

* They compete with crops for nutrients, space and light and soil moisture hence reducing crop yields.
* Some e.g. witch weed (Striga sp) are parasite to cultivated crops e.g. maize
* Some weed seeds lower the quality of agricultural produce. Some get attached to sheep wool lowering its quality
* Some weeds are poisonous to man and livestock e.g. Datura stramonium
* Some weeds act as alternate hosts for insect pests and others for disease e.g. wild oats is an alternate host for rust.
* Some weeds are allelaphatic i.e. produce poisonous substances that may suppress the growth or germination of cultivated plants
* Some block irrigation channels
* Aquatic weeds affect fishing
* Weeds lower the quality of pastures e.g. Lantana camara
* Some weeds are difficult to handle and control because they irritate the workers hence reducing the efficiency in which they are controlled e.g. stinging nettle and devils horsewhip

**15. Give three reasons for the success of settlement schemes in Kenya after independence**

 (1½ marks)

* There was high population pressure in the African reserves
* The settlers ware provided with credit facilities in kind to start off
* Settlers came from far distances and were able to break away from the traditional society and embraced the new changes
* Extensions services were provided to adopt new techniques of agricultural production
* There was organised marketing of agricultural products through the formation of primary co-operative societies

**16. State four factors affecting the efficiency of pesticides. (2 marks)**

* Concentration
* Timing of application
* Weather conditions at the time of application
* Persistence

**17. State four factors that influence solifluction. (2 marks)**

* Slopes of the land
* Climate e.g. amount of rainfall
* Nature of the material
* Human activities
* Forces within the earth crust

**18. Give a reason for carrying out of the following practice**

**(a). topdressing established crops. (1 mark)**

* replenish nutrients/ensure nutrient balanced

**SECTION B (20 MARKS)**

***Answer all the questions in the spaces provided***

19. Below is a diagram of a type of soil structure. Study it and answer the questions that follow.



1. **Identify the soil structure illustrated above. (1 mark)**
	* + Platy soil structure
2. **Give one way in which the structure illustrated above limit crop production.**

**(1 mark)**

* Inhibit root penetration in the soil
* Inhibit/impedes drainage
* Encourage soil erosion by encouraging run-off during rains

**20. Study the illustration given below and use it to answer the questions that follow.**



1. **Identify the operation illustrated above. (1 mark)**
* Annuall prunning
1. **State four reasons for carrying out the operation named in (a) above (2 marks)**
* To regulate quality/bearing and quality of the fruits
* To remove dead, broken or diseased branches
* To open up the plant for light penetration
* To create an unfavourable environment for the disease
* Eases penetration of chemicals

21. A farmer has four plots L1, L2, L3 and L4 as shown in the table below. Each plot has an agronomic problem as indicated.

**L1 L2 L3 L4**

Infected with witch Infected with Deficient in Prone to soil

Weed bacterial Nitrogen erosion

(striga spp) wilt

Plan a crop rotation programme for the first year in the four plots using the following crops maize, Irish potatoes, Rhodes grass and Beans (2 marks)

L1- Irish

L2- Maize

L3- Beans

L4-Rhodes grass

**(b). Give reasons to justify the plan you have made in plots L2, L3 and L4. (3marks)**

* L2-soil infected with bacteria wilt does not require Irish potatoes and beans hence maize grown.
* L3- soil deficient of nitrogen requires legumes hence beans are most suitable.
* L4-soil prone to erosion requires a cover crop with fibrous roots and hence Rhodes grass grown.

**22. Mr. Mulamba was advised to apply 150kgCAN/ha, while topdressing his maize crop. CAN contains 21%N. Calculate the amount of nitrogen applied/ha (4 marks)**

21kgN is contained in 100kgCAN 1mk

150kgCAN supplies

100kgCAN=21kgN 1mk

150kgCAN =21kgNx150kgCAN 1mk

 100kgCAN

 =31.5kgN/ha 1mk

23. Observe the diagram below and answer the questions that follow.

**(a). Identify the mode of feeding exhibited by a pest having such features. (1 mark)**

* Biting and chewing

**(b). Name any two pests with the above feeding habits. (2 marks)**

* Locusts
* Crickets
* Army worms
* Bollworms
* Beetles
* Grasshoppers
* Maize stalk borers
* Cut worms
* Termites
1. (a) The diagram below shows a nursery management practice carried out on a tree seedling. Study it and answer the questions that follow.

 **(a) Identify the management practice. (1 mark)**

* Root pruning

(b). Give **two** reasons for carrying out the practice above. (2 marks)

- make lifting easier

- reduce damage at time of transplanting

- encourage growth of a dense networks of lateral roots

**SECTION C (40 MARKS)**

*Answer any* ***two*** *questions from this section in the spaces provided after questions.*

**25. (a) Describe harvesting of cotton under the following sub-headings**

**i. Procedure (3 marks)**

* + - Bolls are picked manually when fully open and dry
		- Picking is done during dry weather
		- It is done weekly to avoid decolouration of lint

**ii. Precautions (4 marks)**

* + - Pick from fully opened bolls
		- Do not mix cotton with foreign matter e.g. leaves and small twigs
		- Use separate containers for separate cotton grades
		- Avoid using sisal bags for collecting the bolls because their fibres may mix withthe sad cotton thus creating problems during ginning.

 **(b). Outline five measures taken to prevent water pollution (5 marks)**

* + - Fencing water sources
		- Installing soil conservation measures
		- Treating industrial effluents before dumping them into water sources.
		- Using non-chemical methods in Agriculture such as organic farming
		- Avoiding grazing cattle/livestock near water sources
		- Treating sewage before directing it into water bodies

 **(c). Explain four ways in which biotic factors influence crop production in Agriculture (8 marks)**

* + - Pest-They feed on part/whole plat reducing the yields
		- Transmit diseases to crops
		- Parasites-Transmit diseases to livestock/suck blood leading to Anaemia
		- Decomposers-break down organ matter releasing nutrients to plant
		- Pathogens-Transmit diseases to crops and livestock
		- Predators-The kill other animals/some eat pest reducing population
		- Pollinators-transfer pollen grains from plaint to plant causing pollination and fertilization
		- Nitrogen fixing bacteria-convert atmospheric nitrogen to nitrate-making it available to plant

Stating 4x1=4mks

Explaining 4x1=4

**26. (a). Explain five farming activities which may encourage soil erosion. (10 marks)**

* + - Continuous cropping/frequent cultivation, pulverizes the soil making it easy to detach and carry it away
		- Burning of land to destroy vegetation cover and exposes soil to soil erosion
		- Overstocking leads to overgrazing; which destroys ground cover exposing it to agents of erosion
		- Ploughing up and down the slope; create channels which speed up and increase the speed and erosive capacity of water.
		- Cultivation of the soil when too dry; this destroys soil structure making it eroded.
		- Overstocking, detach and carry away soil particles
		- Deforestation/clean weeding; leave soil bare, exposing to agents of soil erosion

**(1x5=5mks for stating and 5x1=5mks for explanation=10mks)**

 **(b). Explain the importance of a nursery in crop propagation. (5 marks)**

* + - Excess seedlings can be sold to earn income
		- It facilitates production of many seedling in a small area
		- Routine management practices are easily and timely carried out than in the main seedbed
		- Facilitates planting of small seeds
		- It ensures transplanting of only healthy and strong seedlings
		- The crops takes a shorter time in the field
		- Tender seedlings are given maximum attention
		- Gives a higher germination percentage hence a lower seed rate is used

**(Any 5x1=5mks)**

 **(c). Give the contributions of settlement schemes to agricultural development.**

 **(5 marks)**

* + - Improved land use as idle land has been put undo productive use.
		- Increased agricultural production as more land has been put under agricultural production through settlement of the landless.
		- Marketing co-operatives have enhanced the selling of farm produce. This helps in maximizing profits in agriculture
		- Enhanced development of infrastructure e.g. roads, water provision, telecommunication and schools

**27. (i). Field preparation (4 marks)**

* + - Seeds bed is prepared early enough/during dry season to allow time for residues to rot
		- Clear the lad
		- Ploughing n(primary cultivation) is done either manually or mechanically
		- After primary cultivation, secondary cultivation is done where the seed bed is rough. Harrowing is done to achieve appropriate tilth i.e. medium tilth

**(1x3=3mks)**

 **(ii). planting (3 marks)**

* + - Crop planted at the onset of rains except during the long rains when planting may be delayed to avoid rotting of the crop before harvesting
		- Two seeds are planted per hole
		- Spacing is 30cm – 45cm x 15 cm
		- Depth of planting is 2.5cm – 10cm depending on moisture availability and type of soil
		- Apply phosphatic fertilizer at planting
		- Diammonium phosphate is applied at the rate of 200kg/hac
		- Seed rate is 50-60kg/hac

(1x3=3mks)

 **(iii). Field management practices. (5 marks)**

* + - Gapping is done immediately after germination to replace the empty gaps
		- Thinning s done to remove excess seedlings to maintain plant population
		- Weeding is don when the field is dry to avoid spreading diseases
		- Shallow weeding is practiced
		- Hand weeding is practiced
		- Weeding should be done before flowering to avoid knocking down flowers.
		- Pest such as aphids, bean bruchid, spotted borer, American boil worn, bean fly and golden ring moth should be controlled by spraying with appropriate insecticides, i.e. formation,diazinon and dimethoate
		- Disease control should be done because this causes great loss. Some of these diseases include bean rust, anthracnose, halo blight and mosaic etc. These are controlled by spraying with appropriate copper fungicide to control fungal diseases. Rogueing is also practiced to control some of the diseases. (1x5=5mks

**(b). Outline the advantages of a mixed grass legume pasture over pure grass. (8 marks)**

* + - It’s more palatable
		- Famers has security against total loss due to attack by pests, diseases or bad weather
		- Mixed pasture yields more per unit area than pure grass pasture
		- Mixed pasture make maximum use of soil nutrients
		- Mixed pasture has better weed control effects
		- Mixed pasture increases soil fertility because of Nitrogen fixation
		- There is economy in use of fertilizers in mixed pasture
		- There is better distribution of growth in a mixture of early and late maturity species

(Any 8x1=8 mks)