**TERM 2 2022 OPENER EXAM FORM 4**

**443/1**

**AGRICULTURE**

**PAPER 1**

**TIME: 2 HOURS**

**MARKING SCHEME**

**SECTION A (30 MARKS)**

**Answer all questions in this section**

1. Give two disadvantages of intensive system of farming. (1mk)

* **Requires high initial capital/Expensive**
* **Is labour intensive**
* **Requires high level of management/skilled labour**

1. List four methods of farming. (2mks)

* **Shifting cultivation**
* **Nomadic pastoralism**
* **Organic farming**
* **Mixed farming**
* **Agroforestry**

1. Give the meaning of the following terms:

a) Nitrogen fixation into the soil; (1mk)

* **Process in which atmospheric nitrogen is converted to nitrates for plant uptake**.

b) Phosphorus fixation in loss of soil fertility. (1mk)

**Process in which phosphorous combines with other elements to form compounds that cannot be absorbed by plants**

4. Give four reasons for keeping livestock health records on the farm. (2mks)

* **Help in calculation of treatment and health costs**
* **Help in culling/selecting livestock**
* **Help in future diagnosis treatment and control measures**
* **Help determine the common diseases and parasites/prevent diseases and parasites**
* **Help to support livestock insurance claims**

5. Explain the relationship between scarcity and choice as used in agricultural economics. (2mks)

* **Scarcity is where production resources are limited in supply relative to demand; therefore a choice has to be made on which enterprise(s) to allocate the limited resources. \**(Mark as a whole)\****

6. Sate two reasons for land fragmentation in Kenya. (1mk)

* **Buying/selling/paying debts/compensation**
* **Inheritance**
* **Settlement and resettlement**
* **Gifts/donations**
* **Shifting cultivation**

7. Give four advantages of individual owner operator tenure system as practiced in Kenya. (2mks)

* **Easy to acquire credit.**
* **Land disputes are minimized**
* **Long term investment is encouraged**
* **Incentive to conserve and improve land**
* **Easy to plan and make decisions**
* **Easy to sell/lease whole or part of the land**

8. Sate four features that should be considered when choosing water pipes for use on the farm. (2mks)

* **Durability**
* **Strength/ability to withstand pressure/thickness of the wall of the pipe**
* **Diameter/size of the pipe**
* **Workability/maneuverability of the pipe**
* **Colour**

9. Give four reasons for treating water for use on the farm. (2mks)

* **Remove chemical impurities/softening of water**
* **Kill disease causing organisms/kill germs/pathogens**
* **Remove bad smells and taste**
* **Remove impurities of solid particles**

10. Give two reasons for carrying out each of the following operations in land preparation:

a) Rolling; (1mk)

* **Increases seed soil contact**
* **Compacts soil/seed to protect it against agents of erosion**
* **Crushing large soil clods**

b) Leveling. (1mk)

* **Ensures uniform depth of planting/uniform germination/uniform fertilizer application**
* **Ensures uniform water level in paddy rice fields**
* **To remove depression which collect water leading to rotting of seeds**

11. List two aspects of light that affect agricultural production (1mk)

* **Light intensity**
* **Light duration**
* **Light wavelength**

12. State four factors considered when determining the time of planting (2mks)

* **Rainfall pattern/ moisture content of the soil**
* **Type of crop to be planted/growth habit**
* **Purpose of the crop**
* **Prevalence of pests, diseases, frost and other adverse ecological conditions**
* **Market demand**
* **Weather conditions at the time of harvesting**

13. List four advantages of the title deed to a farmer (2mks)

* **Reduces land disputes**
* **Acts as security of land ownership**
* **Can be used as security to secure loans**
* **Encourages farmers to carry out long term investments in the farm**

14. Name the plant part used for vegetative propagation of each of the following plants: (2mks)

(a) Cassava

* **Stem cuttings/stems**

(b) Sisal

* **Bulbils**
* **Suckers**

(c) Pyrethrum

* **Splits**

(d) Sweet potatoes.

* **Vines**
* **Root tubers**

**15.** Name four settlement schemes that the Kenyan government started as a result of the success of the Million Acre Scheme**. (2 marks)**

* **Jet schemes**
* **Haraka schemes**
* **Shirika schemes**
* **Lari settlement schemes**
* **The squatter’s settlement schemes**
* **Harambee settlement schemes**

16. What is the meaning of seed dressing (1mk)

* **Seed dressing is the process of coating seeds with appropriate insecticides or fungicide chemicals to prevent the seed from soil borne diseases**

17. What four factors would you advise a farmer to consider when siting a tomato nursery (2mks)

* **Type of soil**
* **Nearness to water source**
* **Topography**
* **Security**
* **Previous cropping**
* **Well sheltered place**

**SECTION B (20 MARKS)**

18. The following is a list of plant nutrients; Copper, Calcium, Nitrogen, Molybdenum, Zinc,

Phosphorus, Carbon, Sulphur, Iron and Magnesium.

Which of the above plant nutrients are:

(a) Macro-nutrients (1mk)

* **Calcium;**
* **Nitrogen;**
* **Phosphorous;**
* **Carbon;**
* **Sulphur;**

**Magnesium**. \****Mark as a whole\****

(b) Micro-nutrients (1mk)

* **Copper;**
* **Molybdenum;**
* **Zinc;**
* **Iron.** \****Mark as a whole\****

(c) Fertilizer elements (1mk)

* **Nitrogen,**
* **Phosphorus**
* **Potassium.**

***\*Mark as a whole\****

(d) Liming elements. (1mk)

* **Calcium;**
* **Magnesium ;**
* **Sulphur**.

***\*Mark as whole\****

(e) Mineral whose deficiency causes blossom end rot in tomatoes (1mk)

* **Calcium**

19. a). A farmer was advised to apply 150 kg CAN (21%N) per hectare while topdressing his maize crop. Calculate the amount of nitrogen applied for two hectares (3mks)

**100kg CAN-------------------21kgN**

**150kgCAN----------------150kgCANx 21kg N**

**100kgCAN**

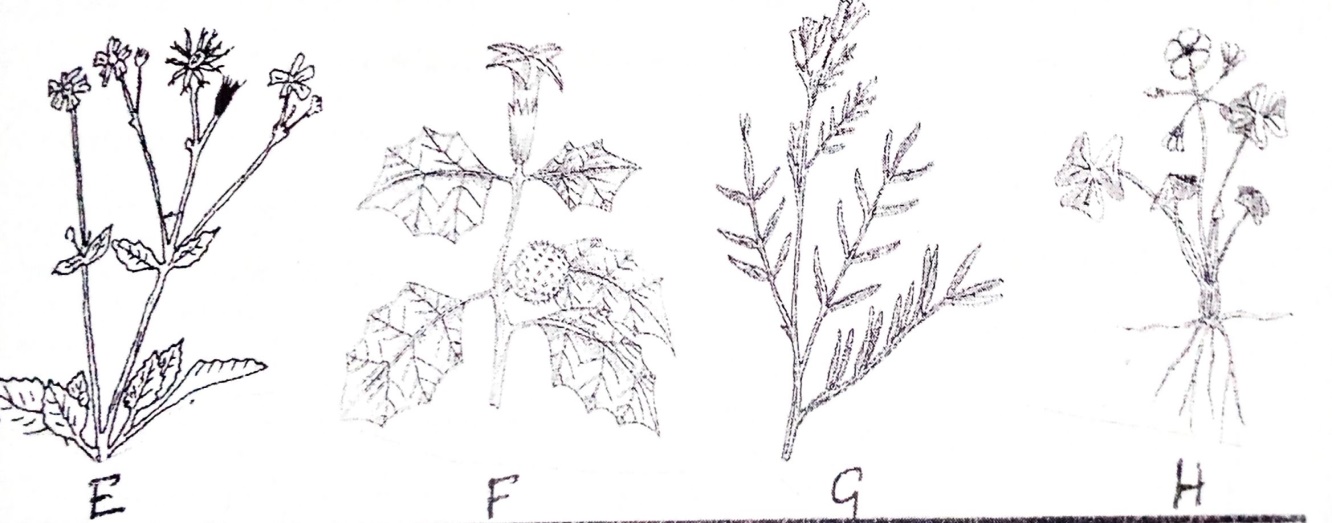
**=31.5kgN/ha**

**2 hectares = 31.5x2 = 63kg N/2 ha**

b) Give two forms in which Nitrogen is absorbed by plants (2mks)

* **Nitrate ions**
* **Ammonium ions**

20. Below are illustrations of types of weeds. Study them and answer the questions that follow.



1. Identify the weeds labelled E, F, G and H. (4mks)

**E-** **Black jack (*Bidens pilosa)***

**F- Thorn apple (*Datura stramonium*)**

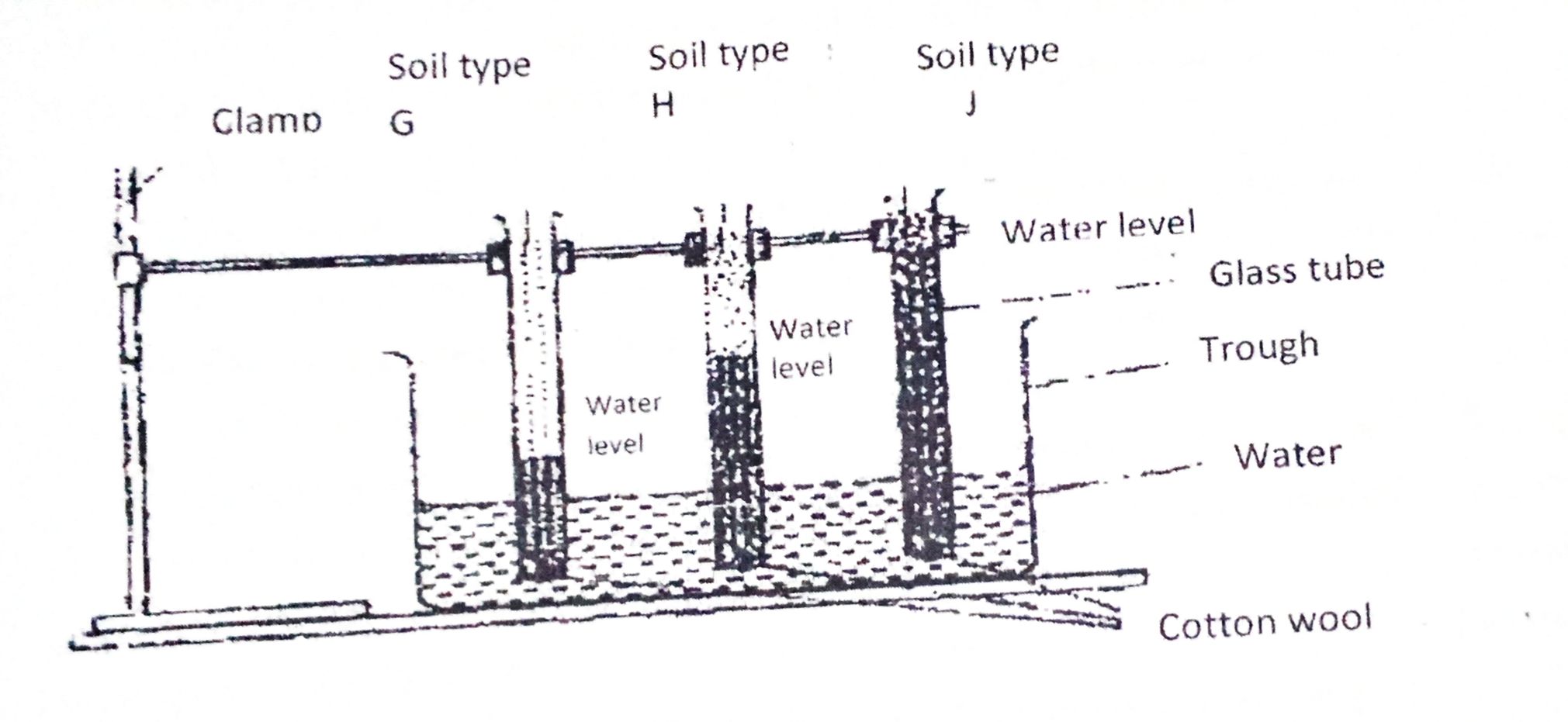
**G- Mexican marigold (*Tagetes minuta*)**

**H-Oxalis (*Oxalis latifolia*)**

1. Why is it difficult to control weed H (1mk)

* **Has bulbs which are underground and difficult to remove**

21. Below shows an experiment set up and observations made after 24 hours. Study it and answer the questions below



1. What is the experiment below designed to study (1mk)

* **Capillarity**

1. Names soil types G, H and J (3mks)

G**-Sandy**

**H-Loamy**

**J- Clayey**

1. How can a farmer improve the structure of soil type G (1mk)

* **Addition of organic manure/ organic matter**

**SECTION C (40 MARKS)**

**Answer any two questions from this section**

22. (a) Explain seven physical methods of pest control. (7mks)

* **Use of lethal temperature to kill the pests;**
* **Proper drying of produce to make it hard for pest to penetrate;**
* **Flooding drowns and kills pests;**
* **Suffocation to kill the pests in air tight containers;**
* **Physical killing of the pests /trapping and killing;**
* **Use of scarecrows /scaring away the pests;**
* **Use of physical barriers to prevent infestation by the pests;**
* **Use of electromagnetic radiation to kill the pests.**

(b) Explain eight factors that contribute to the competitive ability of weeds. (8mks)

* **Some produce large seed quantities to enhance survival chances;**
* **Some remain viable in the soil for a long time to await favorable conditions to germinate**
* **Some are easily and successfully dispersed to enhance chances of survival;**
* **Some have ability to propagate vegetatively into new plants;**
* **Some have extensive root system to enhance survival in drought conditions;**
* **Some have adaptations to survive where water/nutrients are limited through water and food storage modifications**
* **Some have a short life cycle which is completed early before adverse climatic conditions set in**
* **Some irritate animals as a protective measure against grazing, trampling/some are tolerant to pests and diseases.**
* **Some are heavy feeders they make food faster than crop establishes.**
* **Some weeds have allelopathic effects which suppresses growth of other plants enhancing their survival.**

(c) Describe the harvesting of coffee. (5mks)

* **Pick red ripe berries/cherries;**
* **Spread the berries on sisal mats and sort them out into Grades 1, 2 and 3 (Mbuni)**
* **Deliver grades 1 and 2 to the factory for pulping same day;**
* **Dry grade 3;**
* **Deliver grade 3 to factory at the end of harvesting season;**
* **Picking interval of 7 - 14 days**.

23 a) Explain eight factors that can encourage soil erosion. (8mks)

* **Lack of ground cover exposes soil to agents of soil erosion/removal of cover crops**
* **Steep slopes increase the speed of surface run-offs hence erosive power of water**
* **Light/sandy soils are easily carried away by agents of soil erosion.**
* **Shallow soils are easily saturated with water and carried away**
* **High rainfall intensity on bare ground/leads at detachment of soil hence run off**
* **Frequent cultivation/over cultivation pulverizes the soil making it easy to detach and carry away.**
* **Overstocking leads to overgrazing which destroys ground cover exposing it to agents of erosion.**
* **Burning/deforestation destroys vegetation cover and exposes soil to agents of erosion.**
* **Ploughing up and down the slope creates channels which speed up and increases the erosive force.**
* **Cultivation of river banks destroys riverine vegetation and destroys soil structure exposing it to agents of erosion.**
* **Cultivating the soil when too dry destroys soil structure making it easy to be eroded.**
* **Long slopes increases volume speed of run off hence increasing erosive power of water.**
* **High rainfall amount increase saturation of soil hence increase in soil erosion**

***\*(Do not award if factor and effect not qualified/well explained)\****

b) Describe the seven management practices that should be carried out on a vegetable nursery after sowing seeds until the seedlings are ready for transplanting. (7mks)

* **Mulching to conserve moisture**
* **Erection of shade to minimize evapotranspiration**
* **Weed control to reduce competition with seedlings for nutrients, light, space etc.**
* **Pest and disease control to ensure healthy and vigorously growing seedlings**
* **Pricking out/thinning to minimise competition for growth elements**
* **Fertilizer application to supplement nutrients in the soil**
* **Watering to ensure adequate moisture supply**
* **Hardening off/removing shade/reducing watering to acclimatize the seedling to conditions in the field.**
* **Removal of mulch immediately after germination**

c) Outline five ways in which high temperature affects agricultural production in Kenya. (5mks)

* **Increases incidences of some pests/parasite and diseases**
* **Improves quality of certain crops e.g. fruits, pineapples, paw paws**
* **Lowers quality of certain crops e.g. pyrethrum**
* **Increases rate of evapotranspiration/wilting in plants**
* **Increases rate of growth for early maturity in crops**
* **Limits distribution of exotic livestock breeds**
* **Lowers production in livestock**
* **Influences design of farm buildings and structures**
* **Lowers labour productivity**

24. a) Describe the production of cabbages under the following sub-headings:

(i) Seedbed preparation; (3mks)

* **Land should be prepared early during the dry season /land should be cleared**
* **Land should be prepared to minimum tilth**
* **Holes are dug at a depth of 10cm and spacing of 0.9x0.6m for large varieties and 0.6x0.6m for smaller varieties.**

(ii) Transplanting of seedlings. (7mks)

• **Nursery is first watered so that seedlings can be lifted with ease.**

**• Only healthy and vigorous seedlings should be selected.**

**• Lift the seedlings with a lump of soil attached to the roots**

**• Add about 15 gm/1 teaspoonful of phosphatic fertilizer to the planting hole/mix with soil**

**• Firm the soil around the base of seedlings**

**• Water the seedlings as appropriate/if necessary**

**• Apply mulch around seedling/erect shade if necessary.**

**• Transplanting should be done on a cloudy day or late in the evening when it is not too hot.**

b) State biotic factors and explain how they influence crop production in agriculture. (5mks)

• **Nitrogen fixing bacteria: - convert atmospheric nitrogen to nitrates for plant uptake**

**• Pollinators: - transfer pollen grains from the anther of a flower to the stigma of the same flower or different flower.**

**• Decomposers; - organisms which breakdown organic plant and animal remains to release nutrients for plants/aerate the soil**

**• Pests: - Attack crops by eating plant parts, piercing and sucking sap and introduce/spread disease causing micro-organisms**

**• Pathogens;-they cause diseases**

**• Predators;-reduce pest population**

**• Weeds;-compete for nutrients/space/light/moisture/spread pests/suppress growth**

c) Explain five ways in which HIV/AIDS limits agricultural production (5mks)

**Shortage of labour;**

**Lack of motivation to invest in agriculture**

**Increased cost of living leading to low investment in agriculture/lack of resources for Agricultural production**

**Government and NGOs are spending a lot of time and resources controlling the disease instead of investment in agriculture.**

**Lack of market for agricultural produce**