***NAME\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ DATE \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_***

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**AGRICULTURE FORM FOUR PAPER ONE**

**443/1**

**DECEMBER EXAM 2021**

**MARKING SCHEME**

**INSTRUCTIONS**

1. ***Answer all questions in sections A and B.***
2. ***Attempt ANY TWO questions in section C.***
3. ***Be precise and clear in the presentation of your answers.***
4. ***Stealing examination is an offence.***

**SCORE SUMMARY**

|  |  |
| --- | --- |
| **SECTION**  | **MAXIMUM SCORE** |
| **A** | **30 marks** |
| **B** | **20 marks** |
| **C** | **40 marks** |
| **TOTAL** | **90 marks** |

***MARKING SCHEME***

***AGRICULTURE PAPER ONE***

1. ***Role of mulches in soil and water conservation***.

1. Mulches reduces the speed of surface run – off hence high water infiltration.
2. Organic matter improves soil structure hence reduce erosion process on farm.
3. Prevents splash erosion
4. Reduces evaporation of water from the soil.
5. Increase soil water retention. $\left(4×\frac{1}{2}=2mks\right)$

2. ***Differences between field crops and horticultural crops***

|  |  |
| --- | --- |
| **Field crops** | **Horticultural crops** |
| 1. They are planted on fairly large tracts of land
 | 1. Planted in smaller areas/fields
 |
| 1. Most field crops do not spoil faster
 | 1. Horticultral crops are delicate and spoil easily.
 |
| 1. Most carried out in plantation extensively
 | 1. Mostly carried out in small areas intensively
 |

 $\left(2×1=2mks\right)$

3. ***Reasons why NPK are called fertilizer elements***

They are referred to as fertilizer elements because for any material to be called fertilizer it must be having one, or two or all of the three. $\left(1×1=1mk\right)$

4. ***Advantages of using seeds***

1. Seed are easy to treat against soil borne pests and diseases.
2. Not bulky hence easy to store.
3. Seeds are easy to handle during planting.
4. Machines can be used during planting.
5. Easy to apply manure/fertilizer together with seeds.
6. Possible to develop new crop varieties. $\left(first 4×\frac{1}{2}=2mks\right)$

5. ***Advantages of land lordism and tenancy***

1. Idle land is put into use, this increases production.
2. Landlords who can’t use the land can lease out to get some income
3. The landless can rent land for use to earn their livelihood.
4. Land is equitably distributed as a natural resources.$ \left(first 4×\frac{1}{2}=2mks\right)$

6. (a) ***What is solifluction?***

It is the gravitational flow of surface materials saturated with water.$ \left(1×1=1mk\right)$

(b) ***Conditions that increase solifluction***.

1. Steep slopes
2. Heavy rains *rej. Slope and rain alone*$ \left(1×1=1mk\right)$

7. ***Adaptation of weeds making them extremely successful in propagation***

1. Produce large quantities of seeds
2. Weed seeds remain viable for long
3. Weed seeds are easily and successfully dispersed.
4. Some weeds can propagate vegetatively.$ \left(4×\frac{1}{2}=2mks\right)$

8. ***Importance of crop rotation***

1. There is maximum utilisation of nutrients
2. Control soil borne and disease build up.
3. Controls weeds
4. Improves soil fertility
5. Improves soil structure
6. Controls soil erosion$ \left(first 4×\frac{1}{2}=2mks\right)$

9. ***Reasons leading to rogueing***

1. Severe attack by pests
2. Severe attacks by diseases $\left(2×\frac{1}{2}=1mks\right)$

10. ***Effects of strong wind. (Negative)***

1. Increased evaporation of moisture from the soil.
2. Damage of crops/ lodging in cereals
3. Blows away rain bearing clouds (Rej. Any advantage of wind)
4. It’s an agent of soil erosion.
5. Increase the spread of pests/diseases.
6. Destroy farm structures$ \left(4×\frac{1}{2}=2mks\right)$

11. ***Two conditions that may necessitate irrigation.***

1. Practising agriculture in dry areas.
2. During dry period/seasons
3. When growing paddy rice.$ \left(2×1=2mks\right)$

12.(a) ***Opportunity Cost***

This is the value/returns from the best foregone alternative$\left(1×1=1mk\right)$

(b) ***Reasons for keeping livestock health records***

1. Used during selection and breeding
2. Used for culling unproductive livestock
3. Indicates when to vaccinate livestock
4. Shows when to deworm livestock
5. Helps to determine the cost of treatments.$ \left(4×\frac{1}{2}=2mks\right)$
6. They indicate the health history of the animal

13. (a) ***Causes of blossom end – rot disease***

1. Too much nitrogen at early stages
2. Irregular or infrequent watering
3. Calcium deficiency in young fruits$ \left(2×\frac{1}{2}=1mk\right)$

13. (b) ***Why water tomato seedling before transporting***

1. To prevent destruction of roots during lifting
2. For the ease of lifting seedlings for transporting$ \left(1×1=1mk\right)$

14***. Reasons for soil testing***

1. To establish deficient essential elements and ament appropriately.
2. To help estimate appropriate amount of nutrients required for the farm.
3. Helps to determine soil PH and amend appropriately.$ \left(2×1=2mks\right)$

15. ***Disadvantages of row planting***

1. Does not provide ample foliage cover
2. More expensive/labour intensive
3. Requires some skills
4. If appropriate spacing is not used it may lead to low or excess crop population.

 $\left(4×2=2mks\right)$

SECTION B

16. (a) ***Method of propagation***

Whip/ tongue grafting. rej. Grafting alone$ \left(1×1=1mk\right)$

(b) ***Desirable features of K.***

1. K should be high yielding
2. Fast/quick maturing
3. High quality yielding
4. Compatible with L $\left(3×1=3mk\right)$

(c) ***Factors to consider when choosing L.***

1. Should have a good rooting system
2. Should be compatible with L.$ \left(1×1=mk\right)$
3. Resistant to pests and diseases

17. (a) ***Meaning of “20” on the fertilizer bag.***

***It shows the proportion of nitrogen in the fertilizer meaning; for every 100kg of that fertilizer 20kg is nitrogen.***

“20” Means that for every 100kg of that fertilizer, 20kg are of nitrogen.$ \left(1×1=1mk\right)$

(b) ***Factors that determine the rate and amount of fertilizer applied.***

Amount of fertilizer applied per hectare depends on the amount of nutrients needed and the fertilizer grade available.$ \left(1×1=1mk\right)$

17. (c) **Nitrogen**

 20Kg N 100kg of the fertilizer

 ? 200kg of the fertilizer

$\frac{200kg N}{100kg N}$ $×$ 20Kg N

= 40Kg N

**Phosphorous**

10Kg P2 O5 100Kg of the fertilizer

 ? 200Kg of the fertilizer

$\frac{200Kg fertilizer}{100Kg fertilizer}×$10Kg P2O5

= 20Kg P2O5

**Potassium**

5Kg K2O 100Kg of the fertilizer

 ? 200Kg of the fertilizer

 $\frac{200Kg fertilizer}{100Kg fertilizer}×5Kg$

= 10Kg K2O answer only $\left(3×1=3mks\right)$

18. (a) ***Farm documents***

Consumable goods inventory record. Rej. Inventory records alone.$ \left(1×1=1mk\right)$

(b) Importance of the record.

1. They show consumable the assets available on the farm
2. They help to determine value of the farm
3. Help to control theft of various inputs on the farm
4. They help to determine what is available in store hence what is to be bought. (it helps during farm planning /acquisition of inputs $ \left(4×1=4mks\right)$

19. (a) ***The structural measure***

Cut – off drain$ \left(1×1=1mk\right)$

(b) Circumstances under which the measure is used.

When there is heavy flow of erosive surface run – off on land.

 (c) ***Special features and precautions***

1. Excavated soil is put on the lower side
2. Grass is planted on the embankment
3. No cultivation should be carried out on embankment
4. Should be planted with trees.$ \left(3×1=3mks\right)$

20. ***Ten factors influencing soil erosion***

(i) Amount and intensity of rainfall

Heavy rain with speedy raindrops hit the ground with force and splash up soil particles with water. The run – off washes away the splashed fertile top soil.

(ii) The slope of the land (Topography)

The steeper the slope the faster the surface run – off hence the higher the erosive force.

(iii)The type of soil

Sandy soils allow easy/quick infiltration of water, clay soil does not; hence sandy soils are easily eroded.

(iv) Soil depth

Shallow soils saturate faster hence easily eroded.

(v) Vegetation cover

Vegetated/forested areas protect soils against erosion, roots hold soil particles together hence reduce erosion

(vi) Overstocking – overstocked land loses vegetation cover and gets exposed to agents of erosion.

(vii) Deforestation – cutting down trees exposes land to agents of erosion when land remain bare hence speed up the process of erosion.

(viii) Planting of annual crops on steep slopes – this allow frequent cultivation, hence soil is exposed to erosion.

(ix) Indiscriminate burning of vegetation – expose soil to erosion because the land remain bare.

(x) Clean weeding – leaves the soil less protected from rain and wind

(xi) Ploughing up and down the slope – allow easy erosion through quick formation of rills.

20. ***Nursery management practices***

i. Mulching – straw/grass is used, it conserves moisture

ii. Watering – artificial application of water to enhance germination and seedlings growth.

iii. Shading – protects the delicate seedlings from direct sunshine and raindrops

iv. Pricking out – removal of excess seedlings and transfering to other nursery bed before official transplanting to seed bed.

v. Hardening off – exposing seedlings to seedbed conditions before transplanting.

vi. Weed control – to control competition of seedlings and weed for nutrients water and light.

vii. Pest control – to protect seedling from destruction by pests

viii. Diseases control – to protect seedlings from destruction by diseases.

21.(a) ***Reasons for controlling weeds on the farm***

1. They compete with crops for nutrients, space, light and moisture hence reduce yield.
2. Some weeds are parasitic to cultivated crops.
3. They lower yield quality
4. Some are poisonous to livestock and man.
5. Some are alternate hosts of pests and pathogens
6. Some have allelopathic effects.
7. They lower quality of pastures
8. They irritates farm workers during handling/weeding
9. They block irrigation channels. $\left(8×1=8mks\right)$

(b) ***Basis of field pests classification***

1. Their mode of feeding – based on mouth parts, biting and chewing, piercing and sucking
2. Crops attacked – this is based on specific crops attacked example maize pests.
3. Stage of development of the pest – some pests are harmful at a specific stage of development example; caterpillar(larval stage) is destructive yet the adult stage is a pollinator.
4. Stage of growth of the crop attacked – some pest attack crops at young stage other at mature stage.
5. Scientific classification – this is based on scientific groupings e.g insects, birds nematodes and mites.
6. Level of damage – this may depend on body size or population
7. Pest habitats – this is based on the ecological sites where the pest cause effect – field and storage pests.

22. (a) ***Advantages of land consolidation.***

i. Proper supervision of land – its ease to supervise large tract of land under one holding

ii. Economic use of time and saving of transportation cost since the whole farming business is under one holding.

iii. Farmer easily access extension services – made easy due to localization of agricultural activities.

iv. It is easy to adopt crop rotation programmes and sound farm planning program

v. Ease of soil conservation and land improvement - made easy due to localization of all activities on the same portion of land.

vi. Allows construction of permanent structures such as fencing and building.

vii. It’s economical to carry out field/farm activities due to absence of transportation/travelling costs.

viii. If land is registered the owner can use the title deed to obtain loans.

ix. Ease of pests weed, and diseases.

22. (b) ***Importance of keeping proper farm records***

1. Compares performance of different enterprises on the farm and other farms
2. They show farm history.
3. They guide in farm planning and budgeting of operations
4. Help to detect losses or theft on the farm.
5. Help in assessment of income tax to avoid over or under taxation.
6. Help to determine the value of the farm.
7. Enables easy sharing of profits and losses in partnerships
8. Helps in settling disputes among heirs
9. Shows whether the farm business is making profits or loss.