**NAME:…………………………………….SCHOOL: …………..…………..**

**443/1**

**AGRICULTURE**

**PAPER 1**

**DECEMBER, 2020**

**TIME: 2 HOURS**

**LANET CLUSTER JOINT EXAMINATION (LANJET) -2020**

**443/1**

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**MARKING SCHEME**

**SECTION A (30 MARKS)**

1. What do the following terms mean? (1½ mks)

a) Gross domestic product (G.D.P)

* **The sum total of goods and services produced by a country within one year.**

1. Gross national income (GNI)

* **Total output from resources owned by the nationals of a country both within and outside the country within a year.**

1. Per capita income

* **Gross national income divided by total population**

1. **a**) What does the term opportunity cost in farming mean? (1mk)

* **Cost of the foregone alternative when we make a choice.**
* **Example is choosing to grow maize instead of wheat.**
* **Opportunity cost is the value of wheat**
* **Opportunity cost only exists where there are alternatives.**

b) State two situations when opportunity cost nil or zero (2mks)

* **When supply is unlimited**
* **When goods are free**
* **When there are no alternatives**

4. List four advantages of individual owner tenure system (2mks)

* **deed used to secure loan credit  
  Independent production plan  
  Accessibility to agricultural advice  
  Earn income by leasing/renting land  
  High production of quality produce  
  Proper supervision of land (4 x ½ = 2mks)**

4. State two ways to show how check dams reduce soils erosion (1mks)

* **Trap sediments/soil  
  Slow down the speed of run off  
   Reduce volume of run off (2 x ½ = 1mk)**

5. Identify four factors that contribute to competitive ability of weeds (2mks)

* **Produce large quantities of seeds   
  Seeds have a long viability   
  Propagate vegetatively  
  Extensive root system  
  Hardy/survive adverse weather and soil condition  
  Have a short life cycle  
  Gross feeders/heavy feeders (4 x ½ = 2mks)**

6. Mention four ways of classifying herbicides (2mks)

* **Mode of action   
  Time of application  
  Selectivity  
  Formation/physical form of herbicide (4 x ½ = 2mks)**

7. (a) List two ways of controlling smut disease in the field. (1mk) (1mk)

**Rogueing/uproot and burn infected crop (reject rogueing alone)  
Crop rotation  
Plant resistant varieties of maize  
Plant certified seeds  
Avoid application of infected organic manure (2 x ½ = 1mk)**

(b) Name any two pests that attack bean pods in the field (1mk)

**American bollworm (reject bollworm alone**)   
**Flower thrips (2x ½ = 1mk)**

8. What four factors should a farmer consider for effective control of pests in the field (2mks)

* **Nature of crop damage caused   
  Biology of pest/reproduction of pest/feeding habits  
  Weather conditions favoring pest attack  
  Whether pest has natural enemies  
  Population level of pest**

9. Mr. Wotsula Applied 150kg N.P.K 25:20:15 to his one hectare of groundnuts in his Kakamega farm. Calculate how many kg of each of the fertilizer element he applied. (3mks)

**- N.P.K total ratio = 60**

**Nitrogen = 62.50 Kg**

**Phosphate = 50Kg**

**Potassium = 37.5Kg**

10. State five marketing functions (2 ½mks)

* **Buying**
* **Selling**
* **Assembling by traders or middlemen**
* **Transportation i.e. distribution**
* **Standardization by grading and sorting out**
* **Storage facilities**
* **Processing**
* **Packing or packaging**
* **Advertising i.e. sales promotion**
* **Financing i.e. provide credit to farmers**
* **Risk bearing, Market research**

11. State five functions of cooperative societies (2 ½ mks)

* **Marketing facilities**
* **Provision of inputs on credits**
* **Provide expert advice**
* **Storage of inputs and produce**
* **Giving loans all credit to farmers**
* **Educating for fair prices of inputs and produce**
* **Keep proper records of all activities**
* **Provide banking services to members.**

12. List three characteristics of green manure crops (1 ½ mks)

* **Fast growth rate**
* **Preferably a legume**
* **Leafy / high foliage ratio**
* **Ability to rot rapidly**

13. Name three types of water pumps to be used on the farm. (1 ½ mks)

* **Centrifugal / rotardynamic**
* **Semi-rotary**
* **Piston/ reciprocating pumps**
* **Hydram.**

14. Name four species of trees commonly used in agroforestry (2mks)

* **Eucalyptus**
* **Cypress**
* **Grevillea**
* **Leukemia**

15. List four factors that determine the competitive ability of weeds (2 mks)

* **Short life cycles**
* **Ability to produce many seeds**
* **Ability to propagate vegetatively**
* **Easy seed dispersal**
* **Seeds have long viability**
* **Extensive rooting system**

**SECTION B (20 MARKS)**

**16. (a) Name the parts labeled A1, and A2 (2 mks)**

A1 -root stock

A2 -scion

**(b) Name the methods of propagation illustrated in diagrams A3 and B (2 mks)**

A3 -Grafting

B- Trench layering

**17.**

1. **Identify the soil structures F and G (2mks)**

G– Platy soil structure

F- Granular soil structure

1. **Name the parts labeled X and Y in diagram F (1mk)**
   * + Y- air space
     + X- Humus with clay
2. **Sate two ways through which structure G influences crop production (2mks)**

* Impedes root penetration.
* Hinders aeration
* Hinders drainage
* Hinders water infiltration

**18.**

**a) Beside what is visible on the maize cob. State two other symptoms of the disease. (2mks)**

* **Severe dwarfness**
* **Increased tillering**

b) State three control measures of the above disease. (3mks)

* **Planting resistant varieties**
* **Use of certified seeds**
* **Field hygiene**
* **Crop rotation**

**19**

1. What was the aim of the experiment? (1mk)

* **To investigate the presence of living organisms in the soil**

1. State one observation that was made in each of the flasks labelled C and D (2mks)

**C- Lime water turned milky**

**D- lime water remained clear**

1. Give a reason for your answer in (b) above (2mks)

**The living organisms in flask C respired and produced carbon dioxide which turned the lime water milky while heating in Flask D killed the microorganisms hence the lime water remained clear**

1. Apart from the aspect under the study above, state any other soil component that could be studied (1mk)

**-Soil water**

**-Soil air**

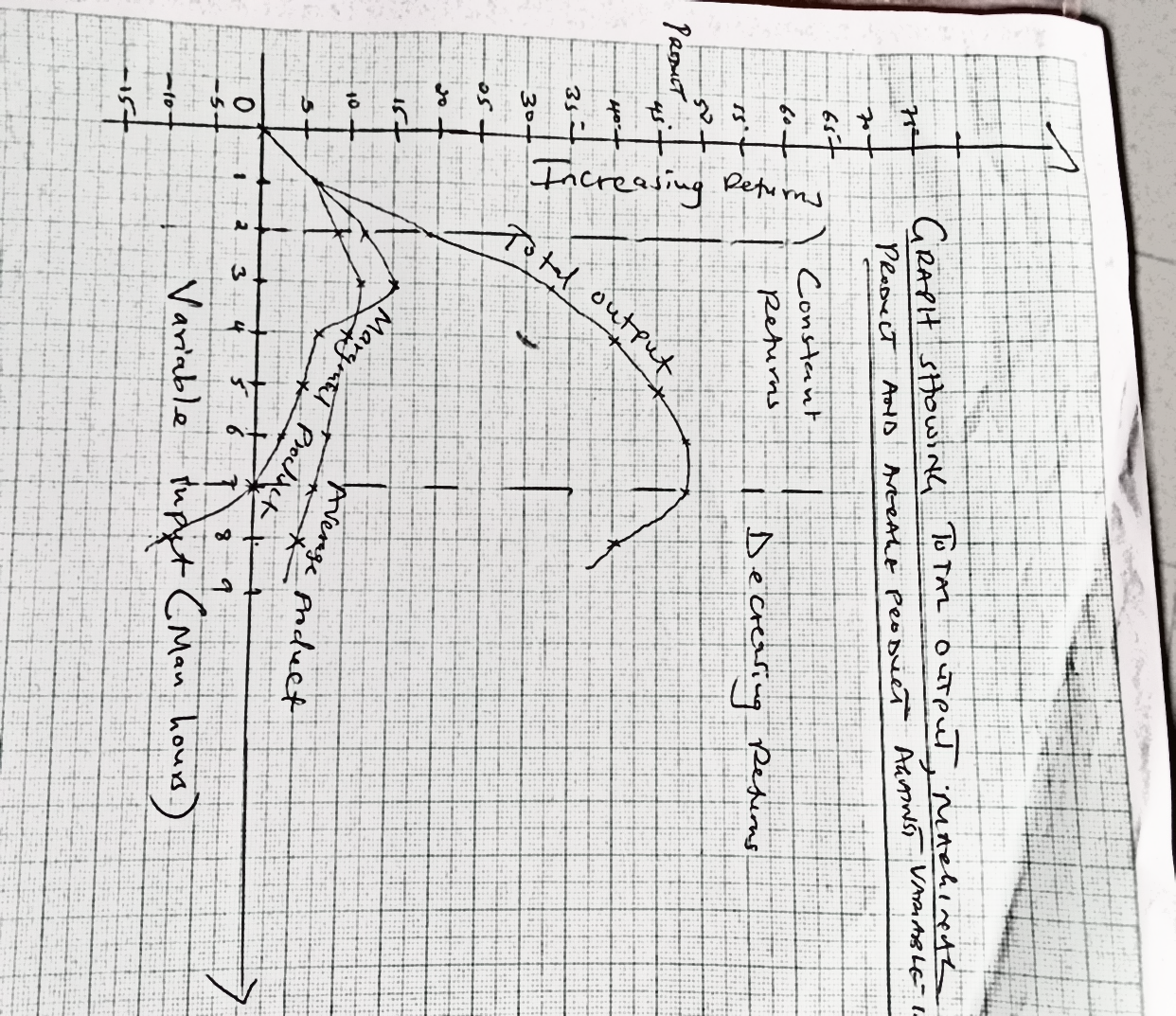
**-Soil organic matter**

**SECTION C (40 MARKS)**

**20.**

|  |  |  |  |
| --- | --- | --- | --- |
| Units of variable input (Man hours) | **Total output of maize**  **(Tons)** | **Marginal Product** | **Average product** |
| 0 | 0 | **0** | **0** |
| 1 | 6 | **6** | **6** |
| 2 | 18 | **12** | **9** |
| 3 | 33 | **15** | **11** |
| 4 | 40 | **7** | **10** |
| 5 | 45 | **5** | **9** |
| 6 | 48 | **3** | **8** |
| 7 | 48 | **0** | **6.9** |
| 8 | 40 | **-8** | **5** |

**18 x ½ = 9mks**

1. **On the same graph paper, plot the graph showing total output, marginal product and average product against variable input (8mks)**
2. ****

**Plotting=3mks**

**Smooth curves=3mks**

**Correct scale =1mk**

**Correct labelling=2mks**

1. On the graph draw lines to show the following zones (3mks)
2. **Increasing return production function**
3. **Decreasing return Production function**
4. **Diminishing return production function**

21(a) Outline five benefits of trees and shrubs to the economic wellbeing of Kenyans (5mks)

**Some are used as cash crops**

**Some produce edible fruits which can be sold**

**Some are used for production of industrial products**

**Most are source of timber and poles**

**Their roots help to bind soil particles together which helps to prevent soil erosion**

**Some trees provide nectar and pollen which is used by bees**

**Some have medicinal value**

b) Explain 7 ways on how farmers overcome risks and uncertainties in a farming business (7mks

**Diversification/ growing a variety of crop or having various enterprises so that if one fails has something to rely on.**

**Insurance against losses/ taking insurance policy for farming activities so that in case of failure the enterprises are covered.**

**Inventory marketing/ strategic farming keeping farm product and selling at when prices are favorable**

**Flexible enterprises engaging in enterprises that can be stopped or started early as condition change.**

**Rationing of inputs using just sufficient inputs such that in case of losses the cost is not too high**

**Using more certain husbandry practices using practices that the farmer is sure of and has used in the past.**

**Hedging/ contract marketing making arrangements with marketing agencies in advance so that changes in price after the arrangement do not change the price of the farmer’s produce.**

**Selecting more certain enterprises selection of enterprises that the done well in the area/ tried though research** **(Any 7 x 1 = 7mks)**

**21**a) Explain the factors that influence the type of irrigation to be used in a farm

**Topography,**

**Soil type**

**Type of crop to be irrigated.**

**Amount of water available.**

**Technology available.**

**Distance of the source of water to the field.**

**Capital available, skills available**

**Climate factors of the area.**

**(Relevant application to be given, 8 x 1 =8mks)**

22(a) State the principles involved in planning a crop rotation programme. (6mks)

**Shallow rooters should alternate with deep rooters.**

**Crop attacked by the same pests and disease should not follow each other.**

**Crops with high nutrient requirement should come first in a newly ploughed land.**

**Legumes should be included in the programme to increase nitrogen content of soil.**

**Fallow period / grass should be included in the rotation to build soil structure.**

**Crops which are hard to weed should alternate with those that are easy to weed**.

b) Discuss the production of maize under the following subheadings Maize

i) Seedbed preparation (2mks)

**Clear land early before the rains**

**Harrow the land to medium tilth**

**Cultivate land to get rid of perennial weeds and allow vegetation to rot.**

Planting (2mks)

**Done at the beginning of rains**

**Dry planting is recommended**

**Spacing varies with variety i.e. 23-30 cm x 57 – 90 cm**

**Plant seed at 2.5 – 10 cm deep**

**Planting manually or mechanically**

**Apply DAP at 100 – 150 kg/ hectare in planting** hole

Top dress with CAN at 200kg / hectare

Weed control (2mks)

**Weed at early stage to reduce competition for moisture**

**Hand weeding done**

**Herbicides sometimes used e.g. simazine/ atrazine before germination and MCPA / 2-4- D after germination.**

Field management practices (2mks)

**Thinning done early to get consistent growth**

**Gapping done early**

Pests control (2mks)

Scare birds e.g. quellea and weaver birds

Use appropriate control of pests e.g. aphids, army worm e.g. insecticides.

Disease control (2mks)

**Use appropriate control e.g. fungicides for smut, rust and maize streak**

Harvesting (2mks)

**Depending on altitude and variety**

**Stock out maize or harvest cobs when dry in field**