**PC 5023 WASSCE (PC 2ND), 2022 Agriculture science 3 Alternative to Practical Work**

1. The diagram below illustrates the components of a typical soil. Study it and answer the questions that follow:
2. Name the soil components labelled **III** and **IV. (2 marks)**

**III:** Mineral matter­­­­­­­­­­

**IV:** Organic matter

1. State the percentage composition of **each** of the parts labelled **III** and **IV** in a typical soil.

**(2 marks)**

**III:** 45%

**IV:** 5%

1. Name three constituents of the part labelled **III**.  **(3 marks)**

Clay

Sand

Gravel

Silt

stones

Mineral salts

calcium carbonate

magnesium carbonate

Oxides of iron and aluminum

Silica

1. Give **four** reasons **each** why parts labelled **II** and **IV are** important to crops

**II: (4 marks)**

Helps to dissolve plants nutrients

Essential for photosynthesis

Aids the turgidity of plants cells

Promote the activities of soil organism

Necessary for germination of seeds

Provides medium for soil reactions

makes soil crumbly, improving aeration and root penetration

helps soil hold moisture for longer periods

decomposes to release nitrogen, phosphorus, and other essential elements.

provides food for earthworms, fungi, and bacteria that enhance soil fertility.

softens seed coats and activates enzymes for growth

most plant metabolic processes occur in a watery environment.

**IV: (4 marks)**

Improves soil aeration

Moderates soil temperature

Improves water holding capacity of soils

Improves soil structure

Buffers soil pH

Prevents leaching of nutrients

Improves the activities of soil microbes

Rich in plants nutrients

makes soil crumbly, improving aeration and root penetration

helps soil hold moisture for longer periods

decomposes to release nitrogen, phosphorus, and other essential elements.

provides food for earthworms, fungi, and bacteria that enhance soil fertility.

helps prevent sudden changes in soil acidity or alkalinity

improves soil aggregation, reducing wind and water erosion

1. **Table 1** below illustrates a poor crop rotation plan I Year 1. Study it and answer the question that follow.
2. Give **three** reasons why **Table 1 is** regarded as poor crop rotation plan. **(3 marks)**

Yam and cassava are attacked by the dame pests and should not follow each other

Yam and cassava are attacked by the same diseases and should not follow each other

Cowpea and maize are shallow rooted crops and should not follow each other.

Yam and cassava are deep rooted crops and should not follow each other.

Yam and cassava have the same nutrients requirements and should not follow each other.

All crops listed are primarily annuals/tubers without inclusion of deep-rooted crops or pastures that can help break pest and disease cycles

Similar pest or disease groups may attack more than one of the listed crops

Maize, yam, and cassava are heavy feeders, which can lead to soil nutrient depletion if grown in close sequence without enough soil-replenishing breaks

1. Using the crops in **Table 1,** complete **Table 2** with a good crop rotation plan starting with cassava in plot 1.

. **(2 marks)**

**Year 1 plot 1:** cassava

**Year 1 plot 2:** Maize

**Year 1 plot 3:** Yam

**Year 1 plot 4:** cowpea

. **(2 marks)**

**Year 2 plot 1:** Maize

**Year 2 plot 2:** Yam

**Year 2 plot 3:** Cowpea

**Year 2 plot 4:** cassava

. **(2 marks)**

**Year 3 plot 1:** Yam

**Year 3 plot 2:** Cowpea

**Year 3 plot 3:** cassava

**Year 3 plot 4:** Maize

. **(2 marks)**

**Year 4 plot 1:** Cowpea

**Year 4 plot 2:** Cassava

**Year 4 plot 3:** Maize

**Year 4 plot 4:** Yam

1. Why is Cowpea included in crop rotation plan? **(1 mark)**

The bacteria in the root nodules of Cowpea fix atmospheric nitrogen in the soil; thus reduces the need for nitrogenous fertilizers.

Cowpea is included in the crop rotation plan because it is a legume that helps to add nitrogen to the soil, making the soil richer and better for the next crop to grow well.

Cowpea adds nutrients to the soil before heavy feeders like maize or yam

1. States **three** advantages of a good crop rotation system to the soil. **(3 marks)**

Improves soil structure

Increases microbial activities

Increases soil organic matter

Reduces leaching of nutrients

Reduces soil erosion

Improves soil water retention

Maintain nutrient balance in the soil

Increases soil nitrogen through nitrogen fixation by leguminous crops

Keeps the soil fertile

Prevents soil pests and diseases

pests don’t get to live in the same crop every year.

Improves soil structure

roots of different crops help keep the soil loose and healthy.

1. **T**he diagram below illustrates a housing unit for raising livestock. Study it and answer the questions that follow:
2. Identify the housing unit illustrated in the diagram. **(1 mark)**

Deep Litter house

Deep bedding system

1. Give **three** examples of farm animals that could be reared in the illustrated *housing unit.*

**(3 marks)**

Pig

Rabbit

Sheep

Turkey

Goat

Quail

Chicken

Turkey

Duck

Geese

Guinea fowls

1. Mention **three** materials that could be used as bedding in the illustrated *housing unit*. **(3 marks)**

Wood shavings

Crushed maize cobs

Saw dust

Sugarcane

Straw

Groundnut shell

Dry leaves

Corn cobs (crushed)

Rice husks

Shredded paper

1. List **Four** equipment that are required in the illustrated *housing unit*. **(4 marks)**

Feeders

Electric bulb

Drinkers

Hygrometer

Thermometer

Weighing scale boxes

Laying

Ventilation fans or vents

Heaters

Nest boxes

1. State **Four** disadvantages of using the illustrated *housing unit*.**(4 marks)**

Increases wastage of feed

Increases wastage of water

Requires a lot of space

Making culling of unproductive / sick birds difficult

Increases the incidence of soiled/dirty eggs.

Increases incidence of egg sucking in laying birds.

Increases incidence of cannibalism

Encourages the build-up of pathogens

High risk of disease outbreak if the litter is not changed regularly.

Parasite build-up (like mites and lice) can occur in the litter.

Bad smell due to ammonia from droppings if not well-managed.

Higher labor is needed for regular cleaning and maintenance.

Wet litter problems can cause foot diseases in birds.

Rodents and pests may hide in the litter.

Poor ventilation can worsen odor and disease risk.

Eggs can get dirty if birds lay on the floor instead of nest boxes.