

FORM ONE END TERM 3 2023 MARKING SCHEME

1) What is soil fertility? (1mk)

The ability of the soil to provide crops with the required nutrients in proper proportions and form for high production.

2) Give six indicators of a fertile soil. (6mks)

- Good depth. Deep soils give plant roots greater volume to obtain plant nutrients and provide strong anchorage.*
- Proper drainage. A well-drained soil is properly aerated promoting healthy root development.*
- Good water holding capacity. This ensures that enough water is retained for plant use.*
- Adequate nutrient supply. Should supply the nutrients needed by plants in the correct amounts and in a form that is available to the crops.*
- Correct soil pH. Different crops have different soil pH requirements.*
- Free from excessive infestation of soil borne pests and diseases*

3) Name three sources of underground water. (1 ½ mks)

- Wells.
- Springs.
- Borehole.

4) Name three types of water pumps that may be used in the farm. (1 ½ mks)

- Semi-rotary
- Piston.
- Centrifugal/rotodynamic pumps.
- Hydram

5) state the stages of chemical water treatment. (6mks)

Stage one: filtration at water intake. Water leaves the source and pass through a series of sieves before entering intake pipe. Sieves have different size meshes. As raw water enters the pipe, large particles of particles of impurities are trapped by these sieves.

Stage two: softening of water. Water flows into mixing chamber. This is a small tank where water circulates and is mixed with soda ash. And alum. Soda ash softens the water, while alum helps to coagulate solid particles which settle down to the bottom of sedimentation tank in stage three.

Stage three: coagulation and sedimentation. The softened water moves to coagulation tank which is circular and large. Solid particles such as silt and sand settle down. The tank is also open to allow in fresh air into the water removing bad smells. Water should stay for at least 36 hours to kill bilharzia worms which cannot survive in stored for that long.

Stage 4: filtration. Water with few impurities pass into filtration tank where all the reaming solid particles such silt are removed. Filtration tank has layers of different sizes of gravel and a top layer of sand. The layers allow water to seep through very slowly leaving all the solid particles behind.

Stage five: chlorination. Filtered water enters chlorination tank. Small amount of chlorine solution is added. Flow of chlorine solution is controlled by a doser .the chlorine is used to kill micro-organisms in water

Stage six: storage. Water is stored before distribution. Should be out of bounds to unauthorized persons. It should be covered and the area around it well fenced.

6) state four methods of draining waterlogged land (4mks)

- Open ditches. Ditches are dug for water to flow in by gravity thus lowering water table.*
- Underground drain pipes. Perforated pipes are laid underground where water seeps from the surrounding area into the pipes.*
- French drains. Ditches are dug, filled with stones and gravel and then covered with soil. Water from the surrounding area seeps into these drains and is carried into a waterway.*
- Cambered beds. Raised beds are constructed and are use with combination with ditches. Used on poorly drained soils such as black cotton soil.*
- Pumping. In low lying areas where other methods are not suitable water is pumped out of the soil.*
- Planting trees. Trees such as eucalyptus that consume a lot of water are used to drain excess water from soils.*

7) Name three ways of conveying water in the farm. (3 mks)

- Piping.
- Use of containers.
- Use of canals

8) state six ways of restoring soil fertility. (6mks)

- Control of soil erosion. The measures to control soil erosion aims at promoting good water infiltration and reducing runoff.*
- Crop rotation. Ensures maximum utilization of soil nutrients by growing a variety of crops which have different nutrient requirements. Legumes in a rotation Programme improves the soil nitrogen.*
- Control of soil pH. Most living organisms do well at a pH around neutral. Extreme pH inhibit the activities of living organisms.*
- Proper drainage. Can be done by breaking hard layers impeding drainage. Where poor drainage is as a result of poor soil structure and texture, water channels can be used.*
- Weed control. The weeds compete with crops for growth resources such as: nutrients, soil moisture, space and sunlight.*
- Intercropping and mixed cropping. Intercropping offers a better ground cover thus smothering weeds and controlling soil erosion. Legumes intercropped with cereals fix nitrogen which is used by the cereal crops.*
- Minimum tillage. Over cultivation destroys the soil structure leading to soil erosion. Therefore unnecessary land operations should be avoided.*
- Use of manure. Supply organic matter, which on decomposition releases nutrients into the soil.*
- Use of organic fertilizer. Chemical substances which are manufactured to supply specific plant nutrients. Once used they improves the soil fertility.*

9) Give five importance of adding organic matter to the soil. (5mks)

- It increases the water holding capacity of the soil, it also increases the infiltration rate due to its colloidal nature.
- Releases a wide range of nutrients into the soil.
- Provides food and shelter for soil micro-organisms responsible for the decomposition of organic matter.
- Improves soil structure. Humus binds soil particles together thus improving the soil structure. Drainage and aeration are also improved.
- It buffers soil pH. That is, it moderates soil pH by avoiding rapid chemical changes.
- Reduces the toxicity of plant poisons that may have built up in the soil as a result of continuous use of pesticides and fungicides.
- Humus which is mostly dark in colour gives the soil its dark colour. Black colour absorbs heat, thus helps to moderate soil temperatures.

10) State four ideal characteristics of plant used to make green manure. (4mks)

- They should be highly vegetative or leafy.
- They should have a fast growth rate.
- They should have a high nitrogen content, thus leguminous plants are preferred.
- The plants must be capable of rotting quickly.
- The plants should be hardy, that is, they should be capable of growing in poor conditions.

11) Justify why the use of green manure is not common among farmers in Kenya. (4mks)

- Most of the crops grown are food crops and it is hard for people to use them as green manure.
- Green manure crops might use most of the soil moisture and leave very little for the next crop.
- Most of the nutrients are used up by micro-organisms in the process of decomposing the green manure plant. These are released only when the micro-organisms die.
- It takes time for green manure crop to decompose and therefore planting is delayed.

12) State four factors affecting the quality of farm yard manure. (4mks)

- The type of animal used. Dung from fattening animals has higher level of nutrients than from that of dairy animals
- Type of food eaten. Feedstuffs that are highly nutritious results in manure with a higher level of nutrients.
- Type of litter used. Wood shavings and sawdust are slow to decompose and contain very little nutrients. Napier grass provides both nitrogen and phosphorus but has low urine absorption capacity. Litter used should have a high urine absorption capacity.
- Method of storage. Farm yard manure must be stored well in a leak proof and concrete floor to prevent loss of nutrients through leaching and vaporization.
- Age of farm yard manure. Well rotten manure is rich in nutrients and it is easy to handle and mix with the soil.

13) State four factors to consider when siting a compost manure pit. (2mks)

- A well-drained place. This avoids waterlogging which leaches nutrients from the manure.
- Direction of prevailing wind. Should avoid direct drift from the compost manure to the dwelling place. This prevent bad odour being blown to the homestead.
- Size of the farm. The site should be centrally placed to the area of the farm where it is to be used.
- Accessibility. The site must be easily accessible to make it easy for transportation of materials needed.

14) Give the uses of the following in the preparation of compost manure. (2mks)

a) Calcium Ammonium Nitrate.

- To raise the level of nitrogen in the resulting manure.*

b) Top soil.

- To introduce microorganisms responsible for decomposition.*

c) Well decomposed manure.

- To provide food and shelter for microorganisms.*

d) Wood ash.

- To raise the level of phosphorous and potassium in the resulting manure.*

