

MARKING GUIDE

AGRICULTURE 2

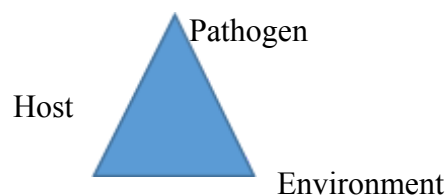
1. (a) characteristics of a normal health plants

- (i) Undergoing normal cell division, differentiation and development
- (ii) Absorbing of water and minerals from the soil and translocation of photosynthesis
- (iii) Undergoing normal photosynthesis and translocation of photosynthates
- (iv) Utilization and storage of photosynthates
- (v) Performing normal reproduction processes (flowering, pollination and maturation)
- (vi) Metabolism of metabolites and photosynthesis
- (vii) Storing reserves for over seasoning or reproduction **(Any five points, 05 marks @ 1 mark)**

(b) The interaction shown by the components of the infectious diseases

The components of the infectious diseases includes the susceptible host, environment and virulent pathogens, for the diseases to develop, the three components **(01 marks)**

A plant become diseased when it attacked by pathogens, however, If at a time the pathogens comes into contact with a plant, environment condition are too cold, too hot or too dry or some other extremes, the pathogens may be un able to attack or may be able to resist the attack, therefore despite the two being in contact no disease will develop. **(02 marks)**



2. (a) Symptoms of nematode infections shown in the field

(i) Fusion thickening of the stem; this is triggered by stem worms, it deforms leaves, petioles swelling and the presence of dark spots on tubes

(ii) Blemishes on top of the leaves and dark of the grain; this is a disease in paddy caused by nematodes called *Aphelenchoides besseyi*, it makes blemishes on the top of the leaves and bark of the grain.

(iii) Gradual death of leaves and branches; nematodes cause seriously disease in plant for example citrus which cause the gradual death of leaves and plants.

(iv) Galls formation in the roots

(v) Root rots or root decays (05marks@1)

(b) Importance of plant diseases

(i) Plant diseases damages plant and plant product on which human depends for food, clothing, furniture and environment use.

(ii) Plant products deteriorates product qualities, hence results into increasing prices due to reduced supplies

(iii) Some pathogens produces toxic compounds which contaminates crops product, poisoning a food safety problem due to food poisoning example, fusarium fungal infect crops such as, maize and produces mycotoxin like fumonisins which is associated by some illness to consumers.

(iv) Plant disease make farmer incur additional costs associated with plant diseases management such as buying seeds of diseases resistance varieties, pesticides and expensive storage system.

(v) Plant disease limits the kind of plants to be grown in a certain area (05 maks@1)

3. Persistence nature of seeds

(i) Prolific seed production;

Weeds are prolific seed producers and highly viable therefore it can be anticipated that even a few weedy plant that escaped control measures in the field can be sufficient to produce enough seeds to continue their progeny for years to come.

(ii) Dormancy of weed seeds and other propagules in soil

The majority of weed seeds lying below 5cm soil depth remain dormant and act as future flushes for weed. Therefore both agricultural and non-agricultural soil act as reserves banks for the weed seed and their other propagules.

(iii) Vegetative propagation,

The majority of weeds are highly persistence because of their ability to propagates by vegetative methods, this is important because when the above ground parts of such weeds destroyed during weed management their deeply place vegetative propagules re-spout to produce new shoots as soon as the external stresses are removed and favorable conditions resumes.

(iv) Rapid disposal mechanization.

Disposal is extremely important means of weed survival and persistence, disposal exposes weed of different environments so that each weed species can choose its most favorable environment and struggles for existence in nature.

(v) Inherent hardiness.

weed seems to have some kind of in built mechanisms to survives against the vagaries of nature like extreme cold , heat, drought, biotic, stress and soil abnormalities.

(vi) Evasiveness

Many weeds are capable of evading or escaping destruction by animals and human because of their bitter taste, unpleasant odor, spiny nature and mimicry.

(vii) Self-regeneration.

Weeds are self-sown plants , the don't require any artificial , friable seeds for their germination, detached from the mother plants weed seeds and other propagules germinate profusely on un disturbed soil whenever the environments is favorable for the purposes.

(viii) Selective invasion

Weeds species differ widely in their ecological requirement I invading new ecologies, entry of a weed species in a particular location depends up on the chance a particular weed had to reach that particular site. Nature makes a critical selectin out of the population and allow only the adapted surviving weed seeds germinates **(Any 5 points, 10 marks @2)**

4. Damages can be caused by the followings crops pests

(a) Cassava green mites

(i) They attack the plant by sucking fluids out of the cells of the plant tissues which causes chlorotic spots to appear on leaves due to loss of chlorophyll.

(ii) The leaves may become mottled and die.

(iii) They attack and cause the terminal leaves to die and fall off.

(iv) Mites damage the shoots of the plants and took like a candle stick (**04 marks @1**).

(b) American bollworms.

(i) It feeds on the inside buds, flowers and bolls of several crops

(ii) The caterpillar bores into young maize cob or seeds to other crops when they are in milk ripe condition.

(iii) It influences the secondary infectious by fungi and bacteria which may lead to rotting of fruits seeds or cob.

(iv) Clear circular holes are bored in flower bud in case of cotton plants and blooms that have been attacked may open prematurely and stay fruitless,

(v) It may make injury to the growing tips of the plants which interfere the development and maturity will be delayed.

(c) African maize stalk borer

(i) It damages the young leaves since caterpillar feeds on them and enter into them.

(ii) Damages the growing parts of the plants resulting into dead heart effect where the youngest leaves can be easily pulled off.

(iii) They make extensive tunnels inside the stem which interrupt the flow of the nutrients to the grain.

(iv) They bore into the stem and the maize cobs (**any three 03 marks @1**)

5. Explanation on the features shown by the varieties produced from mass selection.

(a) Genetic constitution.

In self-pollinated crops, mass selected varieties are homozygous but heterogeneous because they are the mixer of pure line. In crop pollinated species such as varieties are the mixture of homozygote and heterozygous because they consist of several homozygous and heterozygous genotype.

(b) Adaptability

They have a wide adaptation and are more stable to environmental changes due to their nature of heterogeneity, mass selected varieties has broader genetic base than pure lines, the adaptability is more stable in cross pollinated species than self-pollinated.

(c) Variation.

They are composed of several pure lines in self-pollinated crops and several homozygous and heterozygous genotypes in cross pollinated species, hence there is heritable variation in mass selected varieties besides environment variation.

(d) Resistance

Mass selected varieties are **less** prone to attack new diseases due to wide genetic diversity, more resistance or tolerant to new diseases.

(e) Quality.

Mass selected varieties is less uniform in the quality of seeds than pure line due to the presence of heritable variation **(10 marks @2)**

6. Anti-nutritional factors presents in animal feeds

(i) Gossypol

This is he toxic compound found mostly in cotton seeds, the microorganism in ruminants digestive system detoxify gossypol in cotton seed, young ruminants with immature rumen do not have protection and are sensitive to it, the use of unprocessed cotton seeds are not recommended to young ruminants.

Solution, Addition of iron salts to the diet binds gossypol and alleviates gossypol toxicity.

(ii) Trypsin inhibitors.

These are ant-nutritional factors found in soya bean seeds, trypsin inhibitor bind with trypsin, a protein digestive enzymes in a small intestine to form inactive complex substance that prevent the enzymes to form digestive feed protein.

Solution, Trypsin inhibitor are heat-labile, hence are destroyed by heating. Treatment is required before feeding soy beans products to animal.

(iii) Hydrogen cyanides

This is the toxic compound found in both leaves and tubers of cassava. The amount of hydrogen cyanide in the cassava leaves and tubers depends on the variety, maturity, fertilizers application and post-harvest processing.

(iv) Tannins

These are toxic substances found in sorghum. They bind with protein, precipitate them and make them unavailable during digestion. Hence the digestibility reduced.

Solution, Inactivating of tannins by reconstitution followed by anaerobic storage, formaldehyde and acid treatment.

(v) Mimosine

This is the poisonous amino acid abundant in leucaena that is harmful to non-ruminant. Leucaena is also hazardous to cattle if provided in significant doses (greater than 35 percentages of the diet) for lengthy period of time it decreases live-weight gain and reproductive performance of animal by decreasing feed intake.

Solution, Leucaena toxicity can be reduced by supplementing with zinc sulphate or iron salt. It can also be lowered by soaking it with water and drying it (**10 marks, @2, mention 01@explain @1**)

7(a) The vector of the disease,

The possible disease; **trypanosomiasis**

(i) The possible vector is tsetse fly (**01 marks**),

Scientific name-Glossina spp (**01 marks**).

(ii) The possible method to control tsetse fly-

(a) The use of traps and screens.

This involves the use of traps and screens soaked or saturated with attractants and insecticides, the traps or screens attract the flies to a device that collect and kill them on.

(b) Bush clearing

This aims at destroying tsetse flies favorable breeding environments, this should be a continuous practices as there is a tendency of vegetative regrowth.

(c) Insecticides application.

This aims at using insecticides to kill the fleas in their breeding sites.

(d) Dipping and spraying farm animal by using acaricides.

This method aim at preventing animals from being attacked by tsetse flies as some acancides will remain in the animal body skin.

(e) The use of sterile male release techniques.

This is achieved by inducing sterility to make tsetse flies which is done by radiating their reproductive cells (**05 marks @1**).

(b) Control measures to prevent fleas.

(i) Proper hygienic, this helps o eliminates eggs on the ground and lava

(ii) Removing Dustin using water in the animal house.

(iii) Spraying insecticides to the environment and host itself will kill larvae and adult (**03 mark @01**)

8. The contributions of human being in the loss of natural pastures in Tanzania.

(i) Cultural values, specifically ownership of big herd of animals leading to higher stocking rate than the carrying capacity of the pasture land.

- (ii) The land tenure system, which demarcate communal ownership of land hence no incentives to conserve the grazing land.
- (iii) The existing competition between crops and animal resulting into animal being removed to marginal land.
- (iv) Poor animal marketing facilities in some areas hinder stocking due to low animal prices.
- (v) Frequent and uncontrolled fires destroy grassland. **(10 marks @2)**

9 (a) Description on oogenesis processes

Oogenesis-the process of egg production in female cattle, oogenesis occur in the ovaries when a female animal is born, her ovaries are filled with a finite number of small follicles

-Each follicle contain a single primary oocyte which are diploid cells that began mitosis before birth.

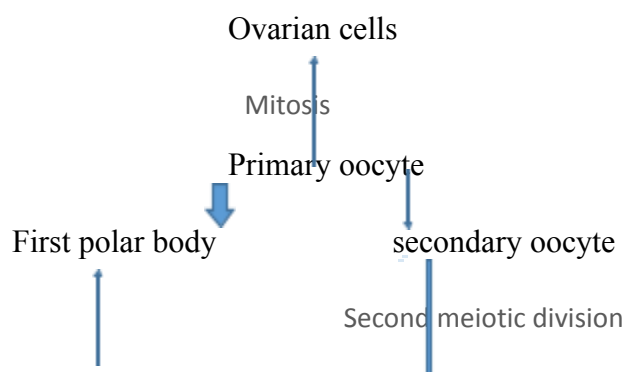
-These primary oocyte continue through meiosis at puberty stage where certain hormones tell them to wake up and start dividing.

-The primary oocyte undergoes the first split of meiosis, however it does not split equally inside, one is large cell and other tiny cell polar body are produced.

-Polar body usually deteriorates overtime, the remaining large cell (secondary oocyte) are released from the ovary during ovulation.

- It then undergoes a quickly meiotic division, it is uneven split again and another polar body forms.

Illustration.



zygote(if fertilized) (05marks)

(b) The role of accessory sex gland in the male cattle

(i) Seminal vesicles

This open in the urethra to produce a fluids that protects and transport sperms

(ii) The prostate gland

This is near the urethra and the bladder, it produces fluids that mixes with the seminal fluids throughout animal reproduction.

(iii) The Cowper's gland

Produces a fluids that moves down the urethra a head of the seminal fluids, it cleans and neutralizes the urethra helping protecting the sperm as they move through (05 marks)

10. Benefits of organic farming to the ecosystem.

(i) It lowers the cost of production as the method avoid the use of chemicals

(ii) Improves plant growth

(iii) Health and production of food less polluted by inorganic chemicals

(iv)The method is more energy efficient

(v) It has better gross margin and helps in reduction of global warming

(vi) Through organic farming ground water table remain unpolluted

(vii) Improves economic benefits to famers sustainably (**any five @2marks) point; 01mark, explanation; 01 marks)**