UACE P515/2 Principles and practices of agriculture2 2004

3hours

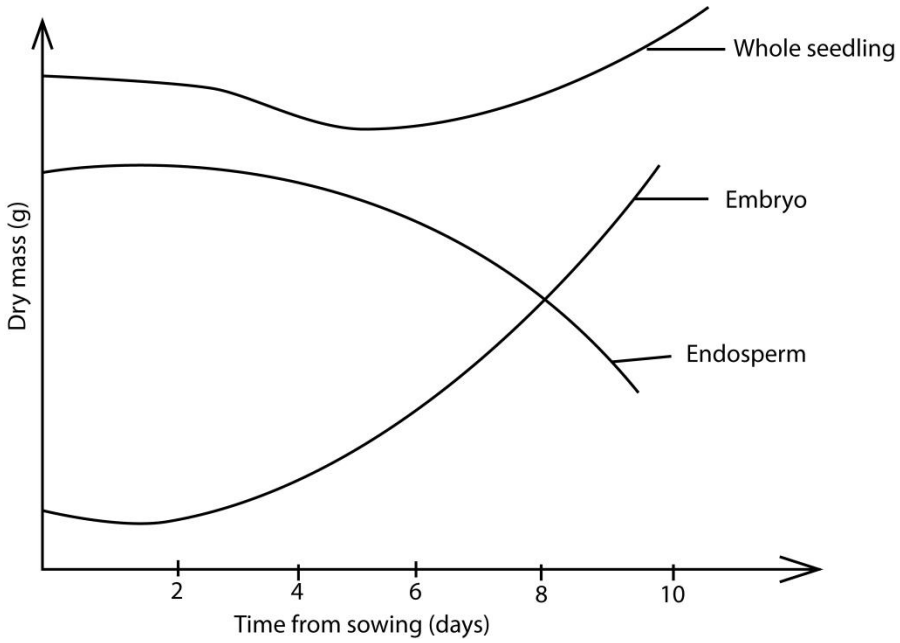
Instructions

- This paper consists of sections: **A, B, C, D and E**
- Answer **question 1** in section A and **four** other questions, selecting **one** from each of the sections **C, D and E.**
- Write your answers in the answer booklets provided
- Any additional question(s) answered will not be marked

SECTION A (20MARKS)

Question1 is compulsory

1. The graph below shows relative changes in dry mass of endosperm, embryo and whole seedling of maize. Study the graph and answer the questions that follow.



(a) Describe the changes in dry mass of endosperm, embryo and whole seedling during the experimental period. (06marks) (06marks)

(b) Explain the relationship between the change in dry mass of endosperm and embryo. (04marks)

(c) Explain the changes in dry mass of

(i) The whole seedling during the first week

(ii) the embryo at about day 7 (06marks)

(d) Explain environmental conditions necessary for germination of seeds. (04marks). (04marks)

SECTION B (20 MARKS)

2. (a) Explain the functions of organizations that market agricultural commodities (12marks)

(b) Describe the problems which these organization face in the marketing of agricultural commodities (08 marks)

3. (a) Describe the stages of management process on a farm. (08marks).

(b) Discuss the factors that govern the choice of a farm enterprise. (12marks). (08marks)

SECTION C (20 MARKS)

4 (a) Describe the characteristics of a good tree species to be used in agro-forestry. (08marks)

(b) What benefit do crops get when interplanted with trees? (12marks)

5 (a) Discuss the conditions that encourage soil aggregation. (12marks)

(b) Explain the importance of soil structure in farming (08 marks)

SECTION D (20 MARKS)

6. (a) Describe the methods used to select farm animals for breeding. (08marks). (10marks)

(b) Discuss the characteristics to be considered when selecting dairy animal for breeding. (12marks)

7. (a) Discuss what you would consider in flock of birds when planning to vaccinate the birds. (08marks)

(b) Outline the precautions that should be taken during vaccination. (12marks)

SECTION E (20 MARKS)

8. (a) With the help of a well-labeled diagram, describe the working a carburetor (14marks)

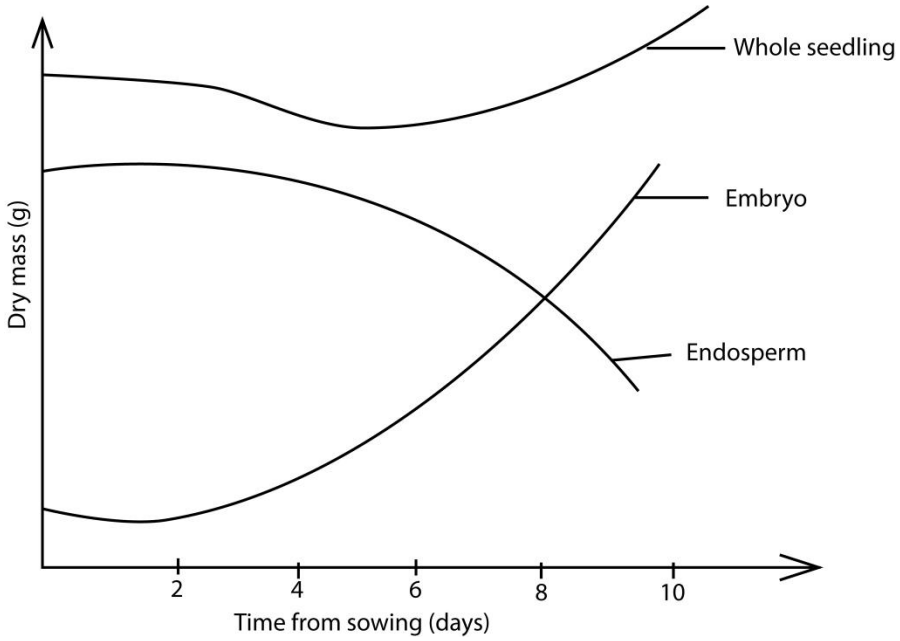
(b) How would you ensure the proper functioning of a carburetor? (06marks)

9. (a) What are the benefits of irrigation in Agriculture? (08marks)

(b) Explain the problems that may result from irrigation

Suggested answers

1. The graph below shows relative changes in dry mass of endosperm, embryo and whole seedling of maize. Study the graph and answer the questions that follow.



(e) Describe the changes in dry mass of endosperm, embryo and whole seedling during the experimental period. (06marks) (06marks)

- The dry mass of embryo increased exponentially as the day of germination increased
- The mass of the endosperm decreased slowly as the days increased
- The mass of the whole seedling decreased slowly in the first 5 days and then increased

(f) Explain the relationship between the change in dry mass of endosperm and embryo. (04marks)

- The mass of the endosperm decreased because its nutrients were used for respiration and growth of the embryo
- The mass of the embryo increased with the number of days because it used the nutrients from the endosperm to grow.

(g) Explain the changes in dry mass of

(j) The whole seedling during the first week

The mass of the whole seedling decreased in the first week because there was a net loss of nutrients through respiration

(ii) the embryo at about day 7 (06marks)

From the 7th day the mass increased because of sugars accumulated by photosynthesis

(h) Explain environmental conditions necessary for germination of seeds. (04marks). (04marks)

- Temperature: optimum temperature activation enzymes in the seed
- Oxygen is used for respiration

- Water dissolves; it is a medium of transports nutrients and a reagent in in metabolic reaction

SECTION B (20 MARKS)

2. (a) Explain the functions of organizations that market agricultural commodities (12marks)

- **Market regulation**: These organizations often set and enforce standards for quality, safety, and fair trading practices to ensure a transparent and efficient market.
- **Price stabilization**: they help stabilize prices by managing supply and demand, often through mechanisms like buffer stock or price support schemes.
- **Market information**: provide timely and accurate market information to farmers, trader and consumer
- **Facilitation of trade**: they facilitate trade by providing platforms for buying and selling; such as commodity exchange and by ensuring smooth logistics and transportation.
- **Support services:** they offer support services like warehousing, financing, grading, packaging, transport and processing to add value to agricultural products.
- **Policy advocacy:** These organizations often advocate for policies that support the agricultural sector, including trade policies, subsidies and infrastructural development.
- **Buy and sell agricultural products**
- Undertake the task of processing agricultural products into forms that satisfy customers' needs
- Receive goods and sell them on behalf of the farmers

(b) Describe the problems which these organization face in the marketing of agricultural commodities (08 marks)

- Lack of marketing skill
- Political interference
- Inadequate warehouses/storage
- Poor transport network increasing costs of transport
- Lack of organized market since most of farmers reside in villages
- Lack of standardization and grading
- Scanty market information
- Subsistence production responsible for low production
- Bulkiness of agricultural products increasing transport cost
- High interest rates on loans making financing of marketing activities very expensive
- Lack of preservation facilities causing losses as products are moved the market
- Limited processing facilities hindering value addition
- Price fluctuation
- Illiteracy of farmer making it difficult to pass on market information

- Excessive production leading low prices

3. (a) Describe the stages of management process on a farm. (08marks).

(b) Discuss the factors that govern the choice of a farm enterprise. (12marks).

- Farmers interest influences their efforts to the nature and level of production
- Availability of market for the intended produce
- Level of skills and experience affects the level of production and efficiency
- Government regulation on zoning and land use.
- Social and religious factors, for instance the Muslims may not invest in pigs
- Soil type and climate to support the choice crops and/or animals
- Available capital to finance the enterprise
- Availability of labour to work on the enterprise
- Pests and diseases limit agricultural activities
- Availability of land on which the enterprise is to be seated
- Security: the site should be protected from theft and vandalism
- Water supply: the farm site should be able to access water for animals and
- Future expansion: there should be room for expansion
- Topography: the site should be gentle sloping, free from flooding and erosion
- Accessibility: the site should be easily accessible to ease transportation and other farm activities
- Relationship other enterprises carried out on the farm
- Environmental impact of the farm: implement measures to prevent soil erosion, waste management and protect natural resources.

SECTION C (20 MARKS)

4 (a) Describe the characteristics of a good tree species to be used in agro-forestry. (08marks)

- They are quick maturing/grow fast for profitability
- They are deep rooted with few extensive lateral roots to reduce competition with the crops/have deep root system to recycle nutrients
- They have a narrow /less dense canopy on to minimize shade to the crops
- They should grow straight with few or no branches to enable crops get light
- They are easy to establish and quick to eradicate
- They withstand repeated pruning/are able to sprout easily and quickly grow
- They are nutritious and palatable to livestock/non-toxic
- They are resistant to pest and diseases
- They support growth of crops; some possess nitrogen fixing bacteria.

(b) What benefit do crops get when interplanted with trees? (12marks)

- Some trees fix nitrogen to the soil
- Crops receive shade from trees or are protected from excessive sun heat
- Dead leaves decompose to provide nutrients
- Act as weed breakers and protect crops from strong wind
- Trees reduce soil erosion caused by weed
- Pest control: some trees attract pest that would feed or damage crops

5 (a) Discuss the conditions that encourage soil aggregation. (12marks)

- Soil organic matter binds the soil particles together
- Soil water: moist soils are more plastic than dry ones
- Liming: calcium has a capacity to flocculate soil colloid
- Living organisms produce substance such as mucus that binds soil particles together
- Compaction lead to formation of platy structures
- Soil texture: soils with large particles are not plastic enough so their particles easily detach.

(b) Explain the importance of soil structure in farming (08 marks)

- It controls the passage of water through the soil i.e. granular structure enables are more rapid downward flow of water than planty structure
- It controls aeration of soil
- It controls soil temperature
- It regulate water holding capacity
- Controls soil pH by controlling air passage
- It controls workability of the soil; single, loose grained soil is easier to work than sticky heavy soils.
- It control root soil penetration
- Control soil erosion; loose soil is easily eroded.
- Controls the ability of soil to hold nutrients

SECTION D (20 MARKS)

6. (a) Describe the methods used to select farm animals for breeding. (08marks).

- **Individual Selection:** animals are selected basing on their performance or appearance (phenotype value)
- **Progeny testing:** selection is done basing on the performance of offspring of individual animals. For example, an animal to give birth to cow that produce a lot of milk

- **Pedigree Selection:** Here animals are selected basing on the performance of their ancestors. This method is used for traits that can't be measured in life e.g. quality of beef. The breeder assumes that the animal considered will show the same characteristics as the ancestors.
- **Family/Collateral relatives Selection:** here is selection done basing on performance records of close relatives like brothers, sisters, half-brothers etc. The transmission of traits (characteristics) with known importance between relatives can be measured using subtests.

(b) Discuss the characteristics to be considered when selecting dairy animal for breeding. (12marks)

- Adaptability of the animal to environmental conditions
- Availability of the breed with in the environment
- Availability of market for animal products for the animal being bred
- Animal temperament should be low for easy handling
- Animal resistance to pests and diseases should be high
- Animal body conformity should confirm the breed and type
- History of success of the breed in the environment
- Feed conversion ratio of the breed i.e. should have a high ability of converting feeds into products like milk , meat and eggs
- Growth rate of the breed
- Availability of quality feeds for the animals
- Fertility of the animal being considered
- Productivity of the animal in terms of milk, meat and eggs

7. (a) Discuss what you would consider in flock of birds when planning to vaccinate the birds. (08marks)

- **Age of the bird:** Some vaccines are administered to a day old chicks e.g. new cattle diseases or after a week.
- **Genetic resistance of the flock:** If a flock is resistant to a certain disease naturally then vaccination may not be needed.
- **Health status of the bird:** Vaccines should be administered to healthy birds not sick ones since it may not serve the purpose.
- Feeding and management practices followed.
- Methods of administration of the vaccine.
- Methods of storage and available facilities.

(b) Outline the precautions that should be taken during vaccination. (12marks)

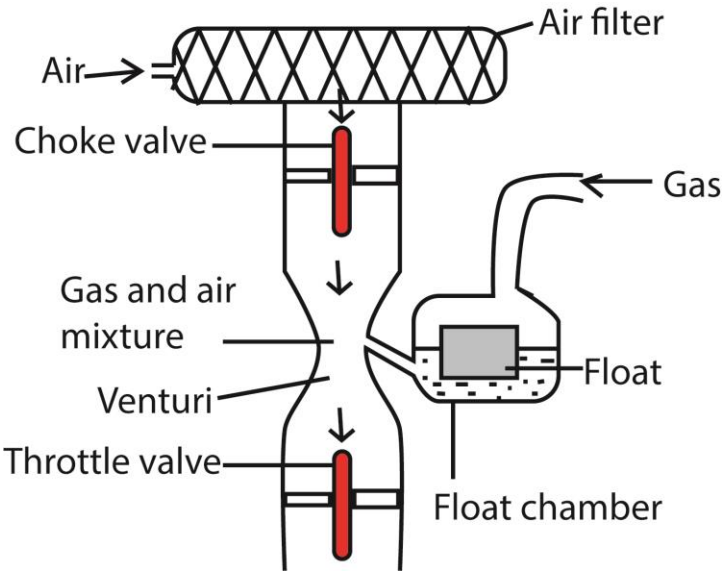
- Follow the manufacturer's instructions regarding the use of vaccines.
- Avoid exposing vaccines to high temperatures during transit.

- Store vaccines in a deep freezer before use.
- Do not vaccinate birds when they are under stress.
- Do not mix two vaccines together while administering
- Use distilled water in case you want to reconstitute the vaccine.
- Anti-stress medicine like antibiotics and vitamins should be given to birds before vaccination.
- All birds in the poultry house should be vaccinated at one time.
- Vaccination should be carried out in the cool hours of the day.
- The equipment to be used in the vaccination process should be disinfected.

SECTION E (20 MARKS)

8. (a) With the help of a well-labeled diagram, describe the working a carburetor (14marks)

A carburetor is a device that mixes air and fuel for internal combustion engines in the proper ratio for combustion.



Working of a Carburetor

- **Air Intake**: Air enters the carburetor through the air filter, which removes any dust or debris.
- **Choke Valve**: This valve restricts the air intake to enrich the fuel mixture, which is useful for starting a cold engine.
- **Venturi**: As air passes through the narrow section called the venturi, its speed increases, and pressure decreases, creating a vacuum.
- **Fuel Jet**: The vacuum draws fuel from the float chamber through the fuel jet into the airstream.
- **Throttle Valve**: This valve controls the amount of air-fuel mixture entering the engine. When you press the accelerator, the throttle valve opens wider, allowing more mixture to flow in.

- **Float Chamber**: This chamber maintains a constant level of fuel, ensuring a steady supply to the fuel jet.

Steps in Operation

- **Starting**: When the engine starts, the choke valve is partially closed to provide a richer fuel mixture.
- **Idling**: At low speeds, the throttle valve is nearly closed, and the engine runs on a small amount of fuel.
- **Acceleration**: When you accelerate, the throttle valve opens, allowing more air and fuel to enter the engine.
- **Cruising**: At steady speeds, the throttle valve maintains a constant position, providing a consistent air-fuel mixture.
- **Deceleration**: When you decelerate, the throttle valve closes, reducing the air-fuel mixture entering the engine.

(b) How would you ensure the proper functioning of a carburetor? (06marks)

- Regular Cleaning
- Inspect and Replace damaged Parts
- **Reassemble the Carburetor**: Carefully put all the parts back together.
- **Use Fuel Additives**: Add in-tank cleaners to help keep the internal passages clean.
- **Wear Protective Gear**: Use gloves and safety glasses to protect you from chemicals.

9. (a) What are the benefits of irrigation in Agriculture? (08marks)

- Provides water and reduce water stress of plants and increases crop yields
- Cools soil.
- Increases amount of cultivable land
- Reduces wind erosion
- Improves the quality of agricultural produce e.g. plumpness of seeds and fruits
- Provides food security
- Control some pests such as aphid that are more serious in dry weather
- Control weeds for instance in rice fields by flooding
- Soften soil to cultivation
- Enable timely planting
- It can help dilute toxins in the soil

(b) Explain the problems that may result from irrigation

- Promotes water borne diseases
- Leads to soil erosion

- Causes leaching
- Reduces soil aeration
- Leads to accumulation of salts in the soil causing soil salinity
- Make soil heavy for cultivation
- May cause death of microorganism due to poor aeration
- Cause denitrification due to poor aeration
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END