



Dr. Blossa Science

Sponsored by  
**The Science Foundation College**  
**Uganda East Africa**  
Senior one to senior six  
+256 778 633 682, 753 802709  
**Based On, best for science**

[digitalteachers.co.ug](http://digitalteachers.co.ug)



## UACE P515/2 Principles and practices of agriculture2 2022

### Instructions

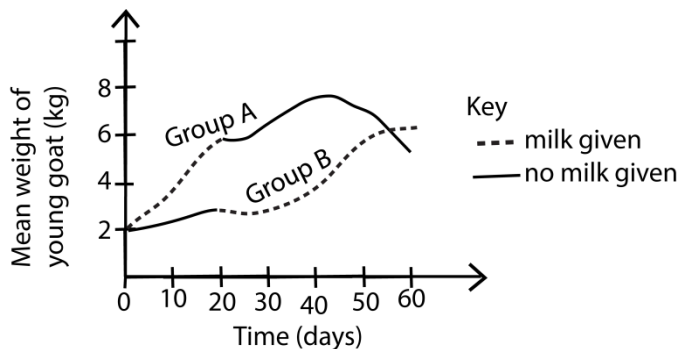
- This paper consists of sections: **A, B, C, D and E**
- Answer **question 1** in section A and four other questions, selecting **one** from each of the sections **C, D and E**.
- Write your answers in the answer booklets provided
- Any additional question(s) answered will not be marked

### SECTION A

#### Question 1 compulsory

- In an experiment to investigate the effect of including milk in diet on the growth of young goat, two groups A and B each containing four young goats were fed on synthetic diet consisting of purified milk proteins, sucrose. Fats. Inorganic salts and water.
  - Group A received the supplement of one litre of milk per day for the first 20 days and then no further milk was given.
  - Group B received no milk supplement for the first 20 days then the one litre of milk supplement was introduced per day throughout the experiment

The results are shown in figure below



- From the graph, find the mean weight of each group of young goats at day 10
- Explain the changes in mean weight for each of the groups A and B up to day 20
- Compare the changes in the mean weight of both groups of young goats from
  - Day 20 to day 40
  - The 40<sup>th</sup> day to the end of experiment.

- (d) Why was there a slight decline in mean weight from the 20<sup>th</sup> to about the 25<sup>th</sup> of group B goats yet
- (e) Using evidence from the graph, suggest the best advice to a goat regarding introduction of milk supplements to young goats for best result in the first one and a half months of growth,
- (f) One of the mineral salts found in the milk supplement is calcium. Outline the importance of calcium in animals

SECTION C (20MARKS)

CROP PRODUCTION

Answer **one** question from this section

- 2. (a) Distinguish between bulk density and particle density in soil (04marks)
- (b) Explain factors that influence bulky density. (10marks)
- (c) Suggest activities that can lead destruction of soil structure. (06marks)
- 3. (a) Discuss the advantages and disadvantages of controlling weed by cultivation. (10 marks)
- (b) Explain the environmental factors that cause disease in plants. (10marks)

SECTION B (20MARKS)

ANIMAL PRODUCTION

Answer **one** question from this section

- 4. (a) Describe the features of good hay (04 marks)
- (b) Explain factors affecting the quality of hay (12marks)
- (c) Outline factors affecting productivity of farm animals (04marks)
- 5. (a) Describe the procedures of training a calf to feed from a bucket. (08marks)
- (b) Outline the precautions that must be taken in bucket feeding (06marks)
- (c) Explain the advantages of bucket feeding (06marks)

SECTION D (20MARKS)

AGRICULTURAL ENGINEERING

Answer **one** question from this section

- 6. (a) State the functional requirements of the following farm buildings:
  - (i) Animals house (05marks)
  - (ii) Building for processing equipment. (05marks)
- (b) Explain the factors that may affect the level of farmer's investment in farm buildings. (10marks)
- 7. (a) Give the functions of each of the type of wooden posts in a barbed wire fence.
  - (i) Strainers (King post) (02marks)
  - (ii) Standard (ordinary posts) (02marks)
  - (iii) Droppers (01mark)
  - (iv) Struts (01mark)
- (b) Outline the procedure to be followed when constructing a barbed wire fence. (10marks)
- (c) State ways of maintaining barbed wire fence. (04marks)

SECTION E (20MARKS)  
AGRICULTURAL ECONOMICS

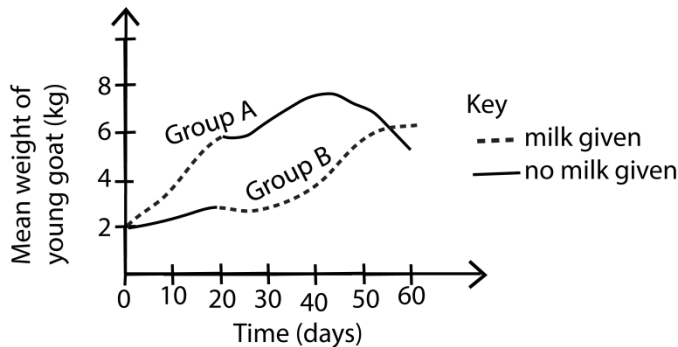
Answer **one** question from this section

8. (a) Distinguish between agricultural credit and subsidy (02marks)  
(b) Describe different types of agricultural credit and give examples of each (06marks)  
(c) Explain factors that may make it difficult for a farmer to repay credit. (12marks)
9. (a) Explain the advantages of diversification in agricultural production (08marks)  
(b) Explain how price influence agricultural production. (05 marks)  
(c) suggest ways of improving the marketing of farm products. (07marks)

Suggested answers

1. In an experiment to investigate the effect of including milk in diet on the growth of young goat, two groups A and B each containing four young goats were fed on synthetic diet consisting of purified milk proteins, sucrose. Fats. Inorganic salts and water.
- Group A received the supplement of one litre of milk per day for the first 20 days and then no further milk was given.
  - Group B received no milk supplement for the first 20 days then the one litre of milk supplement was introduced per day throughout the experiment

The results are shown in figure below



- (a) From the graph, find the mean weight of each group of young goats at day 10  
Mean weight for group A = 4kg  
Mean weight for group B = 2.8kg
- (b) Explain the changes in mean weight for each of the groups A and B up to day 20  
For A: there was a significant increase in the mean weight because of the milk supplement given which was rich in nutrients required for growth.  
For B: there was slight increase/low increase in the mean weight because the goats were denied milk thus lacked the required adequate nutrients for growth.
- (c) Compare the changes in the mean weight of both groups of young goats from  
(iii) Day 20 to day 40  
For A: the weight increased by 1 kg from 5.8kg to 6.5 kg while for B the mean weight increase by 2kg from 3kg to 5kg  
(iv) The 40<sup>th</sup> day to the end of experiment.  
For A: there was a decrease in weight from 6.5kg to 4kg while for B there was na increase in mean weight from about 5.8kg to about 6.3 kg.
- (d) Why was there a slight decline in mean weight from the 20<sup>th</sup> to about the 25<sup>th</sup> of group B goats yet they received the milk supplement.

Because the goats were getting acclimatized to the milk, i.e. synthesis of the necessary enzymes for utilization of milk nutrients.

- (e) Using evidence from the graph, suggest the best advice to a goat regarding introduction of milk supplements to young goats for best result in the first one and a half months of growth,  
**Advice:** goats require milk supplements in the first one and half months in order to grow fast/properly

**Evidence:** goats grew fast during the period they received milk supplements.

- (f) One of the mineral salt found in the milk supplement is calcium. Outline the importance of calcium in animals

- Leads to the formation of strong bones and teeth
- Helps in milk formation i.e. is a major constituent of milk.
- Required for blood clot formation
- required in muscle contraction
- required for formation of body parts like egg shells, horns, hooves, body shell line in reptiles

2. (a) Distinguish between bulk density and particle density in soil.

Bulk density is the weight per unit volume of a dry sample of soil in its natural structure intact while particle density is the mass per unit volume of soil solids.

- (b) Explain factors that influence bulk density

- Organic matter content: organic matter is very light and spongy and so increase in organic matter content lowers bulk density of the soil.
- Soil particle size: clay soil with tiny particles have higher bulky density than sand with large particles
- Porosity of the soil: porous soil has lower bulky density than non-porous soil
- Soil depth: bulk density tends to increase the deeper one goes into the soil profile due to lower organic matter and high density of the underlying rocks.
- Level of cultivation: intensive cultivation increases bulk density because it causes rapid break down of organic matter and cause compaction of the soil
- Systems of soil management: addition of manure in large amounts to soil lowers its bulk density.
- Cropping systems: continuous cropping reduces the amount of organic matter in the soil and increases the bulk density.
- Amount of air in the soil: the higher the air in the soil, the higher the bulk density
- Soil structure: the more compacted the soil structure, the higher the bulk density
- Mechanization: use of heavy machines such as tractors during cultivation compact the soil increasing its bulk density.

- (c) Suggest activities that can lead to destruction of soil structure

- Pollution of the soil such as application of fertilizers and insecticides.
- Ploughing soil at high moisture content results into mingling of the soil especially those that contain high clay content
- Excessive leaching especially calcium and iron oxides that bind soil particles
- Continuous cultivation of the soil break up soil aggregates
- Bush burning destroy the organic matter and expose the soil to agents of erosion
- Soil erosion erodes the aggregates destroying their shape
- Use of heavy machinery compact the soil and destroy soil structure.
- Water logging prevents organic matter from decomposing encouraging crumbling of soil structure

3. (a) Discuss the advantages and disadvantages of controlling weed by cultivation. (10 marks)

Advantages of weed control by cultivation

- Cheap especially for small plots of land
- Improve soil aeration
- Loosen soil particles
- Nonpoisonous to the crop and does not pollute the environment like herbicides
- Requires little skill
- Break up life cycle of crop pests by burying them or exposing them to harsh climatic condition
- Burying of weeds promotes their decomposition to provide nutrients to the plant.
- Improves water filtration
- Fast when machines are used
- Allows simultaneous application of fertilizers and weeding
- It allows earthing up of crops such as potatoes
- Can be used to control both annual and perennial crops

Disadvantages of weed control by cultivation

- Destroy soil structure
- Tiresome and laborious
- Increase water loss through evaporation
- Damage roots of the crops
- Bury and encourage germination of weed seed
- Encourages soil erosion

(b) Explain the environmental factors that cause disease in plants. (10marks)

(i) Temperature

- Sun scald exposed sites of fresh fruits and vegetables
- Wilting due to high evaporation
- Over sweetening of potatoes due to low temperature

(ii) Soil moisture

- Cause stunted growth due to inadequate nutrients
- Increase yellowing and leaf senescence due to lack of water
- Rotting due to much water
- Chlorosis and early senescence due to inadequate supply of nitrogen
- (iii) Limited sunshine/shadows
  - Causes etiolation and weakening of plant stems
- (iv) Water scarcity/drought/lack of rainfall
  - Causes stunted growth

4. (a) Describe the features of good hay (04 marks)

- Good hay should be leafy since leaves are richer in food value compared to other parts of the plant.
- Should be prepared out of herbage cut at the stage near flowering when the plant is highly nutritious.
- It should be green in colour since the green colour signifies the presence of Vit .A
- It should be free from dust and moulds which reduce palatability
- It should be soft and pliable for easy consumption by the animals.
- It should be free from weeds and poisonous plants.
- It should have a smell which is a characteristic of the plant from which it is made.
- The moisture content of hay should not exceed 15% since high moisture may cause rotting.

(b) Explain factors affecting the quality of hay (12marks)

- The species of grass – some grass species produce high quality hay since they can be easily turned and have nutrient content.
- Storage – Proper storage of hay by protecting it from rain and sunlight preserve the quality.
- Stage of cutting the grass – Grass cut before flowering produces high quality hay than that cut after flowering.
- Level of drying/moisture content – Poorly dried hay becomes moldy and over dried hay lacks Vit. A
- Method of drying or curing; those dried under shade are more nutritious than those dried in direct sunlight
- Degree of turning; properly and regularly turned hay during drying ensures uniform drying and hence high quality
- Handling to prevent loss of leaves

(c) Outline factors affecting productivity of farm animals (04marks)

- Breeding type/inheritance: genetic composition of beef animal determines its growth rate, feed efficiency and reproductive performance that contributed to overall productivity.
  - Age of the animal: productivity of livestock increases with age and then diminishes with time
  - Proper and regular feeding on balanced diet promotes high productivity in beef animals
  - Climate conditions, including temperature, humidity, and access to clean water, affect cattle well-being and productivity.
  - Health status: Healthy animals are more productive.
  - Health care such as regular vaccinations, parasite control, and disease prevention programs are critical.
  - Effective management: including proper housing, handling, and record-keeping, contributes to productivity.
  - Parasites: A part from transmitting pathogens, animal parasites can extract a lot of nutrients that are supposed to be used by the animals' body.
5. (a) Describe the procedures of training a calf to feed from a bucket. (08marks)
- The calf should be removed from the dam three days after birth to ensure colostrum intake.
  - Immediately after milking, the bucket with the milk should be presented to the calf for training.
  - Wash your hands with clean water and soap and dry it using a clean hand towel
  - The trainer should dip the index and middle fingers in the milk and later place it in the calf's mouth to suckle.
  - The calf suckles the fingers as the trainer lowers the hand in the bucket containing milk.
  - As the mouth of the calf approaches the milk in the bucket containing milk, the fingers are removed slowly to allow the calf to drink milk.
  - The calf begins slowly to drink the milk
  - Training can be repeated until the animal learns
- (b) Outline the precautions that must be taken in bucket feeding (06marks)
- The calf should not be allowed to drink in large quantities at ago as the milk can choke it or enter the undeveloped rumen where it would ferment causing digestive disturbances.
  - The calf should be fed in a clean bucket to avoid infection
  - Milk should be at the body temperature to avoid digestive disorders
  - Calf should be fed on regular interval with appropriate amount for proper growth.
  - The trainer's fingers should be clean to avoid infections
- (c) Explain the advantages of bucket feeding (06marks)
- It is easy to keep feeding records that can be referred to in any case since the amount of milk taken is known
  - Calves are rationed according to their body weight and healthy status
  - Reduces risk of transmission of diseases from dam to calf.
  - The farmer can introduce milk substitutes easily and therefore save milk for market.

- The method permits early weaning which can save milk
- The dam will give milk even when the calf dies
- Drugs to calf can easily be given through milk in the bucket.

6. (a) State the functional requirements of the following farm buildings:

(i) Animals house (05marks)

- Should have strong walls to reduce accidents to animals
- Should have concrete rough floor to reduce accidents of farmers from falling
- Should have a gently sloping floor for easy cleaning and draining.
- Should have a roof that is leak free to keep it dry
- Should have enough feed and water trough
- Should be well ventilated
- Should be spacious to accommodate animals
- Should have a lockable door for security

(ii) Building for processing equipment. (05marks)

- It should be water proof to keep it dry and prevent damaging machines
- Should be well ventilated to facilitate aeration for easy cooling of machine
- Should have noise and temperature regulator
- It should be fitted with a fire extinguisher to safeguard it in case of fire outbreak.
- It should be spacious to accommodate the machinery and operator
- Should be strong enough to resist vibrations caused by the machine
- Should have stable power supply to run the machines
- Should have emergency exist in case of accident
- It should be easily accessible for transportation of produce

(b) Explain the factors that may affect the level of farmer's investment in farm buildings. (10marks)

- Capital of the farmer; the higher the capital, the more/bigger the farm buildings.
- Size of the firm; the bigger the size of the farm the more likely the bigger the investment in farm building.
- The nature of the enterprise; different enterprises require different investment in the farm building
- Security; big investment are placed in secure places
- Level of technology, high technology requires big investment in farm buildings
- Expected economic returns; high returns required big capital investment especially in buildings

10. (a) Give the functions of each of the type of wooden posts in a barbed wire fence.

(i) Strainers (King post) (02marks)

- They are used to make corners

- They are used to make farm gate
- They keep the train of wire
- (ii) Standard (ordinary posts) (02marks)
  - They hold, strain and support wire
- (iii) Droppers (01mark)
  - Prevent wires from sagging
  - Maintain spaces between wires
- (iv) Struts (01mark)
  - They give support to the strainers in corner
  - They brace strainer at the gate.

(b) Outline the procedure to be followed when constructing a barbed wire fence. (10marks)

- Identify the area to be fenced
- Clear vegetation/bush in the space where the fence line will pass
- Use a string to make the line straight
- Use pegs to set the position of the posts in a straight line (4.6m apart)
- Determine the number of corners and gates since this will give the number of strainers and standard posts required.
- Set the corner and gate posts
- Dig holes about 2 feet deep for standard posts and 3 feet deep for strainer just enough to take the size of the post.
- Fit the posts and struts into the holes
- Fix struts on the strainer at the corner and gate
- Pour concrete or mortar and ram
- Nail struts to the corner and gate posts
- Stretch and staple the first strand of the barbed wire starting from the lower strand to the second upwards
- Fix in droppers where necessary
- Fix gate

(c) State ways of maintaining barbed wire fence. (04marks)

- Replace broken wire
- Treat the posts regularly which recommended preservatives
- Replace decayed posts
- Tighten loose wire with new staples
- Put dropper in between the wires to prevent sagging
- Replace broken gate

SECTION E (20MARKS)  
AGRICULTURAL ECONOMICS

Answer **one** question from this section

11. (a) Distinguish between agricultural credit and subsidy (02marks)

A **credit** is a sum of money that is expected to be paid back with interest while Agricultural subsidy is an incentive given to the farmers usually in form of reduced prices by the government.

(b) Describe different types of agricultural credit and give examples of each (06marks)

- **Short term credit:** usually less than a year used to purchase farm supplies, payment of salaries etc.
- **Intermediate /medium credit for a period of 1 to 5 years:** usually for purchase of machine, and improvement of farm houses and fence.
- **Long term credit beyond 5 years:** for purchase of say land.

(c) Explain factors that may make it difficult for a farmer to repay credit. (12marks)

- High interest rates charged.
- Short grace period which doesn't allow the farmer to realize the borrowed money.
- Poor loan supervision among the loan providers giving room for defection.
- Crop failure and animal death due to calamities.
- Theft by farm employees
- Price fluctuation of agricultural product.
- High taxes.
- Natural hazards such as floods, pests and disease outbreak.
- Inflation which increases the costs of inputs.
- Fall in demand of the products.
- Unplanned loans.
- Lack of proper enforcement.
- Uncertainties such as sickness and death of a farmer.
- Improper record keeping.
- Poor farm management skills.
- Political interference where a farmer may take the loan advanced to be a political payment or reward.

12. (a) Explain the advantages of diversification in agricultural production (08marks)

- Resources are effectively utilized in the production process.
- Increase supply of raw materials to agro-processing industries.

- It promotes integration of economy when byproducts of one industry are useful to other industries.
- Leads to self-reliance of the farmer and the country.
- Allow production of a variety of food which reduces malnutrition.
- It reduces risks that are associated in producing one type of crop or animal.
- It increases a variety of products produced in a country.
- Provides employment in different enterprises.
- It encourages the participation of many people in the production process to produce the different goods.
- It reduces over dependence on products from one place or country.
- Increase farm productivity and income

(b) Explain how price influence agricultural production. (05 marks)

- When prices in the market is high farmers are encouraged to produce more produce than when prices are low
- When prices are high farmers make high profits
- Price determine what the farmers produce to fetch high profits
- High input prices may discourage some farmers causing low agricultural production.
- Price determines investment in agricultural firms

(c) Suggest ways of improving the marketing of farm products. (07marks)

- Providing adequate market information i.e. the buyer should be informed of availability of the produce.
- Standardization of the quality and package of products.
- Improvement of transport network to enable transport of produce to the market
- Processing to increase value and lifetime of produce
- Formation of marketing cooperatives that help farmers to improve quality, source for the market and bargain for good prices
- Improving on security of the country to allow free movement of traders.
- International integration to increase market for produce
- Promoting agro-industries to provide market for agricultural produce

**Please obtain free downloadable notes of general paper, biology, economics, geography etc. from [digitalteachers.co.ug](http://digitalteachers.co.ug) website**

**Thanks**

**Dr. Bbosa Science**