



**UGANDA NATIONAL EXAMINATIONS BOARD**  
**Uganda Advanced Certificate of Education**

**P515/1 PRINCIPLES AND  
PRACTICES OF  
AGRICULTURE**

**SCORING GUIDE  
FOR THE SAMPLE PAPER**

**Item 1.**

*The candidate at the highest level of achievement is expected to;*

*Prepare a relevant cash flow analysis crop marketing document that rhymes with the problem in the scenario, with all its features depending on type OR describe a step-by-step procedure leading to the formation of a relevant animal product to solve a problem given in the scenario (for task a).*

*Identify specific challenges related to marketing of crop and animal products; market and price behavior and explain the strategies that can be used to address these challenges in order to improve marketing of crop and animal products (for task b).*

**Possible responses**

**(a).**

| <b>PN AGRICULTURAL PRODUCE LTD</b><br><b>DELIVERY NOTE</b> |                  |         |          |
|------------------------------------------------------------|------------------|---------|----------|
| No. _____                                                  | DATE: 25/01/2026 |         |          |
| To: St. Joseph's Secondary School                          |                  |         |          |
| Please receive the following goods                         |                  |         |          |
| S/N                                                        | Item             | Unit    | Quantity |
| 1                                                          | Beans            | Kg      | 700      |
| 2                                                          | Maize flour      | Tonnes  | 1.6      |
| 3                                                          | Maize grain      | Kg      | 750      |
| 4                                                          | Rice             | Tonnes  | 2.5      |
| 5                                                          | Ground nut seeds | Kg      | 645      |
| 6                                                          | Soya bean seeds  | Kg      | 420      |
| 7                                                          | Bananas          | Bunches | 50       |
| Received the above goods<br><br>Signature: _____           |                  |         |          |

The delivery note must have the following attributes;

- Correct title
- Name of the Company delivering the commodities
- Authorised representative of the Company delivering the commodities
- Delivery note number
- Date of delivery of the commodities
- Items, Units and Quantities of each of the commodities delivered

- Acknowledgement by the representative of the company receiving the commodities/ Signature of the representative of the company receiving the goods.

**(b).**

Rice mixed with stones; sorting the rice to remove stones and improve their acceptability by the consumers.

Beans of various sizes and colour; grading the beans into uniform lots according to colour and sizes such that each grade attracts its own price.

Limited market for his produce; carrying out advertising/sales promotion to create product awareness for increased sales.

Accident to truck; insuring the truck such that in case of the eventuality, he can be compensated by the insurance company to avoid loss.

Maize grains had become moldy; proper drying of the maize to the recommended moisture content for storage to curtail fungal growth and maintain quality of the grains.

## Item 2

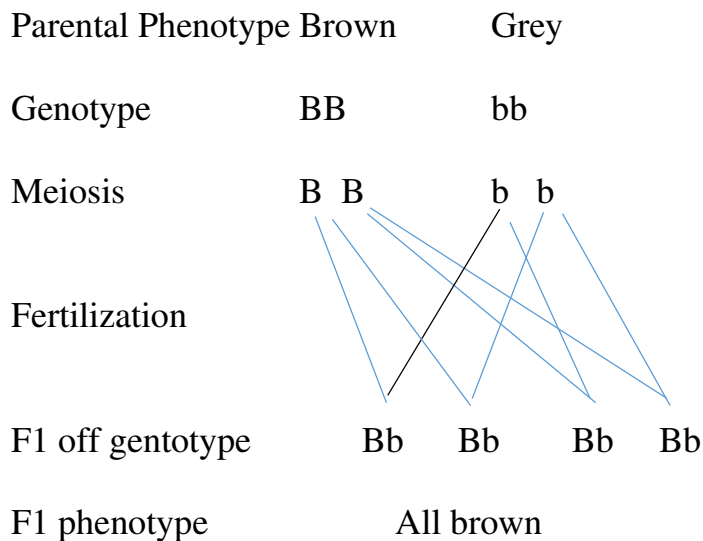
*The candidate at the highest level of achievement is expected to;*

*Describe a step-by-step scientific procedure of solving a challenge at hand OR identify challenges facing production and use biological knowledge to explain how these challenges affect production of crops and animals (for task a)*

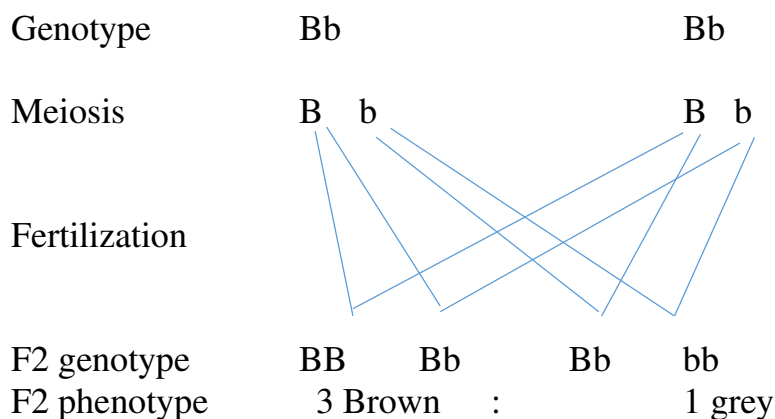
*Apply biological principles in solving specific challenges identified in the scenario and explain how these will lead to improved performance/yield/growth/productivity (for task b).*

### Possible responses

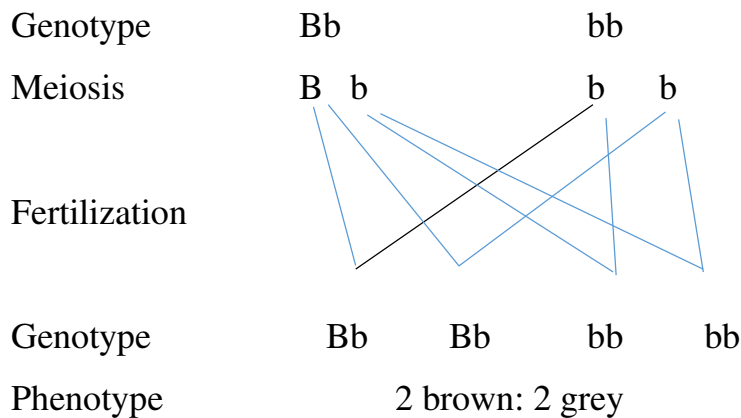
(a).



When the F1 offspring interbred,



Using some of the brown rabbits in the F<sub>2</sub> generation, Geoffrey can obtain rabbits in the proportion of 50% brown 50% grey by crossing the breeding the heterozygous rabbits from F<sub>2</sub> generation with the original grey parents or the grey parents in the F<sub>2</sub> generation as follows;



**(b)**

Females with 4-6 teats; select females with 8-10 teats that can be able to support a larger litter size up to weaning.

Females with narrow hind quarters and thin pelvis; select females with well-developed/wide hind quarters and a large pelvis to facilitate easy parturition and enhance survival of both the new borne and the mother.

Males having empty scrotal sac: select males with well descended testes into the scrotum to improve spermatogenesis that takes place at a lower temperature than the body temperature hence improving male fertility.

Males with thin chest and weak hind quarters; select males whose chests and hind quarters are wider for effectiveness during mating.

Slow growth rate of the rabbits; feed the rabbits on a properly balanced ration including enough protein for improved cell division and growth.

Feeding young rabbits on mature leaves of elephant grass; feed the rabbits on soft materials that they can easily digest since they only have less quantities of cellulase necessary for digesting the fibre in coarse feeds to ensure efficient food utilization.

## **SECTION B**

### **Part I**

*The candidate at the highest level of achievement is expected to;  
Identify specific challenges from the scenario and use agricultural knowledge and skills to explain how these challenges contribute to a yield challenge in the scenario (for task a).*

*Use agricultural principles to address specific challenges in animal production and show how these strategies lead to increased yield from the crops (for task b).*

### **Possible responses**

#### **Item 3**

##### **(a).**

Crowding around water points; leads to trampling of the pastures around the watering points reducing available herbage/limits water intake by the animals which consequently reduces milk yield.

Calf houses with walls that reach the roof; this limits ventilation in the calf pens thus increasing chances of diseases among the calves.

Damp walls; due to poor foundation construction or siting houses in poorly drained areas, leading to dampness in the cattle houses and consequently increases disease incidences among animals.

Low concentration of the dip wash; leads to development of resistance by the ticks towards the acaricide and ineffectiveness of the acaricide in controlling ticks thus increasing external parasite incidences on the farm.

Bleeding of calves after hoof trimming; due to excessive sole removal resulting into exposure of the soft tissue of the hoof to attack by hoof diseases and resulting in extreme pain and lameness.

Animals having pale gums, swollen bellies and rough hair; due to attack by parasites that suck nutrients from the animals' body resulting in reduced growth, productivity and vitality.

A section of grazing land becoming bare; due to overgrazing which exposes the grazing land to soil erosion and reduces the amount of herbage for the animals leading to reduced productivity

Bulls freely grazing with breeding females; leads to uncontrolled breeding which reduces hybrid vigour among animals, easy spread of venereal diseases that all affect growth and production.

Irregular milking schedule; disrupts the cow's release of oxytocin leading to incomplete udder emptying and milk yield loss.

Long milking duration; causes the action of hormone oxytocin responsible for milk let down to stop before completing the milking, resulting in reduced milk yield.

Wrong milking technique/pulling teats; causes pain to the teats and the animal withholds its milk, this resulting in reduced milk yield/ leads to development of mastitis that reduces milk yield and quality.

Buying excessive fencing posts for the perimeter to be fenced; leads to wastage of resources that would be channeled to other management practices for the farm that would increase yield.

**(b).**

Crowding around water points; Distribute the watering points evenly throughout the grazing area to ensure uniform grazing of the sward and increased productivity of the pasture.

Calf houses with walls that reach the roof; construct house in such a way that the walls reach half way in order to ensure sufficient air circulation in the calf house and to enable the calves see each other to diseases and distress.

Damp walls; Site the cattle house on well drained areas and construct strong foundations to ensure dryness and warmth inside the house and prevent pathogen accumulation in the cattle houses.

Low concentration of the dip wash; mix 275 litres of the acaricide in the water to ensure a strong dip wash that can effectively kill the external parasites.

Bleeding of calves after hoof trimming; Trim off only the overgrown hoof up to when it is level with the sole to avoid damaging the animal's flesh that would cause pain, lameness and reduced growth.

Animals having pale gums, swollen bellies and rough hair; control parasites by dipping/spraying/drenching to ensure effective utilization of feed nutrients by the animal and ensure healthy growth.

A section of grazing land becoming bare; carry out over sowing of the pasture to fill up the bare patches and ensure increased herbage availability for the animals.

Bulls freely grazing with breeding females; separate breeding males from females to ensure controlled breeding and improve the genetics of the animals.

Irregular milking schedule; Follow a strict milking schedule to take advantage of the Oxytocin that is responsible for milk letdown in order to have better milk yields.

Long milking duration; Complete the milking in 8 minutes or less to take advantage of the Oxytocin hormone responsible for milk let down whose effect goes down after 8 minutes in order to have good milk yields.

Wrong milking technique/pulling teats; Hold the teats between the fingers and squeeze the teat starting from the its base going down wards to harvest the milk from the udder without hurting the teats, so that the animal can sustain the release of oxytocin leading to increased milk yield.

Buying excessive fencing posts for the perimeter to be fenced; Buys 140 fencing posts that are optimum for fencing the grazing land to ensure optimum utilization of resources.

#### **Item 4**

##### **(a).**

Overstocking by 700 birds; leads to easy spread of diseases/stress which both reduce number of birds due to death and reduce productivity of the birds.

Stocking the house with broiler chickens at the beginning of September for supply during Christmas festivities; leads to long stay of the chickens in the house resulting in increases expenses on feeds and other management practices thus increasing the cost of production and reducing profitability.

Fewer feeders (less by 25); leads to congestion/overcrowding around the feeding places resulting in cannibalism that may lead to death of birds. Also leads to reduced feed intake by the bids leading to slow growth rate and low productivity.

Wet walls and litter; cause accumulation of pathogens and spread of diseases that affect the health of the flock.

Disposing off birds in the nearby rubbish pit; causes spread of diseases from the dead birds to other birds in the nearby environment which escalates losses.

Birds spreading wings during slaughter; causes anxiety to the birds at the time of slaughter causes release of adrenaline and cortisol that lead to poor meat quality and increased susceptibility to bacterial spoilage.

Workers running in the poultry house; causes stress to the birds that reduces feed intake, utilization and overall growth.

Droppings scattered all over the litter; reduce the quality of litter/durability of the litter/eases spread of diseases among birds thus increasing cost of production with the need to replace the litter and leading to losses due to diseases.

Partially digested food in the crop and intestines; these accelerate spoilage of the meet and reduce its market value.

**(b).**

Overstocking by 700 birds; Fewer feeders (less by 25); reduce the birds to 800 to match the available space and reduce spread of diseases and occurrence of vices for healthy growth and improved yields.

Wet walls and litter; proper construction of the foundation with a PVC sheet on top to stop the rise of water by capillarity into the walls and floor, and ensure a dry house necessary for good warmth and dry litter.

Disposing off birds in the nearby rubbish pit; dispose off the dead birds by burning them in an incinerator to ensure death of pathogens and maintain good health of the surviving flock.

Birds spreading wings during slaughter; stun the birds before slaughter for humane killing and to ensure good quality of meat.

Workers running in the poultry house; workers should move gently within the poultry house to ensure a calm environment necessary for handling of birds without stressing them, thus ensuring normal feed intake and growth.

Droppings scattered all over the litter; provide perches in the poultry house such that birds can roost on them and deposit their droppings in one place for easy collection and good quality of litter.

Partially digested food in the crop and intestines; starve the birds 24 hours before slaughter to empty their digestive systems before prior to slaughter and ensure good quality and prolonged stay of meat.

Fewer feeders; add more 25 feeders in the poultry house to increase food intake/prevent vices due to crowding around the feeding places thus ensuring normal growth of the birds.

## **PART II**

*The candidate at the highest level of achievement is expected to;  
Identify specific challenges from the scenario and use agricultural knowledge and skills to explain how these challenges contribute to a yield challenge in the scenario (for task a).*

*Use agricultural principles to address specific challenges in animal production and show how these strategies lead to increased yield from the crops (for task b).*

## Possible responses

### Item 5

(a).

A foreigner buying land on free-hold basis; since foreigners are constitutionally not permitted to own land by free hold, this discourages the land owner from carrying out improvement practices on the land for fear of losing it.

Workers taking too long to finish clearing the land; delayed completion of land clearing leads to delayed preparation of the land and consequently delayed planting which all lead to late season pest attack/late harvest/reduced moisture availability after the rains hence reduced yields.

Water stagnating on top of the soil shortly after rains/shallow soils; this is due to low water infiltration rates that reduce the availability of rain water for the plants as most of it is lost to erosion and evaporation.

Very acidic soils; a hydrogen ion concentration of  $10^{-2}$  is pH 2 which is way too acidic and leads to unavailability of nutrients needed by the plants/increases incidences of fungal diseases that attack the plants and reduce yield.

Short plants with reduced internodes; due to ratoon stunting disease which reduces the growth rate and size of the cane resulting in low cane yield.

Use of non-selective herbicide; these are designed to kill any plant they come into contact with thus killing the sugarcane in addition to the weeds, resulting in no yield in the section they are applied.

Sugarcane mealy bugs; these suck plant sap and reduce the vigour/inject their toxic saliva into the plant grossly reducing growth rate and yield.

Irritation of farmers during weeding; due to exposure of the body parts to the irritating morphological features of the plants thus reducing the work output by the workers during weed control and consequently leading to sustained competition for nutrients by the weeds.

Irrigation shortly before harvesting; this reduces the sucrose content of the cane resulting in low quality canes.

Use of immature cuttings for establishing the plant; these do not have enough food reserves necessary for fast sprouting and establishment of the plant thus leading to delayed growth and reduced yield.

Machines that cut the cane into very small pieces; this leads to sucrose loss and juice deterioration leading to reduced quality of the yields.

**(b).**

A foreigner buying land on free-hold basis; should apply for lease to have land for a longer period of time that gives him incentive to develop it for better yield without worries of losing it.

Workers taking too long to clear the land; should use a faster method of clearing land for example using machines or chemicals that can clear the land in a short time and allow for early seedbed preparation and timely planting that controls late season pests/enables plants benefit from the early rains leading to better yield.

Water stagnating on top of the soil shortly after rains; should carry out subsoiling/deep cultivation to improve water infiltration into the soil.

Very acidic soils; should apply agricultural lime to increase the pH and make it favourable for availability of nutrients necessary for crop growth and reduction in prevalence of fungal diseases.

Short plants with reduced internodes; should immerse the cuttings in hot water for 2 hours before planting in order to kill the bacteria that cause ratoon stunting disease and have normal plant growth.

Use of non-selective herbicide; should use selective herbicides that will only kill the weeds and spare the plants to reduce competition for nutrients by the weeds and increase availability of growth factors needed for a healthy growth.

Sugarcane mealy bugs; should apply systemic pesticides to kill the mealy bugs and have a vigorous crop growth.

Irritation of farmers during weeding; workers should wear protective clothing like overalls and gumboots to protect them against any form of physical hazard so that work out put can be high and crops rid of weeds in time to ensure healthy growth and better utilization of growth factors.

Irrigation shortly before harvesting; irrigation should be done during the growth phase of the sugarcane plants when the water demand is high for increased stalk elongation, longer internodes and improved tonnage at the time of harvest.

Use of immature cuttings for establishing the plant; only the mature part of the cane should be used as planting material as it has enough food reserves (sucrose and glucose) that provide energy during the initial sprouting phase and sustain the bud until it grows roots and functional leaves.

Machines that cut the cane into very small pieces; use machines that cut the cane into longer pieces to maximize sugar yield and preserve quality of the cane.

## **Item 6**

### **(a).**

Prepared a flat seedbed for the Irish potatoes; results in poor anchorage of the plant and development of small tubers leading to reduced yields.

Planted fresh tubers two days after buying them; makes the tubers susceptible to decay after planting and gaps in the field resulting in reduced plant population and consequently reduced yields.

Planted one month after the rains had established; makes the plants miss out on the fast rains leading to moisture stress during peak demand and consequent reduction in growth and yield. Makes the plants susceptible to pests and diseases that attack in the later stages and these reduce the yield of the crop.

Soils drying very fast after heavy rains; due to lower water holding capacity of the soils reducing availability of water to the crops when they need it during dry periods and consequent reduction in growth and yield.

Stagnation of water in the field; water logging leads to reduced soil air/restricted root and tuber development/escalation of fungal diseases that all lead to reduced growth and tuber yield.

Lesions on the leaves; due to attack by bacterial blight that reduces the leaf area available for photosynthesis thus reducing plant growth and tuber size.

Tubers exposed to sunshine; leads to reduction in the quality of the tubers/exposes tubers to damage by pests and rodents/ poor anchorage making the plant susceptible to lodging, all of which reduce tuber growth, size and yield.

Used a basin and broom for applying the herbicide; results in uneven distribution of the herbicide and some parts of the plant may not get the herbicide so some weeds will survive and compete with the crops for growth factors leading to reduced plant growth and yield.

Used a contact pesticide to control root nematodes; the pesticide will remain on those parts it was applied to and the nematodes under the ground will continue inflicting damage on the crop leading to reduced growth and yield.

Used a hand hoe to harvest the tubers; the hand hoe increases the likelihood of tuber damage during harvest resulting in reduced quantity at harvest and market value of the tubers.

Late harvesting of the tubers; leads to rotting of tubers and pre-harvest sprouting of the tubers and reduced quality of the tubers since the nutrients will be used for this pre-sprouting with consequent reduction in market value

**(b).**

Prepared a flat seedbed for the Irish potatoes; should prepare a raised seedbed in form of mounds to provide sufficient soil volume for better anchorage and increased size of the tubers.

Planted fresh tubers two days after buying them; pre-sprout the tubers by keeping them in a cool room with no indirect light for a period of about 4 weeks to ensure fast establishment and vigorous growth after planting.

Planted one month after the rains had established; planting should be done immediately after establishment of the rains so that plants can get sufficient moisture needed during their establishment and other peak periods and survive late season pests.

Soils drying very fast after heavy rains; apply a mulch/organic matter to conserve moisture in the soil for use throughout the growing period even when there are no rains in order to sustain crop growth.

Stagnation of water in the field; construct drainage channels/carry out deep cultivation to lead away excess water/allow more water infiltrate into the soil for improved aeration, root development and healthy growth of the crop.

Tubers exposed to sunshine; carry out earthing up/dig around the plant and heap soil around to cover the base of the plant to provide anchorage, protect tubers from attack by pests and rodents and consequently improve plant growth and tuber yield.

Used a basin and broom for applying the herbicide; use a sprayer to ensure uniform distribution of the spray chemical all over the plant to ensure death of the weeds and ensure proper utilization of growth factors by the plants leading to improved yields.

Used a contact pesticide to control root nematodes; use a translocated/systemic pesticides which when applied is absorbed into the plant's vascular systems and transported through the plant's tissues to reach areas like the roots where it was not applied and effectively kill the nematodes to ensure healthy growth of the plant.

Used a hand hoe to harvest the tubers; use a forked hoe to pull out the tubers undamaged for increased quantity of yield and acceptability by the consumers.

Late harvesting of the tubers; harvest the tubers when they are due to minimize loss caused by pre-sprouting and rotting when they overstay in the soil.