

WAKISSHA JOINT MOCK EXAMINATIONS  
MARKING GUIDE

Uganda Advanced Certificate of Education  
PRINCIPLES AND PRACTICES OF AGRICULTURE P515/2  
July/August 2023

Okello James -

AMS



SECTION A

COMPULSORY QUESTION (20 MARKS)

1. An experiment was carried out to investigate the rate of photosynthesis in a maize plant ( $C_4$  plant) and bean plant ( $C_3$  plant). The rate of photosynthesis of the two crops was determined at different concentrations of  $CO_2$  by measuring the rate of Oxygen evolution from the crops and recorded in the table below;

CO <sub>2</sub> concentration %	Rate of photosynthesis per leaf area per second (O <sub>2</sub> evolved in cm <sup>3</sup> )	
	Maize	Bean
0.01	17.0	0.0
0.02	38.0	0.0
0.03	55.0	01.5
0.04	57.0	23.0
0.06	57.0	56.5
0.08	57.0	65.0

- (a) Compare the variation in the rate of photosynthesis of the crops at the following carbon dioxide concentrations. (04marks)

(i) 0.01 to 0.02

- The rate of photosynthesis in maize increases from 17.0 to 38.0cm<sup>3</sup> of O<sub>2</sub> evolved while in bean there was no photosynthesis recorded or No O<sub>2</sub> was evolved. (2 marks)

(ii) 0.04 to 0.08

- Maize attains a maximum and constant photosynthesis rate of 57.0cm<sup>3</sup> of O<sub>2</sub> evolved while the bean increases rapidly from 23.0 to 65.0cm<sup>3</sup> and attains the highest photosynthetic rate than maize. (2marks)

- (b) Give your possible explanations for the answer in (a) above. (02marks)

- C<sub>4</sub> plants (maize) has a high affinity for Co<sub>2</sub> than C<sub>3</sub> plants (Bean plants)  
- Maize plant is more efficient at photosynthesis at lower CO<sub>2</sub> concentration than a bean plant and vice versa

(Any 1 x 2)

Suggest two factors that were kept constant and give a reason why they were kept constant. (03marks)

- Temperature / warmth
- Light intensity

(2marks)

Reasons: Both factors have an effect on the rate of photosynthesis.

d) Measuring the rate of photosynthesis by determining the rate of oxygen evolved maybe by an inaccurate method and may give misleading results. Give two reasons why. (02marks)

- There could be other parts emitting O<sub>2</sub> other than the plants only.
- O<sub>2</sub> is only produced during the first stage of photosynthesis (light reaction stage) there fore does not represent the full process of photosynthesis.

1 x 1

e) What conclusion can be drawn from the photosynthetic rates of the two crops basing on the results above. (04marks)

- Maize has a higher photosynthetic rate at lower CO<sub>2</sub> concentration than a bean plant.

(4marks)

- Bean has higher photosynthetic rate at higher CO<sub>2</sub> concentration (3marks)

- There is no photosynthesis taking in beans at very low CO<sub>2</sub> concentration.

f) Give four differences between C<sub>4</sub> and C<sub>3</sub> plants (08marks)

C <sub>3</sub> plants	C <sub>4</sub> plants
- More adaptable to cold environment	- More adaptable to hot environment
- CO <sub>2</sub> acceptor in RUBP (ribose Bi-phosphate)	- CO <sub>2</sub> acceptor and PEP (Phosphoenolpyruvate)
- Produce GALP or PGA (Glyceraldehyde -3-phosphate)	- Produce OAA (Oxalo acelate)
- Has no krauz anatomy	- Has a krauz anatomy
- Buddle shealth doesn't contain chloroplasts	- Buddle shealth contain chloroplasts
- Chloroplast don't contain peripheral reticulum	- Chloroplasts contain peripheral reticulum
- Photosynthesis can only take place when stomata are open.	- Photosynthesis can take place when stomata are open or closed.
- Less efficient in CO <sub>2</sub> fixation	- More efficient in CO <sub>2</sub> fixation
- Low rate of photosynthesis	- High rate of photosynthesis.

using each

## CROP PRODUCTION (20 MARKS)

(a) Describe the procedure of growing mushroom from the planting of spawn up to harvesting. *media (substrate)* (10 marks)

- Obtain the growing (maize straw wood, shaving, cotton husks)
- Chopping the media, in order to obtain fine materials to ease compositing.
- Compositing/ soaking the materials with water to cause compatibility.
- *Drain out excess water from the substrate.* Lining the materials; it involves addition of lime to maintain PH.
- Sterilization of the material; to kill pathogens/ *fungal infestation*
- Cooling of the materials; its done to regulate temperature of the material (substrate)
- Inoculation of the spawns(mushroom seeds) into the prepared substrate.
- Encasing the material, This involves putting the substrate with seed into the polythene bags (bagging)
- Hanging of the encased bags in a *dark* room to promote germination.
- Slitting of the bags; it involves putting slit cuts on *bags* to promote sprouting of mushroom.
- Watering and introduce light gradually to promote efficient germination.
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(12 marks)

(b) Explain the challenges faced by farmers growing mushrooms in Uganda.

*(08)* marks)

- Perishability, therefore easily go bad.
- Expensive mushroom seed (spawn)
- The mushroom seeds are not readily available.
- Limited skill of the farmers.
- Inadequate processing equipment/ facilities.
- Harsh climatic conditions especially dry conditions that cause spoilage.
- Inadequate information and extension services to the farmers
- *Lack of market for the mushroom.*
- *Lack of good quality substrate.*
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*any 8*

(8 marks)

3. (a) State the impact of soil erosion on farming communities. (08marks)

- Weakens farm structures
- Leads to spread of soil/ water borne diseases.
- Leads to destruction of the soil structure.
- Leads to loss of soil *nutrients. nutrient*
- Leads to loss of organic matter.
- Increases the rate of rock weathering.
- Leads to destruction of crops.

- Leads to formation of gullies making use of machinery hard.
- It increases the cost of production or farming in controlling it.
- Infertile soil maybe deposited on fertile soil making the latter infertile and vice versa.
- Spread of weed seed
- It leads to silting of water bodies
- Destruction of communication lines

Award 1 mk @ 8 points

(b) Outline the measures to minimise soil erosion and its effects. (12marks)

- Organic mulching
  - Cover cropping
  - Contour ploughing
  - Terracing
  - Deep ploughing
  - Strip cropping
  - Use of graded banks.
  - Use of diversion channels
  - Use of bunds.
  - Agro-forestry.
  - Use of galsions. gabions
  - Close spacing
  - Use of ridges.
  - Bush fallowing
  - intercropping
  - uses of bridges barrages
  - Minimum tillage
  - Afforestation / re-afforestation.
- Application of organic manure.

Award 1 mk @ 12 mks

### SECTION C

#### ANIMAL PRODUCTION (20MARKS)

4. (a) Explain factors that predispose farm animals to ill health. (10 marks)

- Age of the animal
  - Climate
  - Injuries
  - Heredity
  - Nutrition deficiencies
  - Sex of the animal
  - Stress
  - Poor management / poor housing / poor hygiene / poor feeding
  - Injuries
  - Vectors
  - Productivity of the animal (high milkers)
  - Poison
  - poor disposal of dead infested animal
- starvation
- Breed / type of animal

Award 2 mks for 5 pts when well explained

(b) Give the benefits of having a good parasite and disease control program on the farm. (10 marks)

- Control / avoid zoonotic diseases.
- Promote faster growth/maturity.
- Ensure constant/steady production.
- To increase production span of animal.
- To increase production level.
- To enable safe introduction of exotic animals into the farm.
- To promote high breeding efficiency / reproduction rate.
- To improve on the quality of products.
- To increase life span of the animal.
- To increase feed digestibility.
- Lower cost of production / treatment cost.
- Ensures steady market of animal and animal products.

10x1

5. (a) Describe the intensive systems of poultry farming under urban farming. (12 marks)

(i) House and run.

- Birds are confined in a wire netting and a house <sup>is</sup> provided with in the enclosure.

**Advantages**

- Birds are able to exercise.
- Birds get access to greens and insects.
- Less land is required.
- Birds are prevented from ~~staying~~ starving.
- There is close supervision of the birds.
- Birds are protected from predators.

(ii) Fold units

- Birds are confined in movable arks or fold or cages and these are moved on a daily basis in an enclosed area (run).

**Advantage:**

- Birds are under close supervision.
- Predation is minimized.
- Diseases control is easy as the folds can be isolated.
- It is easy to collect the eggs.

(iii) Battery cage

- Birds are kept in individual cages which are stack one another the permanent building.

**Advantages:**

- Allows high stocking rates.
- It's easy to detect and isolate sick birds.
- Allows close supervision of birds.
- Minimises chicken vices.
- There is minimum contamination of water and feeds.
- Requires less labour to tend to the cages.
- It is easy to keep individual bird records.

(iv) **Deep litter system**

- Birds are kept indoors through out their life.

**Advantages:**

- Allows high stocking rates.
- Sick birds are easy to detect ~~birds are protected from predators.~~
- Birds are kept comfortable by the litter.
- The system allows / provides good quality manure.
- Birds are kept from hazards e.g bad weather.
- Record keeping is made easy.
- Birds get close supervision of the farmer.

- Bird are protected from predators.  
- Easy collection of eggs.

Award 3mks for 4 systems  
1mk mention  
2mks advantages.

(b) **Suggest the management practices for production of good quality eggs.**

- proper disease control.
  - proper feeding
  - regular raking of litter.
  - changing of litter.
  - provide clean laying box (nest).
  - provide green vegetables.
  - provide perches to make the birds busy.
  - control of parasites
  - debeaking
  - provide enough clean water.
  - regular egg collection.
  - culling of unproductivity layers.
- (08 marks)*  
*- proper stocking rate*  
*- proper housing*

**SECTION D**

**AGRICULTURAL ENGINEERING AND FARM STRUCTURES (20MARKS)**

6. (a) **Describe factors that affect working efficiency of farm implements.**

*(08 marks)*

- Type of implement. some implements is more efficient than others.
- Type of soil. Some implements are more suitable in some soils than others.
- Strength of the implement, strong implements are more efficient.
- Skills of using the implement skills operators lead to high efficiency.
- Speed of operation, speedy operators are less efficient.
- Type of work to be done, some work lead to high efficiency of implements.
- Level of maintenance, well maintained implements have high efficiency.
- Nature of setting / mounting of the implement. Well set implements have high efficiency.

- Type of vegetation, thick vegetation lowers efficiency.
- <sup>durability</sup> Age of the implement. New implements are more efficient than old ones.
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2mks for each point  
 1 mk for point  
 1mk for explanation  
 (2 x 5 = 10 marks)  
 (5 x 2 = 10 marks)

(b) Give reasons why there is a need to care for farm implements. (12 marks)

- To reduce costs of repair and maintainance.
- To reduce time wastage when repairing implement.
- To reduce accidents during work.
- To increase durability of farm implements.
- To increase efficiency of farm implements while at work.
- To reduce incidences of losing bolts, nut and pins from implements.
- To increase production due to use of better implements.
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1mk for 1 point  
~~1 x 5 = 5 mks~~  
 5 x 1 = 5 marks

(c) How can farmers be encouraged to adopt machinery use in farming.

- Developing simple machines.
- Developing versatile machines.
- Formation of co-operations to afford machines.
- Availing credits to farmers at low interest.
- Training and education of farmers to acquire skills.
- Encouraging land consolidation to make machine use economical.
- Easy access to spare parts for easy repair and maintenance.
- Establishing enough workshops for easy repair and maintenance.

(06 marks)  
 (5 marks)

*subsidizing the prices of machines*

1 mark for each point  
~~1 x 5 = (5 marks)~~  
 (5 x 1 = 5 marks)  
 (12 marks)

7. (a) Explain why water is of great importance on the farm.

- For drinking by livestock and people during hot days.
- For irrigation during times of inadequate rainfall.
- For mixing agro-chemicals to <sup>the</sup> recommended concentrations.
- For preservation of perishable agriculture products like <sup>fruits</sup> ~~limbs~~ and vegetables that require cool conditions.

- For cooling farm engines to avoid overheating.
- For generating power to be used at the farm.
- For transporting farm produce using streams, rivers and lakes at the farm.
- For mixing construction materials like mortar, concrete which are used in construction at the farm.
- For rearing farm animals like fish in controlled conditions like fish ponds at the farm.
- For preparing food or cooking food.
- For mixing animal feeds like bran fed to animals.
- *helps in it is used for cleaning of equipment, animal houses*
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1 mark for @ point

1 x 10 = 10 marks

*10 x 1 = 10 marks*

(b) Explain ways how farmers can fight water shortage on the farm (10 marks)

- Through irrigation during timer of inadequate rainfall for proper crop growth.
- Through afforestation and re-afforestation which encourage rainfall formation.
- Through diversification to avoid total loss.
- Through growing faster maturing crops to utilize available rainfall.
- Through growing drought resistant crops to resist water shortage.
- Through rearing animals which resist drought like local animals.
- Through rain water harvesting and storage to be used in times of drought.
- Use of suitable seed beds like sunken seedbeds which trap all rainfall available.
- Construction of water reservoirs and storage tanks to keep enough water for used in drought periods.
- Agro-forestry that creates cool environment for proper crop growth.
- Establishing food reserves so as to keep enough food for period of water shortage.
- *widens the market bases*
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1 mk for @ point

(1 x 10 = 10 marks)

## SECTION E

### AGRICULTURAL ECONOMICS (20 MARKS)

8. (a) Differentiate between specialization and diversification in farming.

- **Specialisation** is the putting of all resources to production of one product at the same time while **Diversification** is the putting of some resources to production of several products at the same time. (02 marks)

1 mark for each definition

(1 x 2 = 2 mks)

(b) Describe four farming practices that clearly demonstrate diversification



(b) Describe four farming practices that clearly demonstrate diversification in farming. (12 marks)

- Mixed farming. It involves growing crops and rearing animals at the same time on a piece of land.
- Mixed cropping. It involves growing of several <sup>annual</sup> crops in a given piece of land <sup>on</sup> at the same time.
- Intercropping. It involves growing of the crops (major and minor) in the same piece of land at the same time.
- Agro-forestry. It involves growing crops, rearing animals and planting of trees <sup>short-term</sup> at the same piece of land at the same time.
- *key farming - growing of crops with pastures.*
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2 marks for each points  
1 mark for point.  
1 mark for explanation.  
(2 x 4 = 8marks)  
(10 marks)

(c) Explain the benefits of diversification in farming.

- It prevents total loss because a loss from one enterprise can be covered in another enterprise.
- Farmer get constant income throughout the year. *farm*
- It promotes efficient utilization of resources on a ~~form~~ like land, labour and capital.
- It promotes efficient self-sustainability due to several enterprises.
- It promotes double income to the farmer due to several earnings.
- Farmers enjoy a balanced diet due to several products.
- It reduces seasonal unemployment since production is throughout the year.
- It promotes integration of farm products, animal manure can be used as fertilizers.
- Some crops can be given to animals as feeds.
- It promotes a balanced regional development because each region has an enterprise.
- *soil conservation.*
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*10x1 = 10marks*  
*1x10 = 10 marks*  
1 mk for every point

9. (a) Explain five forms in which Ugandan government has reformed its land. (10 marks)

- Land adjudication is the process of establishing clear permanent land boundaries and record details for legal legitimate ownership.
- Land registration is the process of getting a land title.
- Land consolidation is the bringing up scattered pieces.
- Land settlement and resettlement. These involves transfer of people to different areas for land development and use.

- Land redistribution. This is the transfer of rights to land ownership and administration from one class to another class e.g from foreigners to natives.
- Land fragmentation; this is the subdivision of land into small portions to promote land sharing.
- Land compensations.
- Issuance of Certificates of occupancy.
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2 marks for @ point

~~2 x 5 = 10 marks~~

5 x 2 = 10 marks

(b) *Explain reasons why it is necessary for the government to undertake land reforms in Uganda.*

(10 marks)

- To promote co-operation due to cooperative ownership that increases production and productivity.
- To abolish customary land tenure where land is under utilized.
- To promote leasehold system where individuals can use land for specific periods.
- To promote land consolidation that enable use of conflicts and disputes at various levels hence harmony in land use.
- To increase income to the government and individuals through lease systems.
- To encourage land reclamation and effective use of waste land through resettlement to use land.
- To promote efficient land market to enable the landless purchase and acquire land.
- To encourage effective use of idle land by landless people.
- To promote full rights of land ownership through land registration.
- To reduce congestion over land use.
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2marks for each well explained point.

(1 x 10 = 10mks)

8 (5 x 2 = 10 marks)

END

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**PRINCIPLES AND PRACTICES OF AGRICULTURE P515/1**  
 July/August 2023

O.J.  
 mms



**SECTION A (30 MARKS)**

1. A	11. B	21. C
2. D	12. B	22. <del>A</del> C
3. B	13. A	23. C
4. A	14. <del>D</del> C	24. D
5. A	15. A	25. D
6. D	16. A	26. <del>B</del> A
7. C	17. B	27. C
8. C	* 18. <del>D</del> A	28. A
9. B	19. C	29. <del>D</del> A
10. <del>C</del> D	20. B	30. C

**SECTION B (70 MARKS)**

31. (a) *Explain the meaning of gross margin* (02marks)

This is the total revenue minus the total variable costs.

$$GM = TR - TV.C$$

(b) Give 3 (three) ways in which the knowledge of gross margin may be

Total variable cost (T.V.C)

(2marks)

=	Ploughing	50,000/=	
	Seeds	10,000/=	
	Weeding	70,000/=	
	Pesticides	20,000/=	
	Harvesting	20,000/=	
	Transport	10,000/=	total = 180,000/=
	Rent on store	20,000/=	
	Insurance	15,000/=	
		<u>215,000/=</u>	

fixed →  
fixed →  
fixed → salary of workers

∴ Gross margin = TR - TV.C

100,000,000 - ~~215,000~~ 180,000

= 99,785,000

99,820,000/=

(1 mark)

Gross margin per ha

$\frac{99,785,000}{5}$

$\frac{99,820,000}{5}$

= 19,951,000/=

= 19,964,000/=

(1 mark)

32. (a) Explain the factors that determine the fish stocking rate. (05marks)

- Size of the pond, bigger the pond, the more amount of fish it can accommodate.
- Growth stage, bigger and large fish require more space than smaller or younger fish.
- Amount of capital available, large fish ponds require a lot of capital to buy feeds.
- The purpose of the fish kept, those for feeding other animals may be over stocked.
- Fertility of the pond.
- Availability of the feeds for the fish.
- Breed of the fish.
- Level of the water in the pond.
- predation in the pond
- Health of the fish

(Any 5 x 1 = 5marks)

(b) Mention the management practices necessary to maintain the fish pond.

(05marks)

- Clearing shrubs / bushes around the pond.
- Planting grass around the ponds.
- Adding organic manure to the pond water.
- Feeding / ponding with good quality feeds.
- Controlling predators.
- Weeding the pond.
- Cutting big trees around.
- Application of dewormers to control fish worms.
- Raising banks / trenches to avoid flooding.
- Desilting to remove mud / silt.
- Draining out water and replacing with fresh water.

(a) **Define the term Gender** (02marks)  
 Is the state of being a man or woman and their correct responsibility in a society or community. (02 marks)

(b) **Explain how the sex ratio in the population can affect agricultural production.** (02marks)

If the ratio of man is more than women, agricultural production will increase and vice versa (Any 02 marks)

(c) **Suggest factors that influence the productivity of women in agricultural production..** (06marks)

- Age of the woman.
- Physiological status
- Health of women.
- Attitude of women.
- Level of education.
- Cultural beliefs.
- Level of income.
- Land ownership/Resource control
- Nature of work
- Type of tool used.
- Working conditions/soil type.
- Gov't policy
- Accessibility to credit.

6 x 1

34. (a) **Explain the factors that favour the abundance of living organisms in the soil.** (04marks)

- Organic matter : more organic matter in the soil increases the numbers because it acts as food for them.
- Temperature : increase in temperature reduces the number which favourable temperature increases. <sup>of living organism</sup>
- Soil PH : different organisms survive under different P.H i.e more fungal are common in a cedic soil.
- Aeration : more air in soil increases the number because they require oxygen.
- Soil depth
- Moisture content of the soil
- Predation
- Type of crop grown.
- Soil nutrients.
- Pollution
- Tillage practices

(Any 6 well explained 1x1= 6 marks)

(b) **Give the desirable effects of soil living organisms.**

- Make holes in soil and improve soil aeration.

5 x 1 = 5 marks (04marks)

- Bacteria helps to fix Nitrogen into the soil.
- Helps in soil formation.
- Decompose organic matter.
- Die and decompose to form soil.
- Helps in binding soil particles together.
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(Any 4x1 = 4 marks)  
 5 x 1 = 5 marks  
 (04mark)

35. (a) Explain the post-harvest practices handling of mushrooms

- Processing to add value and increase life span.
- Proper drying to reduce moisture content.
- ~~Poor~~ <sup>Proper</sup> packaging to reduce contamination.
- Proper storage to increase life span.
- Branding for easy identification.
- *Sorting and grading for easy setting of price.*
- *proper cleaning of the mushroom*
- *Refrigation.*

(4 x 1 = 4 marks)

(b) What challenges are faced by mushrooms growers in Uganda. (06marks)

- Labour intensive.
- Lack of good quality ~~span~~ <sup>spawn</sup>.
- Limited knowledge and skills.
- Perishability of mushrooms.
- Poor storage facilities .
- Lack of ready market.
- Lack of good quality substrates.
- Fungal diseases.
- *inadequate research.*
- *price fluctuation.*
- *lack of extension services*
- *Some mushroom species are rejected by ~~consumers~~ <sup>long consumers</sup>* (6x1 = 6 marks)

36. (a) Differentiate between inclined plane and a pulley as used in simple machines. (02marks)

A pulley is a <sup>string</sup> rope wound around a rotating wheel to lift or lower load.

Or.

A pulley is a wheel with a grooved rim over which a rope or string passes.

(Any 1 for 1 point)

Inclined plane, is the slanting /sloping edge over which load is moved.

(1x1 mk)

(b) Give four examples of second class levers. (02marks)

- Wheel barrow
- Spanner

- Bottle opener
- Nut cracker
- Nail clippers
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(c) A crane lifts 600 kg through a vertical height of 12 m in 18 seconds. (02 marks)

(i) What weight is the crane lifting?

$$\begin{aligned}
 w &= M \times g \\
 &= 600 \times 10 \\
 w &= 6000 \text{ N}
 \end{aligned}$$

(ii) What is the crane's useful power output? (02 marks)

$$\begin{aligned}
 \text{Power Output} &= \frac{\text{work done}}{\text{Time}} \quad \frac{1}{2} \\
 &= \frac{6000 \times 12}{18}
 \end{aligned}$$

$$\text{Power} = 4000 \text{ watts} \quad \frac{1}{2} \quad (2 \text{ marks})$$

(iii) If the motor has an efficiency of 80%, what is the power input? (02 marks)

$$\text{Efficiency} = \frac{\text{Output}}{\text{Input}}$$

$$\frac{80}{100} = \frac{4000}{\text{input}}$$

$$\text{Input} = \frac{4000}{0.8}$$

$$= 5000 \text{ watts} \quad (2 \text{ marks})$$

37. (a) Describe how the rubber ring elastrator machine is used to castrate a calf. (05marks)

- Restrain the calf to be castrated.
- Put a rubber ring on an elastrator machine.
- Stretch the rubber using elastrator.
- Arrange and push the scrotum through the rubber ring.
- Release the rubber ring at the neck of the scrotum and leave it for about 7 days.
- ~~Release the calf~~ Within 7 days the scrotum will shrink and drop off with testicles.
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(1 mark @ point 5 marks)

(b) Give reasons why castration is a recommended practice in animal management. (05marks)

- Reduce <sup>in</sup> breeding
- Reduce breeding diseases. (reduces the spread of inheritable diseases)

- Improves on quality of wool.
- Makes animals suitable for work.
- Makes animals docile and easy to handle.
- Prevents bad odour in male animals.
- Improve on meat (promote high quality meat)
- To maintain the correct ratio of male to female animal on the farm.
- To increase the growth rate of male animal
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(Any 5 points @ 1 mark)

**END**



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1. (a)

Specimen	Vol of water collected(CM <sup>3</sup> ) with time				
	2mins	4mins	6mins	8mins	10mins
A	A>B	A>B	A>B	A>B	A>B
B	B<A	B<A	B<A	B<A	B<A

*reject any figure above 60cm<sup>3</sup>*

(b) Calculate the percentage volume of water retained after 6 minutes (5 marks) (02marks)

$$A = \frac{\text{Vol of water retained}}{\text{Vol of water used}} \times 100 \quad \frac{1}{2} \text{ marks}$$

% A < B.  $\frac{1}{2}$  marks **Total = 1**

$$B = \frac{\text{Vol of water retained}}{\text{Vol of water used}} \times 100. \quad \frac{1}{2} \text{ marks}$$

% ~~B < A~~.  $\frac{1}{2}$  marks

*B > A*

**Total = 1**

(c) Explain the factors that could be responsible for the difference in volume of water collected after 4 minutes in the two samples. (02marks)

- Soil pore space: Specimen A has more pore space that allows more water to pass through than B.
- Particle size: A has large particles that allow more water to pass through than B.
- Organic matter: A has <sup>less</sup> organic matter which allows more water to pass through than B.
- 
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Any 2x1 = 2 marks

(d) Suggest the measures that can be taken to improve soil sample A (01mark)

- Mixing it with B to improve water retention. (*marking*)
- Addition of organic matter.
  - Liming to flocculate it.
  - Mulching to bind particles.
  - Application of <sup>organic</sup> artificial fertilizers.
  - 
  -

*2 x 1/2*

$$2 \times \frac{1}{2} = 2 \text{ marks}$$

2. You are provided with specimens which are used in construction of farm structures.
- (a) Name one structure where each specimen C, D and E may be used. (02 marks)
- C: Farm houses/ farm building/ wall fence.  $\frac{1}{2}$  mark
- D: Stores/ farm building.  $\frac{1}{2}$  mark
- E: wire fence/fences/paddock/wire fence.  $\frac{1}{2}$  mark
- (b) State how specimen D may be protected.
- (i) from pest attack (01 mark)  
Treating with preservatives which are recommended e.g. Varnish, paints, creosote, pentachlorophenol.
- (ii) Weather (01 mark)  
Treat it with tar/ creosote/paints or tanex.
- (c) Describe how strength of specimen C maybe increased. (2 $\frac{1}{2}$ marks)
- Baking/ Firing/ burning them.
  - Add lime when making.
  - Allow the rammed clay to set before moulding.
  - Plaster with mortar.
  - <sup>Cure</sup> Care/ dry slowly under shade.
  - 
  -
- (d) (i) Give four limitations of using specimen F. 5x $\frac{1}{2}$  = 2 $\frac{1}{2}$  marks (2 marks)
- Can easily catch fire.
  - Easily attacked by termites.
  - Easy to decay.
  - Easily affected by weather.
  - can easily develop defects/cracks
  -
- (e) State four advantages of using specimen C on a farm 4x $\frac{1}{2}$  = 2 marks (2 marks)
- Advantage of Using C
- It's cheaper.
  - Not easily attacked by termites.
  - Easy to be made.
  - Locally available.
  - Easy to lay while making. building
  - 
  -

3. (a) You are provided with the following specimens which are garden weeds. Observe the root systems and describe how they enable them to survive (3 marks)

Blackjack plant — H:

- Has tap roots for absorption of water & mineral salts.
- Has lateral roots for holding it.

$2 \times \frac{1}{2} = 1$

Wandering Jew — I:

- Has roots on the nodes for water absorption.
- Has buds on the nodes for production of new plants.

$2 \times \frac{1}{2} = 1$

$2 \times \frac{1}{2} = 1$

Coach grass — J:

- Has underground Rhizomes for propagation.
- Has roots on the nodes for absorption of water and mineral salts.
- Has nodes for propagation.

$2 \times \frac{1}{2}$

$2 \times \frac{1}{2}$  mark

(b) Basing on the observable features state how each specimen can be propagated. (1 1/2 marks)

- H: - Has seeds for sexual propagation.
- I: - Has runners for asexual propagation.
- J: - Has Rhizomes for propagation.

$3 \times 1 = 3$

$3 \times \frac{1}{2} = 1 \frac{1}{2}$  mark

(c) Describe the mechanical methods of controlling specimen J efficiently.

- Use forked hoe/ hoe to remove underground Rhizomes
- Remove soil from the Rhizomes
- Expose Rhizomes to sun shine to dry.
- Burn the dry Rhizomes.

$2 \times \frac{1}{2}$

(d) Give reasons why specimen H should be controlled in cotton gardens (3 marks)

- Reduce contamination of seeds. *lift with seeds of specimen H.*
- Reduce competition for nutrients.
- Reduce hiding places for pests.
- Reduce the cost of controlling it.
- Increase crop yields.

$4 \times \frac{1}{2}$

3 marks

4. You are provided with the following specimens which are propagative materials. Observe them carefully and answer questions that follow.

(a) Comment on the suitability of each specimen

*Plants with roots*  
*the bulbs*  
*ginger with rhizomes*  
*sugar cane setts*  
*rotten maize roots*  
*Banana suckers*

- K - Suitable.
- L - Suitable
- M - Suitable
- N - Not suitable
- O - Not suitable

(2 1/2 marks)

4 x 1/2 = 2 marks

(b) Using observable features state how specimen K and L are suitable for the planting.

(02 marks)

- K - Has succulent leaves to store food.
- Has buds for vegetative propagation.
  - Has scale leaves for protecting against mechanical damage. 2 x 1/2 = 01 mark
  - Has adventitious roots for water absorption

- L - Has buds for vegetative propagation
- Has swollen stem to store water.
  - Has scale leaves for protection.
  - Has adventitious roots for water absorption.
  - *has swollen stem to store food.*

2 x 1/2 = 1 mark

(c) Describe how you can prepare specimen O for proper planting

- Paring <sup>off</sup> the corm by cutting off all roots.
- Peel off the outer layer of the corm to eliminate weeds. *weevils*
- Dip it in hot water for few minutes to kill weeds.
- Remove all the leaves to reduce transpiration rate.
- Dip it in chemicals <sup>over</sup> ~~one~~ night to kill the pests

(03 marks)

(d) Which other method can be used to multiply specimen O?  
 Tissue culture.

01 mark

(e) Of what advantage is the method given in (d) above to produce specimen O?

Advantage of tissue culture

- Seedlings are free from diseases.
- Seedlings are not bulky.
- Many seedlings can be obtained in a short period.
- Quicker method of multiply crops which do not produce seeds.
- Crops produced are genetically identical.

(3 x 1/2 = 1 1/2 marks)

You are provided with the following specimens S, T and V which are parts of animal's digestive system.

(a) Give the role of each specimen

(1 1/2 marks)

S:

- Help in temporally storage of food.
- Place for anaerobic food formation. *fermentation*
- Its where synthesis of Vitamin B, ~~C~~ & K takes place.
- *its where cellulose are broken down into volatile fatty acid.*
- 
- 

1x1 = 1 mark

T: Helps in mechanical digestion of food due to grit. 1x1 = 1 mark

V: Its where chemical digestion of food takes place i.e. break down of proteins to peptides

*3 x 1/2 = 1 1/2 mark*

(b) Describe the features of the inner surface of each specimen

(3 marks)

S: Gouret- Like structure, with dark brown *muscular* mucosal surface with margins that are pale in colour. (*1* marks)

T: Has grit that grind food.

- Has a tough(horny) inner lining.
- Has thick muscular wall.

*1/2 mark*

U - Has slippery/ smooth inner surface

Its highly folded to increase surface area for *contact* with food.

*3 marks*  
= 3 x 1/2 = 1 1/2 marks

(c) Describe 4 observable features of specimen T that enables it to perform the functions given in (a) above.

(4 marks)

- Has grit to crush food.
- Has thick muscle to crush food.
- Has tough *lining* to reduce damage of inner surface.
- Has *oval* shape to hold food before its passed to small intestine *intestine*
- Has 2 opening one allowing the food from *proventriculus* & food to small intestines.
- 
- 
- 

(d) Compare the digestive physiology of the animals where specimen S and T were extracted.

4x1 = 4 marks

(1 1/2 marks)

S	T
- Animals chew cud	<i>e</i> Don't chew cud
- Digest cellulose	<i>e</i> Don't
- Poly gastric	<i>e</i> Mono-gastric
- No amylase in saliva	- Have amylase in saliva

END

3x 1/2 = 1 1/2 marks