Candidate's Name----------
Signature ----------
515/3
PRINCIPLES &
PRACTICES OF
AGRICULTURE
Paper 3
2 hours

Uganda Advanced certificate of education

PRINCIPLES AND PRACTICES OF AGRICULTURE

(PRACTICAL PAPER)

Paper 3

2 hours

INSTRUCTIONS TO CANDIDATES:

*This paper consists of **five** questions.*

*Answer **all** questions.*

The answers are to be written in ink in the spaces provided.

For Examiners' Use Only		
Questions	**Marks**	**Examiner's signature/Initial**
1		
2		
3		
4		
5		
Total		

1. Specimen D is an extract from a farm animal. Cut D into four pieces of about the same size of length (1cm) and width (1cm). Put each piece in its test tube and label the test tube 1 to 4. Carry out the following tests on the four pieces of specimen D and record your observations and conclusions in the table below:

(a).

Experiment	Observation	Conclusion
To test tube 1, add distilled water to cover D and boil to 100^0c then add $1cm^3$ of H_2O_2.		
To test tube 2, add distilled water and then warm to 38^0c then add 1 cm^3 of H_2O_2		
To test tube 3, add $3cm^3$ of conc.Hcl then after 2 minutes add $1cm^3$ of H_2O_2		
To test tube 4,add $2cm^3$ of NaOH and wait for 5 minutes then add 1cm3 of H_2O_2		

(16marks)

(b).(i) Based on your observation in 1 (a) above, identify the enzyme which is found in D. (1mark)

Enzyme in D ----------

(ii).Name the products formed as a result of the enzyme acting on the food substrate in 1 (a) above. (2marks)

(c).Explain why hydrogen peroxide is acted on by the enzyme in D. (1mark)

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2 You are provided with substance Q. Carry out the following tests to establish and identify the nutrient elements it contains.

(a). Dissolve a spatula of Q in 5cm3 of water. Divide the resultant solution into 3 portions in separate test tubes labelled B_1, B_2, and B_3. (6marks)

Test	Observation	Deduction
To test tube B_1, add 3 drops of 0.5% of Diphenylamine solution and 4 drops of conc.Sulpehric acid.		
To B_2, add an equal amount of freshly prepared Iron II sulphate solution, slant the test tube at an angle and carefully add 4 drops conc.sulpheric so that the drops run down the test tube to touch the mixture.		
To B_3, add 4 drops of dil.Nitric acid and 3 drops of molybdate solution		

(b) Nutrient elements in Q (2marks)

Element 1----------

Element 2----------

(c) What are the important of the elements in Q to crops? (12 marks)

Element 1

Element 2

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3 Specimens S1, S2, S3, S4, and S5 are farm tools/equipments used in the harvesting of specimen S.

(a).Explain in sequence, how each of the tools/equipments are used in the harvesting of S on the farm. (10 marks)

(b).Name any two nutritional composition of S (2marks)

(c).Give any 4 reasons why farmers should undertake the production of S as a business. (4marks)

(d).Suggest any 4 factors that may affect the quality of S . (4marks)

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4 Specimens L, M, N, O and P are used in to set up a farm building.

(a) (i).Name the materials you would use to make a good floor of a calf pen: (1½marks)

(ii).State the appropriate ratio of the mixture of the materials named in 4(a)(i) above. (1½marks)

(b) Sate the procedure for mixing the material used in making the part of the farm building mentioned in 4(a) (i) above. (10marks)

(c).Outline the advantages of using O over P (7marks)

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5 You are provided with specimen T, a crop plant affected by a disease. Carefully observe the defect on the specimen and answer the questions below:

(a).Comment on the defect observed on the specimen. (1mark)

(b).What organism is responsible for spreading the defect observed on the specimen to the crop plant in the field? (1mark)

(c).Suggest measures that can be taken to reduce the problem observed on specimen T (14marks)

(d).Name four other crops that can be infected by the same virus that has caused the defect observed in 5(a) above. (4marks)

END

DRAFT MARKING GUIDE

1 **(a).**

Experiment	Observation	Conclusion
To test tube 1, add distilled water to cover D and boil to 100^0c then add $1cm^3$ of H_2O_2.	-No effervescence -No gas bubbles given off	The enzyme in D has been denatured by heat
To test tube 2, add distilled water and then warm to 38^0c then add 1 cm^3 of H_2O_2	-Effervescence observed -Gas bubbles seen	Enzyme has hydrolysed H_2O_2
To test tube 3, add $3cm^3$ of conc.Hcl then after 2 minutes add $1cm^3$ of H_2O_2	-No effervescence -No gas bubbles observed.	Enzyme does not work under acidic conditions
To test tube 4,add $2cm^3$ of NaOH and wait for 5 minutes then add 1cm3 of H_2O_2	There is effervescence	Enzymes worked under alkaline condition

(b). (i).Enzyme is a catalase

(ii). The products formed are: Water and Oxygen

$2H_2O_2 \xrightarrow[Catalase]{Enzyme} 2H_2O_2 + O_2$

(c).Explain why hydrogen peroxide is acted on by the enzyme in D.

Reasons:

-It is toxic and must be broken down to water and Oxygen which are not toxic.

2 **(a).**

Test	Observation	Deduction
To test tube B_1, add 3 drops of 0.5% of Diphenylamine solution and 4 drops of conc.Sulpehric acid.	A blue colouration observed.	Nitrate present.
To B_2, add an equal amount of freshly prepared Iron II	A brown ring is observed.	Nitrate present.

sulphate solution, slant the test tube at an angle and carefully add 4 drops conc.sulpheric so that the drops run down the test tube to touch the mixture.		
To B_3, add 4 drops of dil.Nitric acid and 3 drops of molybdate solution	Yellow precipitate observed.	Phosphate present.

Award 1 mark each for observation and deduction = 6marks

(b).The nutrient elements in Q are:

Element 1: Nitrogen

Element 2: Phosphorus

Award 1 mark each for the correct element = 2marks

(c) What are the important of the elements in Q to crops?

Element 1: Nitrogen

-Promotes vegetative growth

-Regulate the size of grains

-Helps in protein synthesis and enzyme formation

-It is a constitutient of chlorophyll

-Improves the quality of leafy crops eg cabbages

-Helps in cell division and growth

Award 1 mark each for any 6 correct points = 6marks

Element 2: Phosphorus

-For cell division

-For seed germination

-For photosynthesis

-Important in plant maturation

-Strengthen straws in cereals

-Flowering, fruiting and seed formation

-Plant resistance to diseases

Award 1 mark each for any 6 correct points = 6marks

3 (a).Explain in sequence, how each of the tools/equipments are used in the harvesting of S on the farm.

- Put on or wear S1 first as protective gear from the bees before approaching the hives.

-Place a few embers in a smoker S5, puff all around the sides on the hive then introduce smoke inside the hive gradually to make bees docile and will not sting.

- Using S3, scrape off the bees from the comb.

-Using S2 cut off the comb containing honey from the bar.

-Place the cut comb containing the honey in S4.

Award 2 marks each for any 5 correct points = 10 marks

(b). Name any two nutritional composition of S

-Honey sugar

-Water content

-Acids

-Minerals

Award 1 mark each for any 2 correct points = 2 marks

(c). Give any 4 reasons why farmers should undertake the production of S as a business

-Food to human as sweetener or eaten directly.

-Health benefits are derived from feeding on honey.

-Honey helps with recovering from alcohol intoxication.

-Raw materials in baked products, milk products etc

-Honey is used in tobacco, meat, cosmetic industry.

Award 1 mark each for any 4 correct points = 4 marks

(d).Suggest any 4 factors that may affect the quality of S.

-The method of extraction, direct heating of the honey comb discolours the combs lowering its quality.

-Type of flowers from which the nectar was collected.

-Season of the year, honey formed over dry season tend to be of a lower quality.

-Stage of honey maturity, mature honey is of good quality.

Award 1 mark each for any 4 correct points = 4 marks

4 (a) (i).Name the materials you would use to make a good floor a calf pen: (3 marks).

-Aggregate/small stones/gravels, Sand, Cement,

Award ½mark each for any 3 correct points = 1½ marks

(ii).State the appropriate ratio of the mixture of the materials name in 4 (a) (i) you would make for that floor.

-1 part cement: 2 parts sand: 4 parts aggregate

OR 1; 2; 3

Award ½ mark each for any 3 correct points = 1½ marks

(b) Sate the procedure for mixing the material used in making the part of the farm building mentioned in 4 4(a) (i) above.

-Clear the area where the material will be mixed by removing obstacles and vegetation.

-Make the place water tight by laying up mortar in advance

-Measure cement, sand and aggregate in required ratio of 1:2:3

-Spread the sand on the ground after measuring the required quantity.

-Mix the two items, i.e. sand and cement evenly by turning each over and over.

-Spread the mixture of sand and cement on the ground after mixing.

-Spread the course aggregate over the mixture of cement and sand.
-Mix the aggregate properly with cement and sand.
-Heap the mixture and make a depression in the middle.
-Add water slowly in the depression that has been made in the middle of the heap.
- Use the spade to mix the materials with water until good concrete forms,

Award 1 mark each for any 10 correct procedure = 10 marks

(c).Outline advantages of using O over P

-They are highly durable.
-They can easily resist forces of strain and stress.
-They can be recycled and reused to make other implements.
-Are resistant to pests attacked.
-Can not be easily destroyed by fire.
-Can be used to perform several functions.
-It is highly resistant to wear and tear.

Award 1 mark each for any 7 correct advantages = 7 marks

5 (a). Comment on the defect observed on the specimen.

-Maize plant/maize leaf with symptoms of maize streak virus disease.

Award 1 mark for 1 correct defect = 1 mark

(b).What organism is responsible for spreading the defect observed on the specimen to the crop plant in the field?

-Leaf hopper/Maize leaf hopper.

Award 1 mark for 1 correct organism = 1 mark

(c). Suggest measures that can be taken to reduce the problem observed on specimen T

-Uproot and burn affected plants immediately

-Grow tolerant/resistant varieties

-Early planting

-Closed season to reduce the population of leaf hoppers

-Crop rotation

-Use of recommended pesticides to the leaf hoppers

-Up root and burn crop residues

Award 2 marks each for any 7 correct measures = 14 marks

(d).Name four other crops that can be infected by the same virus that has caused the defect observed in 5(a) above.

-barley, wheat, oats, rye, sugarcane, millet and many wild, mostly annual, grass species.

Award 1 mark each for any 4 correctly named crops = 4 marks

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1. **A piece of liver labelled D**
2. **NPK fertilizer labelled Q**
3. **Provide Honey in a glass beaker labelled S, Beekeeping suit labelled S1, Knife labelled S2, Bee brush labelled S3, Plastic honey bucket labelled S4 and Bee smoker labelled S5**
4. **Provide the following: Aggregate labelled L, Sand labelled M, Cement labelled N, Metal rod labelled O, and Brick labelled P**
5. **Maize plant/ leaf with symptoms of maize streak virus disease labelled T**
   -Four test tubes
   -A spatula
   -A beaker of water
   - Provide the following reagents: 0.5% of Diphenylamine solution, freshly prepared Iron II sulphate solution, conc.sulpheric, dil.Nitric acid, molybdate solution, conc.Hcl, Hydrogen peroxide, NaOH
   -Source of heat.