



**AFRICA**  
**UNIVERSITY**  
*A United Methodist-Related Institution*

***"Investing in Africa's Future"***

**COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES**

**NACP 213 PRINCIPLES OF CROP PRODUCTION**

**END OF FIRST SEMESTER EXAMINATIONS**

**Nov 2023**

**LECTURER: Mr Larry Kies**

**DURATION: 3 HOURS**

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***INSTRUCTIONS***

1. Do not write your name on the answer sheet

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2. Use Answer Sheets Provided

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3. Begin your answer for Each Question on a New Page

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4. Credit is Given for Neat Presentation

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**Answer ALL questions. For questions requiring calculations, show your work and identify your answers clearly.**

1 a. Discuss the advantages and disadvantages of using seedbeds and later transplanting as compared to direct seeding. (4 marks)

b. Give **one** example of a crop from **each** of the following groups which is often transplanted..

(3 marks)

i. Solanaceae

ii Brassica

iii. Cereal

2 a. A farmer named Tafadzwa wishes to apply 120 kg/Ha of nitrogen to a crop. She first applied 150 kg/Ha of the fertilizer Double-D (14:28:14).

How many kg/Ha of urea (46% N) should she apply? Show your work. (2 marks)

b. Give the names of any two plant **macro**-nutrients. (2 marks)

c. Compare organic and inorganic fertilizers regarding ease of transport **and** presence of weed seeds. (2 marks)

3 For the following crops, give the information requested: (6 marks)

a.	barley	Main use in Zimbabwe
b.	rice	Protein content, %
c.	carrot	A crop that should follow it in a recommended garden rotation
d.	Sweet potato	Typical yields in Zimbabwe, tonnes/Ha
e.	maize	High yields in Zimbabwe, tonnes/Ha
f.	cassava	Method of propagation

4 Dan wishes to plant maize with a final population of 45,000 per hectare using 90 cm rows. The seed is expected to have 91% germination, and he expects 6% field losses.

a. What should be the final average spacing of plants within the row? (2 marks)

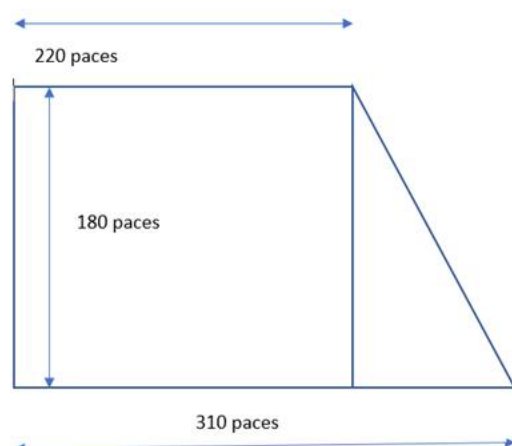
b. When setting the planter, what **spacing** should he use? (2 marks)

c. Use good, clear English to discuss the principle of sowing seeds at the correct *spacing*, giving examples. (5 marks)

5a. Explain why cereals normally have higher total yields than legumes when both are given adequate water and fertiliser. (1 mark)

b. What was the Russian Vavilov known for by crop scientists? (1 mark)

6 Annette measured her field (diagram below) after finding that she took 67 paces to walk 50 m.



- a. What is the estimated area of the field, in hectares? (4 marks)
- b. What would be considered a good yield, in kg, of the following crops on **this** field? (4 marks)
  - i. green beans
  - ii. potatoes
- c. Rudolph is planting broccoli and wishes to apply 800 kg/Ha of "Cpd D" fertilizer. He will apply the fertilizer by pouring the required amount of fertilizer in each planting hole. The spacing of the broccoli is 90cm x 30cm. How many grams of fertilizer should be applied per hole? (2 marks)

7 Jewell had a plot of maize that was 8 m x 8 m. She harvested 230 cobs of maize which weighed a total of 48 kg. She then shelled a sample of 10 cobs, and found the grain weighed 1.8 kg while the cobs weighed 0.4 kg.

- a. What was the plot's yield of grain in tonne per hectare? (3 marks)
- b. Compare the yield of Jewell's plot with typical yields of small-scale farmers and successful commercial farmers in Zimbabwe. (2 marks)

8 Copy and fill in the table for the following crop plants. (9 marks)

Common name	Latin name	Most important part of the plant for marketing	Botanical family
	<i>Sorghum bicolor</i>		
	<i>Beta vulgaris</i>		
	<i>Chloris gayana</i>		

- 9 The table below shows characteristics of four maize varieties named using the Seedco system for maize.

Variety name	WW447	XX523	YY607	ZZ759
Grey leaf spot (GLS) tolerance	7	1	1	8
Maize streak virus (MSV) tolerance	3	2	2	1
Days to maturity	127	132	148	158
Interpretation of scores: 1 = Very good (tolerant), 9 = Poor (susceptible)				

- Name the variety (choosing from one of the four above) which will probably yield the best in an area with a short rainy season. (1 mark)
- Name the variety that requires the most Heat Units to achieve maximum yields. (1 mark)
- Variety XX523 was sown on 1 February at two locations: Harare (elevation 1300m) and Juliusdale (elevation 2000m).  
Use your understanding of Growing Degree Days and climate to explain which crop will mature first and why. (1 mark)
- Chelsea teaches Agriculture in a high school 60 km from Mutare.  
What advice would you give her regarding how to find which maize cultivars do best in *her* area? (3 marks)