AFRICA UNIVERSITY
A United Methodist-Related Institution

"Investing in Africa's Future"

COLLEGE OF HEALTH, AGRICULTURE & NATURAL SCIENCES

NACP213 Principle of Crop Production

END OF SECOND SEMESTER EXAMINATIONS

APRIL/MAY 2024

LECTURER: Mr Larry Kies

DURATION: 3 HOURS

INSTRUCTIONS

1. Do not write your name on the answer sheet
2. Use Answer Sheets Provided
3. Begin your answer for Each Question on a New Page
4. Credit is Given for Neat Presentation

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. Explain briefly the meaning of the following terms:

catch crop

pulse crop (2 marks)

c. A farmer named Esther wishes to apply 150 kg/Ha of nitrogen to a crop. She first applied 200 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)

2 For the following crops, give the information requested: (7 marks)

a.	barley	Main use in Zimbabwe
b.	rice	Protein content, %
c.	cowpeas	Rainfall or irrigation needed, mm
d.	Sweet potato	Typical yields in Zimbabwe, tonnes/Ha
e.	potato	High yields in Zimbabwe, tonnes/Ha
f.	cassava	Method of propagation
g.	wheat	Method of propagation

3 Emmanuel wishes to plant maize with a final population of 45,000 per hectare using 75 cm rows. The seed is expected to have 93% germination, and he expects 5% field losses.

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

b. When setting the planter, what **population** 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)

4a. Explain why cereals normally have higher total yields than legumes when both are given adequate water and fertiliser. (1 mark)

b. Use typical yields of soyabean to show how protein yields per Ha can be calculated. (2 marks)

c. Compare tropical legumes to tropical grains regarding the production of **protein** per Ha. .

. (1 mark)

5 Integrated Pest Management has four major components. One is Chemical. Discuss ONE of the other three components, giving at least two examples. . (4 marks)

6 Nicola had a plot of maize that was 6 m x 6 m. She harvested 190 cobs of maize which weighed a total of 48 kg. She then shelled a sample of 10 cobs, and found the grain weighed 1.9 kg while the cobs weighed 0.2 kg.

a. What was the plot's yield of grain in tonnes per hectare? (2 marks)

b. Compare the yield of Nicola's plot with typical yields of small-scale farmers and successful commercial farmers in Zimbabwe. (2 marks)

7 Copy and fill in the table for the following crop plants, choosing from the scientific names given below . (9 marks)

Chloris gayana *Vigna subterranea* *Daucus carota* *Hordeum vulgare*
Beta vulgaris *Arachis hypogaea* *Secale cereale* *Glycine max*

Common name	Latin name	Most important part of the plant for marketing	Botanical family
Carrot			
Bambara nut			
Rhodes grass			

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

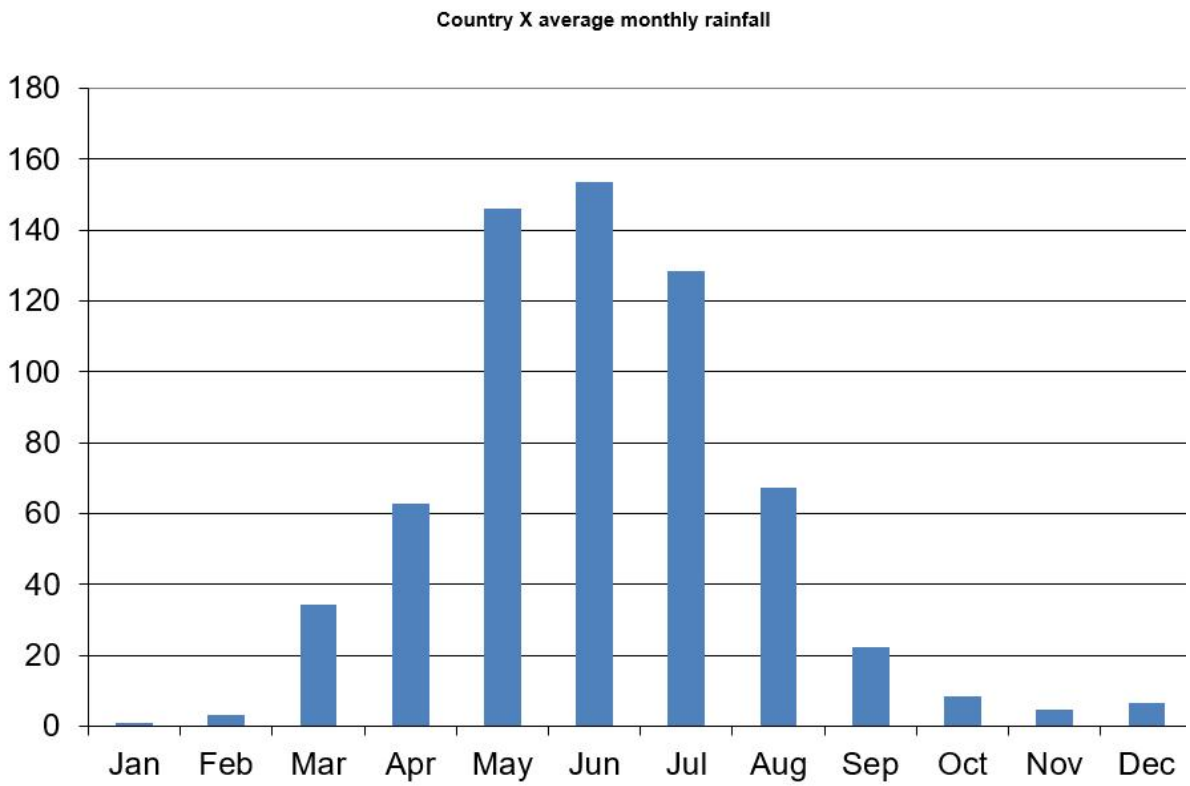
Variety name	WW447	XX523	YY607	ZZ759
Grey leaf spot (GLS) tolerance	7	1	1	8
Maize streak virus (MSV) tolerance	3	2	2	1
Days to maturity	127	132	148	158
Yield potential, tonnes/Ha	1-4	3-6	6-12	8-13
Interpretation of scores: 1 = Very good (tolerant), 9 = Poor (susceptible				

Name the variety (choosing from one of the four above) which will probably yield the best under the following conditions: . (2 marks)

Variety	Rainfall, mm	Irrigation available?	GLS present?	MSV present?
a.	450	No	No	Yes
b.	620	No	Yes	No

c. Name the variety that probably requires the *most* Heat Units to achieve maximum yields. .
(1 mark)

9



A farmer named Munotida has moved to new country X. The above graph shows the average monthly rainfall. The farm has the same latitude, and distance from the sea as Mutare (elevation 1100 m), but is at 1500m.
No irrigation is possible.

a. Based on the information given, *discuss* briefly the suitability (regarding temperature and rainfall) of the following crops:
   i. wheat
   ii. bambara nuts (4 marks)

b. Discuss the suitability of paddy rice at this place if the altitude is 2000 m. (2 marks)

c. Sugar beans were sown on 1 February at Harare (elevation 1300m) and Juliusdale (elevation 2000 m).
   Use your understanding of Growing Degree Days and climate to explain which crop will mature first and why. (1 mark)

10 a. Use principles involved in determining the Centers of Origins of crops to explain how scientists might prove that Rhodes grass is native to Zimbabwe. (3 marks)
b. What is the value to crop scientists of knowing the geographical origin of a crop? (1 marks)
c. Give the main reason why rice is a dominant crop in some parts of West Africa but not in Zimbabwe. (1 mark)