WOMEN'S UNIVERSITY IN AFRICA

Addressing gender disparity and fostering equity in University Education

FACULTY OF AGRICULTURAL SCIENCES

BSc AGRICULTURE HONOURS DEGREE IN HORTICULTURE

AH122 CROP PRODUCTION PRINCIPLES

DECEMBER 2020MAIN PAPER

Time: 3.00Hrs **Date:**

Instructions

Answer any **four** questions

Question one

Examine how the following factors influence the rate of fertilizer application in crop production:

(a) Crop type and crop management; (5)

(b) Crop yield potential; (5)

(c) Soil type and history of use; (5)

(d) Balance of other fertilizer elements; and (5)

(e) Weather. (5)

Question two

A 25kg bag of Calcium Nitrate –$Ca(NO_3)_2$ fertilizer costs US$16.00 at a shop in Marondera. The nutrient levels of Nitrogen and Calcium in the fertilizer are given as 155g/kg N; and 195g/kg Ca respectively.

(a) Express the nutrient levels of Nitrogen (N) and Calcium (Ca) in the fertilizer as a percentage. (5)

(b) Find mass of Nitrogen in 25kg of $Ca(NO_3)_2$ if: A_r (Ca) = 40; A_r (N) = 14; and A_r (O) = 16. (5)

(c) Determine the cost (US$) of Nitrogen in this bag. (5)

(d) Explain why farmers are advised to timeously apply this top dressing fertilizer through split application for crops grown on sandy soils. (5)

(e) Outline the roles of Calcium in this fertilizer. (5)

Question three

'The small-holder sector in Zimbabwe has been hugely supported by government to embrace conservation tillage popularly known as Pfumvudza during the 2020/2021 cropping season'.

(a) Explain why conservation tillage (Pfumvudza) differs from zero tillage; (5)

(b) Examine how conservation tillage through Pfumvudza lowers production costs; (5)

(c) Explore how Pfumvudzahas been structured to guarantee household food security; (5)

(d) Examine how conservation tillage through pfumvudza conserves soil; and (5)

(e) 'The success of Pfumvunza is largely influenced by the extent to which farmers manage weeds'.Explain. (5)

Question four

Examine how the following practices contribute to agricultural pollution:

(a) Tillage using mechanized farm machinery; (5)

(b) Soil nutrient management using organic and inorganic fertilizers; (5)

(c) Pest management using various pesticides including herbicides. (5)

(d) Crop disease management using fungicides; and (5)

(e) Livestock and Dairy farming based on zero grazing. (5)

Question five

Using examples, explore the following principles of crop rotation:

(a) Alternating crops with differing ability to exhaust nutrients or improve fertility; (6)

(b) Growingcrops in succession with different susceptibility to crop diseases; (7)

(c) A succession of crops in a rotation should be based on considerations of beneficial or detrimental effects of a crop to the succeeding crop; and (6)

(d) Alternating crops with different peak requirements for inputs such as labour and water. (6)

Question six

(a) Examine how water-logging and too deep incorporation of cattle manure affect nutrient availability. (5)

(b) Explore how the following management techniques raisesmanure quality:

(i) Supplementinganimal manure with organic fertilizers; (5)

(ii) Provision of litter or bedding in livestock housing; (5)

(iii) Corralling; and (5)

(iv) Storage and staking of animal manure. (5)

END