

CHUKA



UNIVERSITY

UNIVERSITY EXAMINATIONS

THIRD YEAR EXAMINATION FOR THE AWARD OF DEGREE
OF BACHELOR OF SCIENCE IN ANIMAL SCIENCE, BACHELOR OF
SCIENCE IN AGRICULTURAL EDUCATION, BACHELOR OF SCIENCE
IN HORTICULTURE AND BACHELOR OF SCIENCE IN AGRICULTURE

AGEN 331: INTRODUCTION TO AGRICULTURAL FIELD MACHINES

STREAMS: BSC (ANSC, AGED, HORT & AGRIC)

TIME: 2 HOURS

DAY/DATE: MONDAY 09/12/2019

2.30 P.M. – 4.30 P.M.

INSTRUCTIONS:

- This paper contains seven questions
- Answer all questions in section A and any other TWO in section B

SECTION A (30 MARKS) – ANSWER ALL QUESTIONS

QUESTION ONE

Discuss four main objectives for mechanizing agriculture

[8 marks]

QUESTION TWO

State three soil conditions where a disc plough would be preferred to a mouldboard plough in seed bed preparation

[6 marks]

QUESTION THREE

- (a) Explain three important properties of soil that affect the reactions of soil to the applied force by the plough [3 marks]
- (b) Describe the function of the following basic parts of the mouldboard plough bottom:
- (i) Share [2 marks]
 - (ii) Mouldboard [2 marks]
 - (iii) Landside [2 marks]

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QUESTION FOUR

A tractor is ploughing with a four bottom mouldboard plough at a speed of 5km per hour. Each bottom cuts a soil section of 0.4 meters wide at a depth of 0.18 meters (high soil strength).

Determine the following for this tractor implement system (assembly):

- (i) Drawbar pull in Kilonewtons [3 marks]
- (ii) Drawbar power in kilowatts [4 marks]

SECTION B (40 MARKS) – ANSWER TWO QUESTIONS

QUESTION FIVE (20 MARKS)

- (a) Describe the following patterns of distributing (planting) seeds:
 - (i) Broadcasting [2 marks]
 - (ii) Precision planting [2 marks]
 - (iii) Drill seeding [2 marks]
- (b) With the aid of a diagram, name the basic functional parts of a row crop planter (e.g. maize planter) [5 marks]
- (c) The fertility of a particular field is such that the maize yield is at a maximum at 38,500 plants per hectare. The average survival is 90%. Row spacing is 75 centimeters. Determine the seed spacing (one seed to the other seed in the row). [5 marks]
- (d) Describe briefly four classifications of chemical sprays [4 marks]

QUESTION SIX (20 MARKS)

- (a) Explain factors that affect chemical drift when spraying [4 marks]
- (b) With the aid of a diagram, name the basic functional parts of a field chemical sprayer and indicate the direction of flow of the chemical during spraying [6 marks]
- (c) Name the parts that assist the combine harvester machine to accomplish the following functions for a wheat crop:
 - (i) Cutting and elevating the cut crop [4 marks]
 - (ii) Threshing the grain [2 marks]
 - (iii) Separating grain from straw [2 marks]
 - (iv) Cleaning the grain (removal of chaff) [2 marks]

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QUESTION SEVEN (20 MARKS)

- (a) Describe four types of seed losses in a combine harvester [4 marks]
 - (b) With the aid of a diagram, name the basic functional parts of the cleaning unit of a combine harvester machine [6 marks]
 - (c) Name two types of mowers used to cut grass to make hay [4 marks]
 - (d) With the aid of diagrams, explain the function of the following hay conditioners:
 - (i) Crimpers [2 marks]
 - (ii) Roller crushers [2 marks]
 - (e) Safety when using field machinery on the farm is of great importance. Discuss [6 marks]
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