

EGERTON



UNIVERSITY

UNIVERSITY EXAMINATIONS

REGULAR - NJORO CAMPUS

FIRST SEMESTER, 2018/2019 ACADEMIC YEAR

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

AGEN 371- INTRODUCTION TO AGRICULTURAL FIELD MACHINES

STREAM: BSC. ANCI, AGED & HORT

TIME: 2 Hours

EXAMINATION_SESSION: FEB-MARCH

YEAR: 2019

INSTRUCTIONS:

- (i) This paper contains SIX questions
- (ii) Answer any FIVE questions
- (iii) Marks for each question are shown in parenthesis ()
- (iv) EACH QUESTION SHOULD BE STARTED ON A NEW PAGE.

QUESTION ONE

- a) Explain FOUR objectives of secondary tillage (4 Marks)
- b) Differentiate between *conservation tillage* and *minimum tillage* (2 Marks)
- c) Draw a disc plough and state the functions of any FOUR named components of the plough (6 Marks)
- d) A 4 bottom 40 cm mould board plough is operating at 5.5 km/h speed with 75 % field efficiency. Calculate the rate of doing work in hectares per hour (2 Marks)

QUESTION TWO

- a) Briefly explain how the following implements work the soil
 - (i) Sub-soiler

AGEN 371

- (ii) Spike tooth harrow
- (iii) Chisel plough (3 Marks)
- b) Explain **THREE** ways of increasing the penetration ability of a disc plough (3 Marks)
- c) Explain **FOUR** factors affecting the field efficiency during harrowing (4 Marks)
- d) A 5 x 20 cm double action disc harrow is operated by a tractor having a speed of 5 km/h. Calculate the actual field capacity, assuming the field efficiency of 80 percent (4 Marks)

QUESTION THREE

- a) Describe three methods of sowing (3 Marks)
- b) (i) Differentiate between a *seed drill* and a *seed planter*. (2 Marks)
- (ii) Briefly outline the process of calibrating a maize planter (5 Marks)
- c) Calculate the seed rate of a 7 x 17 cm seed drill whose main drive wheel diameter is 124 cm and total weight of grain collected in 20 revolutions is 0.423 kg (4 Marks)

QUESTION FOUR

- a) Describe the functions of **FIVE** major parts of a tractor mounted sprayer (5 Marks)
- b) What is *drift* and explain **THREE** ways of minimizing it (4 Marks)
- c) Explain **TWO** ways of varying application rate of a sprayer (2 Marks)
- d) A sprayer is travelling at 5 km/h. The nozzles are spaced at 30 cm each with an output of 2 l/min. Calculate the application rate per hectare. (3 Marks)

QUESTION FIVE

- a) Explain **THREE** losses associated with harvesting small grains using combine harvesters (3 Marks)
- b) Using a sketch, describe the crop flow through a combine harvester (7 Marks)
- c) Calculate total time required to harvest 2.5 ha of wheat by means of a 2 m combine harvester being operated at 4 km/h. Take field efficiency as 80% (4 Marks)

QUESTION SIX

- a) Explain **FOUR** reasons for transplanting seedlings (4 Marks)
- b) Briefly describe **TWO** types of mechanical harvesters for citrus fruits (6 Marks)
- c) Calculate total time required to level a 500 m by 500 m field by means of a 900 cm leveller being operated at 4 km/h when the field efficiency is 70% (4 Marks)
