

LAIKIPIA



UNIVERSITY

UNIVERSITY EXAMINATIONS

1ST SEMESTER 2025/2026 ACADEMIC YEAR

THIRD YEAR EXAMINATIONS FOR BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AGED 314: INTRODUCTION TO AGRICULTURAL FIELD MACHINES

STREAM: (AGED & EXT.)

TIME: 2 HRS

DAY: FRIDAY (8.30-10.30AM)

DATE: 06/02/2026

THIS QUESTION PAPER CONSISTS OF THREE (3 PAGES)

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.

INSTRUCTIONS:

Answer Question **ONE** and any other **TWO** questions

QUESTION ONE

- a) Explain the following terms as used in agricultural machinery:
- i. Strip tillage [2 marks]
 - ii. Combined tillage [2 marks]
 - iii. Ridge till system [2 marks]
 - iv. Mulch-till system [2 marks]
- b) Explain knife registration as used in mowers [3 marks]
- c) Calculate the seed rate of a 8 x 15 cm seed drill whose main drive wheel diameter is 120 cm and total weight of grain collected in 25 revolutions is 0.45 kg. [4 marks]
- d) Calculate the time required for sowing 2.4 hectares of land by a four-furrow seed drill working at 15 mm deep. The speed of seed drill is 4 km/h and pressure exerted by the soil on the seed drill is 0.4 kg/cm². The space between furrow openers is 15 cm and time loss in turning is 15 %. [5 marks]
- e) With the aid of illustration, describe a disc plough giving the functions of each of its parts [5 marks]
- f) State five tools used for budding and grafting. [5 marks]

QUESTION TWO

- a) Differentiate between a seed drill and a seed planter. [3 marks]
- b) How many hectares of land can be cut by a combine with 3.8 m cutter bar, when it is operating at 6 km/h? [5 marks]
- c) Explain with a neat sketch the working of a typical cutter bar. [5 marks]
- d) During a seed drill calibration practical at Laikipia University farm, the following observations are;
- Number of furrows = 20
 - Spacing between the furrows = 15 cm
 - Diameter of the ground wheel = 1.2 m
 - Speed of rotation of ground wheel = 500 rpm
 - Weight of seed collected = 25 kg.

Compute the seed rate of the seed drill [7 marks]

QUESTION THREE

- a) Give two types of seed metering mechanisms used in planters. **[2 marks]**
- b) A five row 20 cm manual transplanter is pulled at a speed of 1.0 km/h. How much area will be planted in one day of 8 hours if field efficiency is 80 %? **[3 marks]**
- c) Draw the side cross-section view of a self-propelled combine harvester showing a schematic arrangement of the basic functional components. **[7 marks]**
- d) Clearly describe the flow of materials in a combine harvester during operation. **[8 marks]**

QUESTION FOUR

- a) Outline any four ways to reduce wind drift during spraying operation. **[4 marks]**
- b) A five row 20 cm manual trans-planter is pulled at a speed of 1.0 km/h. How much area will be planted in one day of 8 hours? Assume 36 % time is wasted on loading and turning. **[4 marks]**
- c) Briefly describe the construction and operation of a rotary tiller **[6 marks]**
- d) Using a well labelled drawing, discuss the construction of a subsoiler **[6 marks]**

QUESTION FIVE

- a) Differentiate between swath and windrow as used in mowing **[4 marks]**
- b) Explain the different types of nozzles used in modern sprayers **[8 marks]**
- c) Describe the knock out mechanism in seeder cells of a planter **[8 marks]**