



MACHAKOS UNIVERSITY

University Examinations for 2021/2022 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

THIRD YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (AGRICULTURAL EDUCATION AND EXTENSION)

AGN 374: FARM MACHINERY

DATE:

TIME:

INSTRUCTION TO CANDIDATES:

1. Attempt Question ONE and any other TWO questions.
2. Use neat sketches where appropriate
3. Observe instructions on the answer booklet

SECTION A: COMPULSORY

QUESTION ONE (30 MARKS)

- a) Differentiate the following
- i) Farm power and farm mechanization (2 marks)
 - ii) Primary tillage and secondary tillage (2 marks)
 - iii) Integral hitching configuration and drawn hitching configuration. (2 marks)
- b) Explain six objectives of farm tillage. (6 marks)
- c) Explain four benefits farmers can get from use of drones in agricultural production?(4 marks)
- d) A multi-nozzle sprayer with nozzle spacing of 50 cm is operated at a speed of 7.5 km/h. If the fitted 0.787 mm orifice diameter hollow-cone nozzle is rated 0.473 L/min at 275 kPa pressure. Determine

- i) The nozzle flow rate for a hollow-cone nozzle for an application rate of 200 L/ha. (2 marks)
- ii) The pressure required to produce the nozzle flow obtained in (i) above (2 marks)
- iii) If the nozzle produces a Volume Mean Diameter (VMD) of 200 μm at 1000 kPa, determine the droplet size at the flow rate obtained in (ii) (2 marks)
- e) Discuss five factors which farmers would consider when choosing a soil tillage implement. (5 marks)
- f) explain three factors that influence soil penetration ability of a disk plough. (3 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

- a) State the factors that increase penetration of a disc harrow (5 marks)
- b) Explain five functions of a seed drill (5 marks)
- c) explain the main functions of a sprayer (3 marks)
- d) With an aid of a well labeled diagram, describe the operations of a cutter bar. (7 marks)

QUESTION THREE (20 MARKS)

- a) Discuss six importance of land drainage as a method of land reclamation. (6 marks)
- b) With an aid of a well labelled diagram, describe the components of a mould board plough bottom. (6 marks)
- c) Calculate the number of hectares of land that can be cut in 3 hours by a combine with 4 m cutter bar when its operating at 4km/hr (2 marks)
- d) Discuss the major constraints impacting on agricultural mechanization in Kenya
- e) How can the constraints for agricultural mechanization identified in (e) above be overcome.? (6 marks)

QUESTION FOUR (20 MARKS)

- a) Briefly describe the main sources of agricultural power that are commonly used farmers in Kenya (6 marks)
- b) Explain the procedures for hitching a 3-point hitch attachment on a tractor. (8 marks)
- c) Discuss the significance of three forces that a tillage implement is subject into during its field operation. (6 marks)

QUESTION FIVE (20 MARKS)

- a) Outline the steps of attaching a disc plough to a tractor. (7 marks)
- b) Discuss the main differences between the rotary tillage and conventional tillage. (5 marks)
- c) Discuss the criteria that you would consider when selecting a suitable farm implement. (8 marks)