MACHAKOS UNIVERSITY

University Examinations for 2022/2023

SCHOOL OF ENGINEERING AND TECHNOLOGY

DEPARTMENT OF MECHANICAL AND MANUFACTURING ENGINEERING

FOURTH YEAR SECOND SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE (AGRICULTURAL EDUCATION AND EXTENSION)

AGN 374: FARM MACHINERY

DATE: TIME:

INSTRUCTIONS

This paper contains **FIVE** questions
Question **ONE** is **COMPULSARY** and carries **30 Marks**
Questions **TWO – FIVE** carries 20 Marks each. **Answer question ONE and any other TWO questions**

QUESTION ONE -COMPULSARY (30 Marks)

a) What is farm mechanization? (2 marks)

b) Briefly discuss any five (5) advantages of agricultural mechanization. (10 marks)

c) Explain what you understand by the following (5 marks)

i) Secondary tillage

ii) Conservation tillage

iii) PTO

iv) UAV

v) Gang mower

d) A farmer has a 2 bottom, 35 cm plough operating at 25 cm depth in soil with specific resistance of 3.7 N/cm^2 and at a speed of 6 km/hr. Calculate;

(i) Total draft (2 marks)

(ii) Power required to pull the plough. (3 marks)

e) Using a sketch, briefly explain how a cyclone separator on a hammer mill works. (8 marks)

QUESTION TWO (20 MARKS)

a) State the basic parts of a mouldboard plough (5 marks)

b) Briefly discuss the four classifications of a mouldboard plough. (8 marks)

c) Maintenance of farm machinery is a very critical part of machinery management. Briefly discuss the considerations made during the maintenance of a disc plough. **(7 marks)**

QUESTION THREE (20 MARKS)

a) Differentiate between a reciprocating tine harrow and rotary power harrow. (4 marks)

b) Outline clearly the main functions of a seeder (Planter). (6 marks)

c) Figure Q3 shows a seed planter. Name the parts 1 to 8. (4 marks)

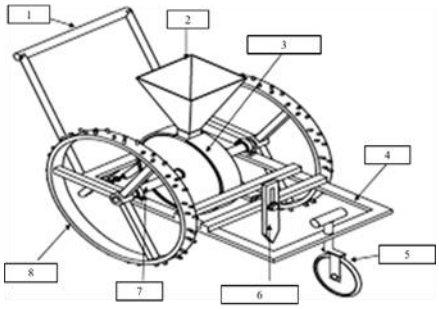

Figure Q3: Seed planter

d) Briefly discuss the three basic metering mechanisms of a precision planter. (6 marks)

QUESTION FOUR (20 MARKS)

a) Briefly explain what you undesrstand by the following terms related to transplanters. (5 marks)

i) Cell fill

ii) Fluted roller

iii) Studded roller

iv) Bare root

v) Modules

b) What are the advantages of module transplanting? (5 marks)

c) Briefly explain how a fertilizer distributor is maintained. (6 marks)

d) A farmer in Nakuru is to transplant 900,000 onion seedlings to one hectare of land with a 300 mm row width. Determine the plant spacing if the field efficiency is 85%. (4 marks)

QUESTION FIVE (20 MARKS)

a) Figure Q5 shows a combine harvester. Name the parts 1 to 10. (5 marks)

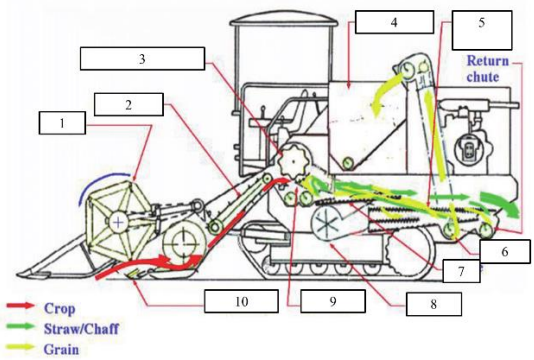

Figure Q5: Combine harvester

b) Give the functions of the parts 1, 2, 3, 4 and 8 in **Figure Q5**. (5 marks)

c) Briefly explain how a flail mowers work. (4 marks)

d) What are the main advantages of using drones in precision farming? (6 marks)