

GWANDA STATE UNIVERSITY



FACULTY OF NATURAL RESOURCES MANAGEMENT AND AGRICULTURE

DEPARTMENT OF CROP SCIENCE

PROGRAMME: BSc HONOURS CROP SCIENCE/ANIMAL SCIENCE

LCS2207: FARM MACHINERY AND STRUCTURES

FINAL EXAMINATION

JULY 2023

This examination paper consists of 3 pages.

Time Allowed:	3 Hours
Total Marks:	100
Special Requirements:	Scientific calculator, ruler (supplied by student)
Examiner's Name:	Mr Madzaramba T.H

Instructions

1. Answer **ALL** questions in Section A
2. Answer any **THREE (3)** questions in Section B

Mark allocation

Question	Marks
Section A	40
Section B	60
Total attainable marks	100

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SECTION A: Answer ALL questions.

Question 1

- a) Enumerate six (6) benefits of mechanization at the farm level [6]
- b) Copy and complete the following table. [6]

Farm implement	Mode of hitching	Purpose
Rotavator	-	-
-	Pull type	-
-	-	Weed control

- c) Differentiate between primary and secondary tillage [8]
- d) A farmer spends 10 hours a day working on the land before a planting operation is carried out. Approximately 40% of the time is spent discing the land. The farmer is targeting to put 100ha under maize. Using a reversible disc plough mounted on a tractor with a forward speed of 0.1km/min, the farmer intends to complete primary tillage in 8 days. The width of the plough is 500cm however during operation only 65% of the width is utilised.
Calculate:
- i. Total working time in hours [3]
- ii. Theoretical field capacity [4]
- iii. Effective field capacity [4]
- iv. Field efficiency [3]
- e) Outline factors that are considered when siting a poultry unit [6]
- [40]

SECTION B: Answer any THREE questions.

Question 2

- a) Outline the adjustments carried out to alter the depth and width of cut of a typical one-way disc plough. [8]
- b) A four bottom 35cm mould board plough has working depth of 15cm and draft of 1500kg, when it is working at the speed of 4km/hr with field efficiency of 75%.
- c) Determine
- i. Unit draft [3]
- ii. Drawbar power [5]
- iii. Actual field capacity [4]

Question 3

- a) The farmer intends to apply 200 litres per hectare of herbicide. If he/she is using a sprayer with 13 nozzles labelled F/60/1.2/3 and the sprayer width is 6.5m.
- i. State the meaning of F/60/1.2/3. [2]
 - ii. Determine the speed to be used to achieve the required application rate. [8]
- b) With reference to named examples explain the impact of innovative technologies in farming. [10]

Question 4

- a) Explain functions of 4 components of a spinning disc fertiliser spreader. [8]
- b) List and describe any four possible losses that can be experienced when combine harvesting grain. [12]

Question 5

- a) Outline the principle of operation of a hammer mill with end suction lift capability. [8]
- b) Describe four methods of haymaking [12]

Question 6

- a) Outline the process of calibrating a manual maize planter using the trial method. [10]
- b) A pneumatic planter with 10 furrow openers at 20cm spacing is to be calibrated to achieve desired seed rate for wheat sowing. The diameter for drive wheels is 120cm. Calculate the seeding rate per hectare if seed collected is 15kg from 200 revolutions of drive wheel. Assume 0% positive slippage. [10]

END OF QUESTION PAPER!!!