GWANDA STATE UNIVERSITY

FACULTY OF LIFE SCIENCES

DEPARTMENT OF CROP SCIENCE

BACHELOR OF SCIENCE HONOURS DEGREE IN CROP SCIENCE

LCS 1205 MECHANISATION IN AGRICULTURE

FINAL EXAMINATION PAPER

JUNE 2020

This examination paper consists of 3 pages

Time Allowed: **3 hours**

Total Marks: **100**

Special Requirements: **None**

Examiner's Name: **N. MATHEMA**

INSTRUCTIONS

1. Answer **ALL** questions in Section A
2. Answer **only three** questions in Section B

MARK ALLOCATION

QUESTION	**MARKS**
SECTION A	**40**
SECTION B	**60**
TOTAL ATTAINABLE MARKS	**100**

SECTION A ANSWER ALL QUESTIONS IN THIS SECTION

1. a) In your own words, define 'Agricultural Mechanization'. (2)
   b) Describe the structure, function and operation of any three (3) machines and their level of complexity (simple, intermediate or complex) for the following groups of farmers;
   i). Resource poor rural farmers (6)
   ii). Large scale commercial farmers (12)

2. a) Distinguish exhaustible energy resource from in-exhaustible energy resource giving examples. (5)
   b) Outline the sources of power for a mixed farm in Zimbabwe giving examples of where they may be used. (15)

SECTION B: ANSWER ANY 3 (THREE) QUESTIONS

3. a) Outline how energy is generated in a tractor engine. (5)

   b) Suppose you are employed as an Agricultural extension officer in Zimbabwe. Recommend to rural farmers the principles they may apply when training oxen for draught power. (15)

4. a) If you were the farm manager at the Gwanda State University farm, what would you advise the tractor driver to check daily before starting the tractor or any other farm motor vehicle. (5)

   b) Justify the importance of a cooling system of a tractor engine. (8)

   c) Describe the two types of cooling systems in a tractor engine. (8)

5. a) What seed spacing is required when planting maize in rows 90cm apart if the desired plant population is 48 000 per hectare and an average emergence rate of 85 % is expected? Clearly show your working. (7)

   b) Use suitable diagrams where necessary to describe the following terms/phrases used in Crop protection;

   i) Swath width (6)

   ii) Spray volume application rate (3)

   iii) Dosage (4)

6. a) Determine the nozzle flow rate for a sprayer with 6 six nozzles spaced at 101.8 cm if the travel speed is 6.2 km/h and the desired application rate is 240 L/ha. (5)

   b) You plan to apply Accent/Nicosulfuron herbicide. The label on the container states that the material contains 720g of active ingredient per litre and you should use 3.0

L/ha. If the nozzles are spaced at 44 cm and have a 70 degree spray angle and the pattern is such that 50% overlap is needed for uniform coverage. At what height above the tops of the plants should the boom be operated? Use a suitable diagram to answer this question. (15)

7. a) Define sprayer calibration (2)

b) Suppose you were the Farm supervisor at Gwanda State University farm. Design a step by step procedure for cleaning a knapsack sprayer after applying Paraquat herbicide. (8)

c) Calculate the **collected quantity per minute** when a Vicon fertilizer spreader is used to apply fertilizer in a field if the desired spread rate is 310 kg/ha fertilizer, desired speed is 7km/hr, working width is 14m. (5)

d) Define preventive maintenance of farm machinery (2)

e) Outline the advantages of preventive maintenance of farm machinery (3)

END OF EXAMINATION