



GWANDA STATE UNIVERSITY
FACULTY OF LIFE SCIENCES
DEPARTMENT OF CROP SCIENCES
BACHELOR OF SCIENCE HONOURS DEGREE IN CROP SCIENCE
LCS 1205 MECHANISATION IN AGRICULTURE
FIRST SEMESTER EXAMINATION
NOVEMBER 2019

This examination paper consists of 3 pages

Time Allowed: 3 hours
Total Marks: 100
Special Requirements: None
Examiner's Name: Mathema. N

INSTRUCTIONS

1. Answer **all** questions in Section A
2. Answer **only two** questions in Section B

MARK ALLOCATION

| QUESTION | MARKS |
|-------------------------------|--------------|
| SECTION A | 60 |
| SECTION B | 40 |
| TOTAL ATTAINABLE MARKS | 100 |

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SECTION A: ANSWER ALL QUESTIONS IN THIS SECTION

1. a) Define Agricultural Mechanisation. (2)
b) Assuming that you are employed as the farm manager at the Gwanda State University farm, demonstrate your understanding of Sprayers (Boom or Knapsack) by answering the following;
i) Compile a schedule of activities to be performed before calibrating a sprayer (7)
ii) Outline the 3 (three) factors that affect calibration (3)
c) You are supplied with a CP3 knapsack sprayer fitted with an LE 80 degree nozzle for band spraying. The sprayer is operated at a pressure of 15 psi which pushes out 950 ml/minute of spray liquid. The chosen nozzle height gives a swath of 0.5 m wide. The normal walking speed is 1 m/s.
i) After spraying for 30 minutes, what area would be covered? (5)
ii) What volume of spray liquid do you need to cover one hectare? (3)
2. a) State the SI units of the following; i) Mass ii) length iii) time (3)
b) In 2006, the Government of Zimbabwe through the Ministry of Agriculture, Mechanisation and Irrigation Development facilitated a programme to Mechanize agriculture in the resettlement areas. If you were to advise the beneficiaries of this programme, **outline** how you would advise them to care for their tractors under the following headings;
i) Functions of a Tractor engine cooling system (8)
ii) How Air cools tractor engines (6)
iii) Importance of Water for cooling tractor engines (6)
3. a) List any five (5) sources of Farm power/energy for Zimbabwean farms (5)
b) Zimbabwe has embarked on a land reform programme meant to equitably distribute land to Indigenous Zimbabweans.
Recommend the Sources of energy which Zimbabwean farmers may use for day to day running of their new farms. (15)

SECTION B: ANSWER ANY TWO QUESTIONS IN THIS SECTION

4. a) List the Tractor engine parts which require lubrication. (4)
b) A tractor engine cannot operate without sufficient lubrication. Support this statement by clearly explaining the purpose of a lubrication system in engines (12)
c) If you were to buy a lubricant for a tractor, what properties would you consider? (4)
5. a) Determine the nozzle flow rate for a sprayer with nozzles spaced at 101.6 cm if the travel speed is 7.6 km/h and the desired application rate is 230 L/ha. (5)
You plan to use a liquid herbicide. The label on the container states that the material contains 720g of active ingredient per litre and you should use 3.5 L/ha. If the nozzles are spaced at 42 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? (15)

6. a) Illustrate the procedure to be followed when a Diesel engine develops an airlock. (10)
- b) Relate how a differential lock (Diff lock) works (6)
- c) List the two (2) types of Tractor transmission systems (4)
7. a) 'It is wise to maintain Farm machinery according to schedule as advised by the manufacturer'. Defend this statement giving implications of not properly maintaining farm machinery and implements. (12)
- b) List the parts which require constant repair and maintenance in the following implements;
- i) Mouldboard plough (4)
- ii) Disc plough (4)

END OF EXAMINATION PAPER