



MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

FIRST YEAR FIRST SEMESTER EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AGN 122: BASIC FARM POWER SOURCES AND UTILIZATION

DATE: 10/12/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS:

Answer ALL questions in section A and any other TWO questions from section B:

SECTION A: COMPULSORY (30 MARKS)

QUESTION ONE (30 MARKS)

- a) Describe the following sources of farm power.
- i. Human power (2 marks)
 - ii. Animal power (2 marks)
 - iii. Mechanical power (2 marks)
 - iv. Biogas energy (2 marks)
- b) Describe the function of the following parts found in a tractor drive train
- i. Clutch (1 mark)
 - ii. Differential (1 mark)
- c) Explain four (4) major differences between diesel and petrol engines. (8 marks)
- d) Explain
- i. Six (6) qualities of a good tractor operator. (6 marks)
 - ii. Six (6) disadvantages of owning a farm tractor. (6 marks)

SECTION B: ANSWER ANY TWO QUESTIONS FROM THIS SECTION (40 MARKS)

QUESTION TWO (20 MARKS)

- a) Explain the working principle of a diesel 4-stroke engine and illustrate in a table form your explanation. (10 marks)
- b) i Briefly explain two main reasons for carrying out maintenance work on tractors (2 marks)

- ii Describe four (4) maintenance work commonly carried out on farm tractors.(8 marks)

QUESTION THREE (20 MARKS)

- a) Explain what happens to the piston, valves, spark plug and fuel-air mixture during the compression stroke and exhaust stroke of a four-stroke petrol engine. (8 marks)
- b) List and describe four (4) basic components of the exhaust system. (8 marks)
- c) State at least four (4) main functions of an engine lubrication system. (4 marks)

QUESTION FOUR (20 MARKS)

- a) Briefly explain the various factors to consider in order to select the appropriate size of tractor for a farm. (10 marks)
- b) Give four (4) major components of a power transmission system in agricultural tractor. (4 marks)
- c) Differentiate three (3) types of PTO system. (6 marks)

QUESTION FIVE (20 MARKS)

- a) Describe four (2) major differences between diesel and petrol engines. (4 marks)
- b) i) Define the synchromesh type transmission system (3 marks)
- ii) Describe the major inherent advantage of synchromesh type transmission systems over the mechanical? (4 marks)
- c) Give two possible causes for gears clashing when shifting (4 marks)
- d) Explain five roles of lubricant system in an engine (5 marks)