

LAIKIPIA



UNIVERSITY

UNIVERSITY EXAMINATIONS

2ND SEMESTER 2023/2024 ACADEMIC YEAR

FIRST YEAR EXAMINATIONS FOR BACHELOR OF SCIENCE IN AGRICULTURAL EXTENSION AND EDUCATION

AGED 123: BASIC FARM POWER SOURCE AND UTILIZATION

STREAM: R

TIME: 2 HRS

DAY: THURSDAY (8.30-10.30AM) DATE: 18/4/24

THIS QUESTION PAPER CONSISTS OF THREE (3 PAGES)

PLEASE DO NOT OPEN UNTIL THE INVIGILATOR SAYS SO.



INSTRUCTIONS: Answer question **ONE** and any other **TWO** questions.

QUESTION ONE (30 MARKS)

- a) Define the following terms in relation to engines
 - i. Bore: [2 marks]
 - ii. Stroke: [2 marks]
 - iii. Engine capacity: [2 marks]
 - iv. Top dead center: [2 marks]
 - v. Bottom dead center: [2 marks]
 - vi. Compression ratio: [2 marks]
- b) State any **five (5)** main component of a diesel engines [5 marks]
- c) Discuss solar energy as a climate smart source of power on a farm [3 marks]
- d) A four-cylinder, four stroke cycle S.I engine has a cylinder bore of 12.7 cm and a stroke length of 18 cm. if the compression ratio for this engine is 10:1, determine:
 - i. Engine capacity [2 marks]
 - ii. Clearance volume per cylinder [4 marks]
 - iii. Total volume per cylinder [4 marks]

QUESTION TWO (20 MARKS)

- a) Discuss the use of differential lock in tractor transmission system [6 marks]
- b) Using a clear and well labeled diagram, describe a typical diesel fuel supply system of a tractor engine [6 marks]
- c) Discuss four factors to be considered in the selection of draft animals [8 marks]

QUESTION THREE (20 MARKS)

- a) Distinguish between a four-stroke and a two-stroke cycle engine [5 marks]
- b) With the aid of labelled sketches, explain the principle of operation of a four-stroke cycle compression ignited engine. [15 marks]



QUESTION FOUR (20 MARKS)

- a) Use three points to differentiate between a spark ignited and compression ignited engine
[6 marks]
- b) Using a clear and well labelled diagram, describe a typical construction of a 2-stroke cycle gasoline engine
[14 marks]

QUESTION FIVE (20 MARKS)

- a) Describe the use of power take off (PTO) in tractors
[4 marks]
- b) Outline **three (3)** main role of additives in lubricants
[6 marks]
- c) Sketch and label the construction of a typical forced-convection water cooling system of a farm tractor
[10 marks]

