



MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

FIRST YEAR SECOND SEMESTER EXAMINATION FOR BACHELOR OF SCIENCE
IN AGRICULTURAL EDUCATION AND EXTENSION

AEN 122: BASIC FARM POWER SOURCES AND UTILIZATION

DATE:19/12/2017

TIME:8.30-10.30 AM

Instructions:

Answer question ONE and any other TWO questions

QUESTION ONE (30 MARKS)

- a) A clean environment inside an engine is achieved by maintaining the intake system. Name any three ways through which this can be attained. (3 marks)
- b) List four factors of front wheel adjustment of a two wheeled tractor (4 marks)
- c) Briefly explain what you understand by the following terminologies (6 marks)
 - i. External combustion engine
 - ii. Internal combustion engine
 - iii. Cylinder bore(B)
 - iv. Piston area (A)
 - v. Stroke (L):
 - vi. Dead centre
- d) Explain the function of a thermostat in water cooled engines ? (3 marks)
- e) With the help of a sketch, explain the operation of a water cooled engine system. (7 marks)
- f) What does PTO stand for and how is it used? (2 marks)
- g) Name five elements of a tractor power train (5 marks)

QUESTION TWO (20 MARKS)

- a) State any 3 major differences between a two and four stroke engines (3 marks)
- b) Explain six (6) main parts of the reciprocating engine (12 marks)
- c) The bore and stroke of an engine are 100 and 120mm respectively. Due to overheating problems, it is necessary to machine off 0.20mm from the main surfaces of the cylinder-head and the engine block which alters the compression ratio for the engine. If the original value of the compression ratio was 8:1. Calculate the new compression ratio.

QUESTION THREE (20 MARKS)

- a) Explain what you understand by the term governor in reference to an engine. (2 marks)
- b) What is the significance of a governor in a tractor operation? (3 marks)
- c) What is a speed drift (2 marks)
- d) Name two types of diesel engine governors (2 marks)
- e) Name five jobs which the lubricant system does for the engine (5 marks)
- f) Name and explain the purpose of any three additives used in lubricating oil (6 marks)

QUESTION FOUR (20 MARKS)

A six cylinder engine has a bore of 80cm and a stroke of 90cm.

- a) What will be the compression ratio of the engine if the clearance volume is half that of the diameter? (5 marks)
- b) Calculate the capacity of the engine if it has three cylinders (5 marks)
- c) Explain why sludge forms in the engine lubricating oil (3 marks)
- d) With the aid of a diagram explain the operation of fuel system in a diesel engine (7 marks)

QUESTION FIVE (20 MARKS)

- a) State four (4) major differences between diesel and petrol engines. (4 marks)
- b) What do you understand by the term synchromesh type transmission system and what is the major inherent advantage over the other mechanical transmission systems? (6 marks)
- c) Give two possible causes for gears clashing when shifting (4 marks)
- d) Describe the following sources of farm power and give the merits and demerits of each.
 - i. Human power (2 marks)
 - ii. Animal Power (2 marks)
 - iii. Mechanical power (2 marks)