



MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

SECOND YEAR SPECIAL/SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AGN 122 BASIC FARM POWER AND UTILIZATION

DATE: 22/7/2019

TIME: 2.00-4.00 PM

INSTRUCTIONS:



MACHAKOS UNIVERSITY

University Examinations for 2018/2019 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

**~~FIRST YEAR FIRST SEMESTER EXAMINATIONS~~ SUPPLEMENTARY
EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN**

AGRICULTURAL EDUCATION AND EXTENSION

AGN 122 BASIC FARM POWER AND UTILIZATION

TIME: _____

DATE: _____

INSTRUCTION TO CANDIDATES: Answer *ALL* questions from Section A and any other *TWO* from Section B:

SECTION A: COMPULSORY: (30 MARKS)

Examination Irregularity is punishable by expulsion

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QUESTION ONE

- a) Agricultural farm power is an essential input in Agriculture for timely field operation and for increasing the productivity of land. Give a clear distinction between human power and mechanical power used in the farm. _____ (4 marks)
- b) Piston ring is a component found in a piston of an engine.
 - i. Differentiate between the two types of a piston ring. _____ (2 marks)
 - ii. Explain the four functions of a piston ring in a diesel engine. _____ (4 marks)
- c) Define the following terms as used in a diesel engine of a farm tractor.
 - i. Detonation _____ (2 marks)
 - ii. Pre-ignition _____ (2 marks)
- d) Explain two conditions that are essential for efficient operation of fuel system of diesel engine. _____ (4 marks)
- e) Explain the following terms in relation to diesel engine.
 - i. Turbocharger (3 marks)
 - ii. Governor (3 marks)
- f) Describe the four functions of a Cooling system in an IC engine. (4 marks)
- g) Explain the function of a clutch in a diesel engine of a tractor in relation to power transmission. (2 marks)

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SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

- a) With an aid of sketches, describe the working of Four Stroke Cycle Engine of a tractor. (8 marks)
- b) A Four cylinder four stroke diesel engine has a cylinder diameter of 20 cm, stroke-bore ratio is 1.45, clearance volume 4508 cm³, engine speed 250 rpm, mean effective pressure 6.8 kg/cm² and mechanical efficiency is 75%. Calculate
 - (i) Indicated Horse Power (3 marks)
 - (ii) Brake Horse Power (3 marks)
 - (iii) Compression ratio (3 marks)
 - (iv) Swept Volume. (3 marks)

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QUESTION THREE (20 MARKS)

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- a. As an agricultural extension officer in Machakos County, you have been approached to describe the working of I.C. engine to high school agricultural students. Applying the skills learnt, describe the working of I.C diesel engine of a tractor to the satisfaction of the students. (10 marks)
- b. With aid of a sketch, describe flow diagram for transmission of power in an IC. Engine. (10 marks)

QUESTION FOUR (20 MARKS)

- a. A tractor power transmission is different to other automobiles. Explain the functional importance of the following in relation to power transfer in an I.C diesel engine.
- i. Differential (5 marks)
 - ii. Final drive (5 marks)
- There are three common systems of lubrication used on stationary engines, tractor engines and automobiles. Explain the three lubrications a farmer use to maintain her/his machines. (10 marks)

b.

QUESTION FIVE (20 MARKS)

- a. You have been contacted to educate the local farmers on tractor operation, service and maintenance. Explain this operations, service and maintenance for effective and efficient operation of their machines. (10 marks)
- b. Describe the various hitching implements to a tractor PTO and draw bar. (10 marks)

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