MACHAKOS UNIVERSITY

University Examinations for 2019/2020 Academic Year

SCHOOL OF AGRICULTURAL SCIENCES

DEPARTMENT OF AGRIBUSINESS MANAGEMENT AND TRADE

FIRST YEAR SPECIAL/ SUPPLEMENTARY EXAMINATION FOR

BACHELOR OF SCIENCE IN AGRICULTURAL EDUCATION AND EXTENSION

AGN 122: BASIC FARM POWER AND UTILIZATION

DATE: 19/01/2021   **TIME: 8.30-10.30 AM**

INSTRUCTIONS;

Instructions: Answer question ONE and any other TWO questions

TIME: DATE:

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

SECTION A: COMPULSORY: (30 MARKS)

QUESTION ONE (30 MARKS)

a)   Describe four distinctions between human power and mechanical power used in the farm.

(4 marks)

b)   Define the following terms as used in a diesel engine of a farm tractor.

    i.   Detonation   (2 marks)

    ii.   Pre-ignition   (2 marks)

c)   Discuss two conditions that are essential for efficient operation of fuel system

(4 marks)

d)   Explain the following terms in relation to diesel engine.

    i.   Turbocharger   (3 marks)

    ii.   Governor   (3 marks)

e)   i)   Describe the working of an IC engine.   (6 marks)

    ii)   Describe four functions of a Cooling system in an IC engine.   (4 marks)

f)   Explain the function of a clutch in a diesel engine of a tractor in relation to power transmission.   (2 marks)

SECTION B: ANSWER ANY TWO QUESTIONS (40 MARKS)

QUESTION TWO (20 MARKS)

a)   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)

b) Describe the differences between the working of PTO and draw bar hitching implements.

(10 marks)

QUESTION THREE (20 MARKS)

a) Describe the working of I.C diesel engine of a tractor. (10 marks)

b) With aid of a flow diagram, describe the process of transmission of power in an IC. Engine.

(10 marks)

QUESTION FOUR (20 MARKS)

a) With aid of sketches, discuss the working of a two Stroke Cycle Engine of a mower.

(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 cm^3, engine speed 250 rpm, mean effective pressure 6.8 kg/cm^2 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)

QUESTION FIVE (20 MARKS)

a) Assume 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) Explain three types of lubrications a farmer uses to maintain optimum working of a tractor.

(10 marks)