# MACHAKOS UNIVERSITY

**University Examinations for 2020/2021 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 AND UTILIZATION**

**DATE: 2/3/2020** **TIME: 8.30-10.30 AM**

---

**INSTRUCTIONS:**
**Answer *ALL* questions from Section A and any other *TWO* from Section B:**

**SECTION A: COMPULSORY: (30 MARKS)**

**QUESTION ONE (30 MARKS) (COMPULSORY)**

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) With aid of a sketch distinguish between TDC and BDC in the IC engine (4 marks)

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

i. Turbocharger (3 marks)

ii. Governor (3 marks)

e) Describe four functions of carburettor in a petrol engine. (4 marks)

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

g) Explain the functions of a clutch in a diesel engine of a tractor in relation to power transmission. (4 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) Discuss the differences between the working of PTO and draw bar hitching implements. (10 marks)

**QUESTION THREE (20 MARKS)**

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

b) With aid of a flow diagram, discuss 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) 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)