MERU UNIVERSITY OF SCIENCE AND TECHNOLOGY

P.O. Box 972-60200 – Meru-Kenya.
Tel: +254(0) 799 529 958, +254(0) 799 529 959, +254 (0)712 524 293
Website: www.must.ac.ke Email: info@mucst.ac.ke

UNIVERSITY EXAMINATIONS 2024/2025

THIRD YEAR FIRST SEMESTER EXAMINATION FOR DEGREE OF BACHELOR OF SCIENCE IN ANIMAL HEALTH PRODUCTION

EMT 3307: INTRODUCTION TO AGRICULTURAL STRUCTURES, FARM POWER AND FARM MACHINERY

DATE: JANUARY 2025 **TIME: 2 HOURS**

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

(a) Outline the functions of the following structures:

(i) Dips (2 marks)

(ii) Crushes (2 marks)

(iii) Spray races (2 marks)

(iv) Creeps (2 marks)

(v) Grids (2 marks)

(b) Briefly explain the term “Agricultural Mechanization” with emphasis on its contribution to the development of the third world. (6 marks)

(c) Highlight three ways by which heat flows to or from an enclosed environment. (6 marks)

(d) State the functions of the following engine components:

(i) The piston (1 mark)

(ii) The crankshaft (1 mark)

(iii) The connecting rod (1 mark)

(e) With the aid of a labelled diagram show the main components of a moldboard plough. (5 marks)

QUESTION TWO (20 MARKS)

(a) The ventilation rate through a certain structure is given as 50 m^3/s and the inside – outside temperature difference is 12^0C. Assuming a $102kg/m^3$ air density and no moisture changes, determine the heat loss/gain due to ventilation and air exchange. (8 marks)

(b) Briefly explain four types of ventilation systems commonly used in intensive production livestock buildings. (12 marks)

QUESTION THREE (20 MARKS)

(a) Explain the classification of construction / engineering materials. (10 marks)

(b) Discuss three methods used in crop storage. (10 marks)

QUESTION FOUR (20 MARKS)

(a) Explain the operation of a four stroke cycle internal combustion diesel engine. (8 marks)

(b) With the aid of a labelled diagram show the main components of a petrol engine fuel system. (7 marks)

(c) A plough cuts a furrow whose cross-sectional area is 80 cm^2. The average soil resistance is 0.6 kg/cm^2. Calculate the pull exerted by the power source if the plough pulls at an angle of 25^0 with the horizontal. (5 marks)

QUESTION FIVE (20 MARKS)

(a) Briefly explain the following types of forage harvesters:

(i) The double-chop type (4 marks)

(ii) The precision-chop type (4 marks)

(b) Highlight the main functions of a combine harvester. (8 marks)

a) Determine the number of hectares per day of 8 hours cut by a combine harvester whose cutter bar width is 4 meters and operating at a speed of 4.5 km/hr assuming an overall operating efficiency of 90%.

(4 marks)