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UNIVERSITY EXAMINATIONS 2024/2025

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

EMT 3207: AGRICULTURAL STRUCTURES

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

INSTRUCTIONS: Answer Question ONE and any other TWO questions.

QUESTION ONE (30 MARKS)

(a) Highlight the functions of the following agricultural structures:

(i) Dips (2 marks)

(ii) Spray races (2 marks)

(iii) Crushes (2 marks)

(iv) Hotbeds (2 marks)

(b) Briefly explain three types of milking parlours. (9 marks)

(c) Outline four basis on which to classify greenhouses. (10 marks)

(d) List six factors considered when choosing a site for a farm building. (3 marks)

QUESTION TWO (20 MARKS)

(a) With the aid of labelled diagrams, explain the operating principles of machine milking. (12 marks)

(b) The following parameters are given for a certain structure:

(i) Roof area ---------- 60 m^2

(ii) Wall area ---------- 150 m^2

(iii) Floor area ---------- 60 m^2

(iv) Wall insulating properties ---------- 0.68 W/m^2 ^{0}C

(v) Roof insulating properties ---------- 0.57 W/m^2 ^{0}C

(vi) Floor insulating properties ---------- 1.10 W/m^2 ^{0}C

(vii) Inside-outside temperature difference ---------- 5 ^{0}C

Calculate the total heat gain/loss through the structure by conduction.

(8 marks)

QUESTION THREE (20 MARKS)

(a) In question 2 (b) above, it is also given that the air ventilation rate is 60 m^3/S, air density is 1.2 kg/m^3 and that there are no moisture content changes. Calculate the heat gain/loss due to ventilation and air exchange through the structure. (6 marks)

(b) Briefly discuss three main types of ventilation systems which may be used in animal housing and handling structures. (9 marks)

(c) Highlight the aspects of a cold chain. (5 marks)

QUESTION FOUR (20 MARKS)

(a) Explain the following methods which may be used for crop storage:

(i) Refrigerated storage (4 marks)

(ii) Ventilated storage (3 marks)

(iii) Controlled Atmosphere (CA) storage (5 marks)

(b) Outline the classification of construction / engineering materials.

(8 marks)

QUESTION FIVE (20 MARKS)

(a) What are bituminous materials? . (8 marks)

(b) A certain structural component consists of 0.08 m^2 cross-sectional area, a length of 8 m and weighing 78.5 kN/m^3. Calculate the dead-load of the component. (5 marks)

(c) Differentiate “Heat transfer” from “Thermodynamics”. (7 marks)