



MASENO UNIVERSITY

UNIVERSITY EXAMINATIONS 2012/2013

**SECOND YEAR SECOND SEMESTER EXAMINATION
FOR THE DEGREE OF BACHELOR OF SCIENCE IN
HORTICULTURE WITH INFORMATION TECHNOLOGY
(MAIN CAMPUS)**

SHC 216: FARM MATERIALS AND STRUCTURES

Date: 23rd July, 2013

Time: 8.30 – 10.30 a.m.

SHC 216: FARM MATERIALS AND STRUCTURES

INSTRUCTIONS:

Answer ALL the questions in **SECTION A** and three questions in **SECTION B**.

SECTION A:

40 MARKS: Answer all the questions in this section

- Q1. Discuss briefly the following wood characteristics:
- i. Natural decay resistance
 - ii. Strength
 - iii. Toughness
 - iv. Stiffness
 - v. Nail holding resistance (5 Marks)
- Q2. Name and describe the two major categories of wood preservation. (4 Marks)
- Q3. Describe four advantages of plastics over other materials used in the agricultural industry. (4 Marks)
- Q4. Describe the following methods used in jointing metals.
- i. Soft and hard soldering
 - ii. Gas and Arc welding
 - iii. Adhesives
 - iv. Riveting (4 Marks)
- Q6. Briefly describe the following characteristics crucial for the design of horticultural structures by giving an example in each case.
- i. Functionality
 - ii. Efficiency

- iii. Economy
 - iv. Flexibility
 - v. Suitability (10 Marks)
- Q7. State the properties that make the following materials suitable in greenhouse crop production functions.
- i. Cover material
 - ii. Plastic containers in insecticide chemical mixing
 - iii. Aluminum metals used in framework
 - iv. High density polyethylene (HDPE) sheeting (5 Marks)
- Q8. Briefly discuss the following properties of metals
- i. Malleability
 - ii. Ductility
 - iii. Compression strength
 - iv. Hardness
 - v. Toughness (5 Marks)
- Q9. Briefly discuss the following aspects of structural ventilation
- i. Natural ventilation
 - ii. Mechanical ventilation (3 Marks)

SECTION B: (30 MARKS): Answer any THREE questions from this section. Each is 10 Marks.

- Q10. Discuss the following heat transfer processes and their importance in ventilation design.
- i. Conduction
 - ii. Convection
 - iii. Radiation
- Q11.i) Discuss the importance of vapour barriers in humidity and heat transmission in buildings used for cold storage. Indicate methods of ensuring there is sufficient barrier for such buildings indicating the materials used and the structural design requirements.

- Q11.ii) Discuss the heat loss and heat loads from spaces that require conditioning within buildings indicating the types of heat losses and gains into buildings.
- Q12. Discuss the five basic considerations in the construction of greenhouses.
- Q13. Discuss in detail the requirements for barbed wire fence construction.