MACHAKOS UNIVERSITY

University Examinations for 2016/2017

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF AGRICULTURAL EDUCATION AND EXTENSION

THIRD YEAR FIRST SEMESTER EXAMINATION FOR DIPLOMA IN AGRICULTURAL EDUCATION AND EXTENSION

AEN 112 FARM STRUCTURES

DATE: 27/7/2017 **TIME: 11:00 – 1:00 PM**

INSTRUCTIONS

*Answer **ALL** questions in **SECTION A** and any other **TWO** questions in **SECTION B***

SECTION A (COMPULSORY) (30 MARKS)

a) Differentiate between the following terms;

i Particle density and bulk density (4 marks)

ii Slump test and silt test (4 marks)

iii Tender and contract (4 marks)

iv Farm plan and farmstead (4 marks)

b) Using examples outline any three reasons why farm structures are important in any agricultural production process. (6 marks)

c) Assume a 1:3:5 cement- sand- stone concrete mix by volume using naturally moist aggregates and adding 62 litres of water. Two bag of cement are used and take the following additional assumptions:

i Moisture content of sand: 4%

ii Moisture content of stones: 1.5%

iii Bulk density of the sand: 1400 kg/m³

iv Bulk density of the stones: 1600 kg/m³

v Solid density of aggregate materials: 2650 kg/m³

vi Solid density of cement: 3100 kg/m³

vii Density of water: 1000 kg/m³

Calculate the following:

i) water- cement ratio (3 marks)

ii) cement - aggregate ratio (3 marks)

iii) solid volume (4 marks)

SECTION B (40 MARKS)

QUESTION TWO (20 MARKS)

a) In respect to the following structures, list any five functional design requirements

i. Milking parlour (5 marks)

ii. Grain store (5 marks)

iii. Farm workshop (5 marks)

b) A five strand barbed wire fence has been planned for a 4ha rectangular plot. Compute the number of posts required if the spacing between the posts is 10m (5 marks)

QUESTION THREE (20 MARKS)

a) Discuss main forces that act on a farm structure and give their cardinal characteristics (6 marks)

b) Explain five factors considered in the selection of building materials (5 marks)

c) State five advantages of soil as a building material (5 marks)

d) Describe three methods used in planning of a new farmstead (4 marks)

QUESTION FOUR (20 MARKS)

a) Explain three methods used for:

i. Improving the soil bearing capacity (6 marks)

ii. Preserving and protecting the steel from rusting and corrosion (6 marks)

iii. Applying wood preservatives (6 marks)

b) Define Bill of Quantities (BQ) in relation to building production (2 marks)