



## MACHAKOS UNIVERSITY

University Examinations for 2017/2018 Academic Year

SCHOOL OF AGRICULTURE AND NATURAL RESOURCES MANAGEMENT

DEPARTMENT OF OF AGRICULTURAL EDUCATION AND EXTENSION

### TRISEMESTER EXAMINATION FOR DIPLOMA IN AGRICULTURAL EDUCATION AND EXTENSION

#### AEN 112 FARM STRUCTURES

Date:

Time:

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#### **INSTRUCTIONS:**

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

#### **SECTION A (Total 30marks)**

1. Differentiate between the following terms;
  - (i) Particle density and bulk density (4marks)
  - (ii) Slump test and silt test (4marks)
  - (iii) Tender and contract (4marks)
  - (iv) Farm plan and farmstead (4marks)
2. Using examples outline any three reasons why farm structures are important in any agricultural production process. (6marks)
3. 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/m<sup>3</sup>
  - (iv) Bulk density of the stones: 1600 kg/m<sup>3</sup>
  - (v) Solid density of aggregate materials: 2650 kg/m<sup>3</sup>
  - (vi) Solid density of cement: 3100 kg/m<sup>3</sup>
  - (vii) Density of water: 1000 kg/m<sup>3</sup>

Calculate the following:

- (i) water- cement ratio (3marks)
- (ii) cement - aggregate ratio (3marks)
- (iii) solid volume (4marks)

**SECTION B (Total 40marks)**

- 4. (a) In respect to the following structures, list any five functional design requirements (5marks)
  - (i) Milking parlour (5marks)
  - (ii) Grain store (5marks)
  - (iii) Farm workshop (5marks)
- (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 (5marks)
- 5. (a) Discuss main forces that act on a farm structure and give their cardinal characteristics (6marks)
- (b) Explain five factors considered in the selection of building materials (5marks)
- (c) State five advantages of soil as a building material (5marks)
- (d) Describe three methods used in planning of a new farmstead (4marks)
- 6. (a) Explain three methods used for:
  - (i) Improving the soil bearing capacity (6marks)
  - (ii) Preserving and protecting the steel from rusting and corrosion (6marks)
  - (iii) Applying wood preservatives (6marks)
- (b) Define Bill of Quantities (BQ) in relation to building production (2marks)