# UNIVERSITY OF EMBU

## 2016/2017 ACADEMIC YEAR

## FIRST SEMESTER EXAMINATION

## FOURTH YEAR EXAMINATION FOR THE DEGREE OF BACHELOR OF SCIENCE IN AGRICULTURE AND
## BACHELOR OF SCIENCE IN HORTICULTURE

## ACS 406: FIELD AND LABORATORY EXPERIMENTATION

**DATE: NOVEMBER 29, 2016**                                   **TIME:  8:30-10:30AM**

**INSTRUCTIONS:**

**Answer Question ONE and ANY other TWO Questions**

### QUESTION ONE (30 MARKS)

Explain the terms in a) to e) as used by researchers:

a)  i) Strategic research                                                              (3marks]

ii) Research design                                                                   (3 marks)

iii) Concept note                                                                     (2 marks)

iv) Interaction effects in experimentation                                            (3 marks)

v) Biophysical and socio-economic parameters                                          (3 marks)

b)  Briefly describe methods for controlling error in experimentation                 (4 marks)

c) Give the importance of a Conceptual Framework in a research undertaking (3 marks)

d) Distinguish between Experimental units and Sampling units in an experimental setup

(2 marks)

e) Why is instrumentation an important undertaking before commencing on a major research undertaking? (3marks)

f) Give the statistical consideration necessary when designing glasshouse and field experiments in field and horticultural crops. (4 marks)

## QUESTION TWO (20 MARKS)

Make clear distinction between the following experimental statistical terms. Where necessary use examples to illustrate your answer
   a) Balanced and unbalanced ANOVA models (10 marks)
   b) Characteristics of quantitative and Qualitative Research Methods (10 marks)

## QUESTION THREE (20 MARKS)

Using a specific field crop give a schematic diagram showing the step by step taken for the **Experimental Processes** from developing of the research plan through the main experimentation to final research output. Show the main experimental materials that you would require to accomplish your plan.

## QUESTION FOUR (20 MARKS)

Give an example of a fully randomised experimental design for a split plot design with 2 treatments for the main plot factor (1 and 2), 5 treatments for the sub plot factor (A - E) and 3 complete blocks. Explain the differences between the precision and error terms for the main plot factor and the sub plot factor.

## QUESTION FIVE (20 MARKS)

Using illustrations where necessary, show the main features of an informal diagnostic on-farm surveys

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