(Knowledge for Development)

KIBABII UNIVERSITY

UNIVERSITY EXAMINATIONS

2022/2023 ACADEMIC YEAR

SUPPLEMENTARY/SPECIAL EXAMINATION

FOR THE DEGREE OF BACHELOR OF SCIENCE IN; AGRICULTURE AND BIOTECHNOLOGY, AGRICULTURE EXTENSION AND EDUCATION AND AGRICULTURE ECONOMICS AND NATURAL RESOURCE MANAGEMENT

COURSE CODE: ARE 321/SAB 390

COURSE TITLE: RESEARCH METHODS

DATE: 23RD AUGUST 2023 **TIME: 11 – 1 PM**

INSTRUCTIONS TO CANDIDATES

Answer Question One and Any other TWO (2)

TIME: 2 Hours

This Paper Consists of 2 Printed Pages. Please Turn Over.

KIBU observes ZERO tolerance to examination cheating

QUESTION ONE: (COMPULSORY) **(30 MARKS)**

a) Define the following terms as used in Research
   i. Research (1 MARKS)
   ii. Treatments (2 MARKS)
   iii. Hypothesis (2 MARK)
   iv. Experimental Unit(s) (2 MARKS)
b) Outline any THREE principles of experimental designs (9 MARKS)
c) Differentiate between Quantitative and Qualitative approaches to research (4 MARKS)
d) Explain any FIVE factors to consider when selecting the source of data for use in research (10 MARKS)

QUESTION TWO

Describe the following types of research
   i. Correlational research design (4 MARKS)
   ii. Diagnostic research design (4 MARKS)
   iii. Experimental research (4 MARKS)
   iv. Applied Research (4 MARKS)
   v. Fundamental Research (4 MARKS)

QUESTION THREE

a) Explain any FIVE importance of research (10 MARKS)
a) Describe sampling as used in research, giving its FOUR advantages and FOUR disadvantages (10 MARKS)

QUESTION FOUR

Explain THREE advantages and TWO disadvantages of secondary data. (10 MARKS)
Discuss any FIVE precautions to consider when using secondary data in research (10 MARKS)

QUESTION FIVE

The following is data weight of bean pods harvested from two different parts of the same plant. Perform a paired t-test for weight of bean pods obtained from the top and bottom part of the plant after treatment with a TSP fertilizer. (20 MARKS)

Plant	Bottom	Top
1	90	85
2	92	86
3	87	82
4	83	79
5	78	82
6	82	75
7	83	88
8	91	82
9	83	78
10	87	82
11	91	93
12	89	84
13	85	82

$CF = \frac{T^2}{N}$	$CF = \frac{(\sum x)^2}{(rn)}$	$E = \frac{R \times C}{N}$
$CF = \frac{G^2}{rt}$	$MST = \frac{SST}{df(T)}$	$\chi 2 = \frac{\Sigma(O-E)^2}{E}$
$SST = \frac{\sum(T)^2}{(r)} - CF$	$S^2 = \frac{\left(\sum x^2 - \frac{(\sum x)^2}{n}\right)}{(n-1)}$	$\rho = 1 - \frac{6\sum D^2}{N^3 - N}$
$SED = Sp - \{\surd\left[\frac{1}{n1} + \frac{1}{n2}\right]\}$	$S^2 = \frac{\left(\sum d^2 - \frac{(\sum d)^2)}{n}\right)}{(n-1)}$	$Sxy = n\sum xy - \sum x \sum y$
$Sxx = n\sum x^2 - (\sum x)^2$	$Syy = n\sum y^2 - (\sum y)^2$	$r = \frac{Sxy}{\sqrt{Sxx\ Syy}}$
$S^2 = \frac{\left(\sum d^2 - \frac{(\sum d)^2)}{n}\right)}{(n-1)}$	$t_{critical} = t(_{(n-1)}, {}^{\alpha}/_{2})$	$\chi 2 = \frac{\Sigma(O-E)^2}{E}$
$SED = \frac{S}{\sqrt{n}}$	$Sp = \sqrt{S^2 p}$	$S^2 = \frac{\left(\sum d^2 - \frac{(\sum d)^2)}{n}\right)}{(n-1)}$
$SE = \frac{\sigma}{\sqrt{n}}$	$\%CV = \sqrt{\frac{MS}{X}} \times 100\%$	$SED = \sqrt{\frac{2MSE}{r}}$