UNIVERSITY OF SWAZILAND
MAIN EXAMINATION PAPER

COURSE CODE: ABE 305

TITLE OF PAPER: - RESEARCH METHODS

BSc. AGRICULTURAL & BIOSYSTEMS ENGINEERING YEAR 3

TIME ALLOWED: TWO (2) HOURS

SPECIAL MATERIAL REQUIRED: NONE

INSTRUCTIONS: ANSWER QUESTION ONE AND ANY TWO OTHER QUESTIONS.

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1st SEM.2013/2014

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SECTION ONE: COMPULSORY

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QUESTION 1

(a) Define research and explain the importance of research on climate change

(10 Marks)

(b) List and explain the chronological steps in research process   **(20 Marks)**

(c) Scrutinise each of the following presentations separately and explain why such style of writing is not acceptable in research articles.   **(10 marks)**

    a. Nowadays, people have come to understand that agriculture should not only be high yielding, but also sustainable (Reynolds, M and Borlaug, L. M., 2006),

    b. According to Montgomery, mechanical soil tillage, particularly when combined with *in situ* burning of crop residues, have magnified soil erosion losses,

    c. Data was analysed using SAS (version 9.1; At:v9doc.sas.com),

    d. Basing on the results obtained at Luyengo, it is concluded that early maize planting increases maize yield in Swaziland,

    e. Matondo, Peter, and Msibi (2005) reported that there will be reduction in runoff under changed climatic conditions in Swaziland, and the available water resources will be less in the future.

SECTION II: ANSWER ANY TWO QUESTIONS

QUESTION 2

(a) Discuss the content of a research abstract highlighting the critical information to be included in an abstract. **(15 Marks)**

(b) Explain what should be written in the conclusion subsection of a research project report **(5 Marks)**

(c)

    i. Giving practical examples, discuss what is meant by sampling frame. **(5 Marks)**

    ii. Explain why we use samples in research **(5 Marks)**

QUESTION 3

(a) Briefly discuss what you understand by literature review and explain the importance of this component in research. **(10 Marks)**

(b) List and briefly describe simple random sampling and snowball sampling methods used in the probability and non-probability sampling processes, respectively. **(10 Marks).**

(c) Briefly discuss the five (5) basic characteristics of a well formulated specific research objective **(10 Marks)**

QUESTION 4

(a) Discuss what you understand by Least Significant Difference (LSD) and probability (P) value in data analysis, indicating how they are used in data interpretation **(15 Marks)**

(b) A study was conducted to determine foliage biomass yield of four (4) sweet potato varieties (variety 1-Ligwalagwala, variety 2-Tia Nong 57, variety 3-Tia Nong 66 and variety 4-Kenya). Part of the analysis of variance (ANOVA) of the foliage yield data showed the following results:

***** **Analysis of variance** *****

Variate: Yield_t_ha

Source of variation	d.f.	s.s.	m.s.	v.r.	F pr.
Blocks stratum	2	1260.1	630.0	5.14	
Blocks.*Units* stratum					
Variety	3	26552.0	8850.7	72.20	<.001

***** **Tables of means** *****

Variate: Yield_t_ha

Grand mean 64.2

Variety	1	2	3	4
	38.7	44.4	65.8	107.9

*** **Leat significant difference of means (5% level)** ***

l.s.d.   variety   10.82

Using the ANOVA results presented above, answer the following questions:

(a) Was there a difference in the foliage biomass yield among the four sweet potato varieties? Explain your answer. **(5 Marks)**

(b) Use the indicated LSD to interpret the sweet potato foliage yield **(10 Marks)**