

**W1-2-60-1-6**

## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**YEAR I SEMESTER III AND II EXAMINATION FOR THE DEGREE OF BACHELOR OF INFORMATION TECHNOLOGY/ BACHELOR OF BUSINESS INFORMATION TECHNOLOGY**

**BIT 2301: RESEARCH METHODOLOGY**

**DATE: APRIL 2015 TIME: 2 HOURS**

**INSTRUCTIONS: ANSWER QUESTION ONE (COMPULSORY) AND**

**ANY OTHER TWO QUESTIONS.**

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**QUESTION ONE (30 MARKS)**

(a) Research may be defined as an organized and systematic way of finding answers to questions. Explain the following terms as applied in this definition. (4 marks)

i) Organized

ii) Systematic

ii) Finding answers

iv) Questions

(b) i) Define the term epistemology hence outline four sources of knowledge recognized by epistemologists. (5 marks)

ii) Explain how research makes use of each of the four source of knowledge enumerated in question b(i) above. (4 marks)

(c) i) Distinguish between independent dependent and intervening variables in research. (3 marks)

ii) Explain what a conceptual framework is and demonstrate graphically how it depicts the relationship between the independent dependent and intervening variables. (3 marks)

iii) For each of the following research topics identify the independent, dependent and any two intervening variables. (4 marks)

1. The effect of programmer experience on algorithm efficient.

2. The impact of mobile and internet banking on performance of financial institutions in Kenya.

iv) Define the term hypothesis hence for each of the research topics in question c(iii) above formulate a null and an alternative hypothesis. (3 marks)

(d) i) What is the main purpose for using random sampling

in an experiment. (1 mark)

ii) What is the main role of a control group in an experiment.(1 mark)

iii) In order to explore the effect of alcohol on visual perception an experiment was devised using two groups. The first group performed a series of tasks when completely sober, while the second group performed the tasks after consuming alcohol to bring their BAC level up to at least 0.059.

1. Which among these groups is the control group(1 mark)

2. Which among these groups is the experimental group(1 mark)

**QUESTION TWO (20 MARKS)**

(a) Outline the strategy for selecting a sample using each of the following sampling techniques:

i) Simple random sampling (2 marks)

ii) Systematic sampling (2 marks)

iii) Stratified sampling (2 marks)

iv) Cluster sampling (2 marks)

v) Purposive sampling (2 marks)

vi) convenience sampling (2 marks)

(b) Describe each of the following forms of unethical behavior in research. Give examples to support your answer:

i) Plagiarism (2½ marks)

ii) Fraud (2½ marks)

(c) State any three differences between APA and IEEE referencing

styles. (3 marks)

**QUESTION THREE (20 MARKS)**

A research was conducted to verify the premise that short life span of refurbished computers for learning is resulting to rapid increase in e-waste amounts in institutions of learning in Kenya. Taking four years as a benchmarking of average life span of refurbished computers the study sort to verify the hypothesis that the average life span of refurbished computers for learning. In Kenya is less than four years. On a scale of 1 to 6 years the interviews were asked to indicate how off often they replaced their computers. The results are summarized in the table below:

Your are required to analyse the data in the table using one sample t-test at 95% confidence level given that:

* Standard deviation of the sample is 0.919
* P-value is 0.012

Table 1: Frequency of replacing computers

|  |  |
| --- | --- |
| Year | Frequency |
| 2 | 3 |
| 3 | 57 |
| 4 | 43 |
| 5 | 24 |
| 6 | 6 |
| Total | 133 |

Use this table to answer the questions that follow:

i) Formulate the appropriate null and alternative hypothesis for this research and indicate the degree of freedom. (3 marks)

ii) Determine the sample mode, median and mean. (4 marks)

iii) Calculate:

i) Standard deviation of the population. (3 marks)

ii) Standard deviation of the mean i.e. standard error mean.(3 marks)

iii) The t-value (3 marks)

iv) Explain the interpretation of this results by comparing the p-value and the confidence level of 0.05.

v) Using this results the researcher concluded that it is not justifiable to claim that short lifespan of refurbished computers is leading to increased pc e- waste in learning institutions. Explain why this conclusion is not valid using the results obtained. (2 marks)

**QUESTION FOUR (20 MARKS)**

(a) i) What is a research report? (2 marks)

ii) Most reports on empirical research follow a standard format that typically consist of the following five major sections. Describe the contents of these sections. (10 marks)

1) Introduction

2) Literature Review

3) Methodology

4) Research Results

5) Conclusion and recommendation

(b) In this question you are given a brief description of a study and some data. You are required to choose the appropriate test. Unless stated otherwise assume that the data are normally distributed and show homogeneity of variance. For each question write the letter corresponding to the correct test (i.e) A for Wilcoxon, B for Friedan, etc) as shown in the table below: Explain the reasons for a selecting each test. (8 marks)

i) Wilcoxom

ii) Krushkal-Wallis

iii) Spearman’s Rho

iv) Pearson’s r

v) CHI Square

1) A researcher is interested in whether there is a relationship between daily temperature and the amount of time that students study. She measures the temperature each day for six months and the mean number of hours spent in the library by a group for students what test is required to test the hypothesis that study time is related to temperature? Explain your answer. (2 marks)

2) A study was a performed to examine the effect of allergies on mood. One group of participants were allergy free, another group suffered from severe hay fever, a third group suffered form eczema, a fourth group had gluten intolerance. A therapist rated the mood of each participant on a 100-point scale. Which statistical test should the researcher use to see if allergies affect mood? Explain your

answer. (2 marks)

3) A researcher is interested in comparing the effectiveness of four different scuba diving courses. He assembles a boat full of divers (twenty from each course) and takes them to nearby barriers reef. Each diver makes one dive in which he attempts to stay safely below the water for 40 minutes. The researcher then measures the number of divers from each course who successful return to the surface, which test should the researcher use? Explain your answer.(2 marks)

4) In response to claims that A-levels are easier now that they were 20 years ago, group of current sixth-formers are given two computer studies exams , one a copy of 1980 A-level paper and the other a copy of the 2005 A-level paper. Each student provides a mark for each exam out of 100. Their scores for the 1980 A- level paper are heavily skewed, which statistical test, should be used to test the hypothesis that English exams used to be harder than they are nowadays? Explain your choice. (2 marks

**QUESTION FIVE (20 MARKS)**

(a) Data is an important component of research identify and describe

four types of data. (10 marks)

(b) Explain the purpose of inferential statistics. (10 marks)

(c) A researcher is concerned that there might be a relationship between marching “celebrity come dancing” and cortical atrophy. The researcher obtains the brains of 30 inmates from a residential home. He takes a standard – sized slice of cortex from each brain and measures how many synapses it contains. HE correlates this measures with a record of how many episodes of “Celebrity come dancing” were viewed by each inmate. Here are some spss outputs from this study.

CORRELATION

|  |  |  |  |
| --- | --- | --- | --- |
|  |  | Number of viewings | Synopsos |
|  | Pearsons |  |  |
|  | Correlation | 1 | -0.772 |
|  |  |  |  |
| Number of viewings | Sig(2 tailed |  | 0.000 |
|  |  |  |  |
|  | N | 30 | 30 |
|  | Pearsons |  |  |
|  | Correlation | -0.772\*\* |  |
|  |  |  |  |
| Synapses | Sing (2 tailed | 0.000 |  |
|  |  |  |  |
|  | N | 30 | 30 |

Model summary and

Parameter estimates

Dependent Variable: synapses

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Equation | Model summary | | | | Parameters  Estimates | |  |
| R square | F | dfi | Df2 | sig | Constant | b1 |
| Linear | 0.597 | 41.395 | 1 | 28 | 0.000 | 3865.010 | -205.403 |

The independent variable is number of viewings.

(i) A correlation test has been performed on these data. What does it tell us about the relationship between the number of viewings of “celebrity come dancing” and the number of synapses? (1 mark)

(ii) How many degres of freedom does this pearsons correlation have?(1 mark)

(iii) Write the equations in the form Y = bx + c that would correctly describe the regression line that spss would fit to the scatter diagram?

(iv) What is the value of the intercept in the regression equation

written above. (1 mark)

(v) Approximately how much of the variability in number of synapse is accounted for by its relationship with viewing “celebrity come dancing” approximately how many synapses would you predict them to have?

(1 mark)

(vi) Which of the regression lines on the graph is the correct one for predicting the number of synapses form the number of episodes of “celebrity come dancing” watched. (1 mark)

(vii) What should the researcher conclude from these results about the relationship between viewing “celebrity come dancing” and the number of synapses present? (1 marks)