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**JOMO KENYATTA UNIVERSITY OF AGRICULTURE AND TECHNOLOGY**

# University Examinations 2014/2015

**SPECIAL/SUPPLEMENTARY EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE**

# TID 3104: BIOSTATISTICS AND DEMOGRAPHY

**DATE: APRIL, 2015**  **TIME: 3 HOURS**

**Question One**

The following data are the oxygen uptake (mililitres) during incubation of 15 cell suspension.

11.2,14,14.2,13.2,12.8,12.2,14.1,12.2,11.1,13.7,13.3,15.2,13,14.5,12.9

Using this data answer the following questions:

a) Do these data provide sufficient evidence at the 5% level of significance (0.05) that the population means is not 12 ml?

b) What assumptions are necessary?

**Question Two**

a) Explain the assumptions needed in the use of the square test.

b) A sample of 600 college students participated in a study designed to evaluate the level of knowledge of a certain disease. In the table below the students are classified by major field of study and level of knowledge of the group.

|  |  |  |  |
| --- | --- | --- | --- |
| Major  | Good  | Poor | Total  |
| Pre-med | 31 | 91 | 122 |
| Other  | 69 | 409 | 478 |
|  | 100 | 500 | 600 |

Do these data suggest that there is a relationship between knowledge of the group of diseases and major field of study of the college students from which the present sample was drawn?

Let 



**Question Three**

Measurement of gastric secretion of hydrochloric acid (milliequivalent per hour) in 16 normal

subjects and 10 subjects with duodenal ulcer yielded the following results:

normal subjects 6.2,1.9,2.2,0.7,2,3.3,4.1,6.2,6.1,3.5,1.3,1.7,4.6,6.2,6.1

Ulcer subjects

13.8,20.7,16,28.5,29.5,18.3,21,3.2,26.2,12.9

Construct a 95% confidence interval for the ratio of the two population variances.

What assumptions must be met for this procedure to be valid?

**Question Four**

a) Describe the disadvantages of using non-parametric (distribution free) methods.

b) The following data shows the results of test two random samples of patients weights in kgs.

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Group I | 62 | 70 | 65 | 57 | 60 | 66 | 59 | 68 |
| Group II | 72 | 60 | 58 | 67 | 67 | 56 | 69 | 64 |

Test the hypothesis that the two groups of patients differ in weight using the mann-whitney u-statistic.



Note U=10 for 

c) Interpret your results.

**Question Five**

Describe the five important properties of the student t-distribution.

The following data shows the results of repeated (paired) observations of diagnostic blood pressure of a group of patients before and after treatment with drug A.

|  |  |  |
| --- | --- | --- |
|  | Before (DBP) | After (DBP) |
| 1 | 145 | 125 |
| 2 | 160 | 165 |
| 3 | 150 | 115 |
| 4 | 140 | 146 |
| 5 | 175 | 180 |
| 6 | 130 | 120 |
| 7 | 128 | 137 |
| 8 | 155 | 130 |
| 9 | 157 | 165 |
| 10 | 170 | 145 |

Test the hypothesis that the drug A is effective in reducing diagnostic blood pressure using the student t-test.

Note: p=0.05 t(a)=2.26

**Question Six**

a) Discuss and describe the properties of coefficient of correlation.

b) Describe the three types of correlation coefficient.

c) What are the basic assumptions of Pearson’s correlation coefficient?

d) Interpret the meaning of the following values of Pearson’s correlation coefficient.

1. When r=+1
2. When r=-1

 r=0

 r=close to +1 or -1

 r=close to 0