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## JOMO KENYATTA UNIVERSITY

**OF**

**AGRICULTURE AND TECHNOLOGY**

# University Examinations 2012/2013

**FIRST YEAR FIRST SEMESTER EXAMINATION FOR THE DEGREE OF MASTER OF SCIENCE IN APPLIED EPIDEMIOLOGY**

**TID 3103 :** **BIOSTATISTICS**

**DATE: AUGUST 2012 TIME: 3 HOURS**

**INSTRUCTIONS: ANSWER ANY FOUR QUESTIONS.**

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**QUESTION ONE (25 MARKS)**

The table below show body weight and plasma volumes of 8 health men.

|  |  |  |
| --- | --- | --- |
| Subject | Body weight  (kg) | Plasma volume  (litres) |
| 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 58.0 | 2.75 |
| 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 70.0 | 2.86 |
| 3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 74.0 | 3.37 |
| 4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 63.5 | 2.76 |
| 5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 62.0 | 3.62 |
| 6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 70.5 | 3.49 |
| 7 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 71.0 | 3.05 |
| 8 \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | 66.0 | 3.12 |

(a) Formulate a hypothesis.

(b) Use the graph paper provided to draw a scatter diagram of plasma volume and body weight.

(c) Calculate the values of regression parameters B0 and B1 of the linear regression.

(d) Write down the equation of the straight line that best describes the relationship before bodyweight and plasma volume.

**QUESTION TWO (25 MARKS)**

Write an essay on the topic “field sampling methods”.

**QUESTION THREE (25 MARKS)**

2x4 contingency table testing the dependence/independence of hair colour and sex in humans

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| Hair colour | | | | | |
| Sex | Black | Brown | Blond | Red | Total |
| Male | 32 | 43 | 16 | 9 | 100 |
|  | (29.0000) | (36.0000) | (26.6667) | (8.333) |  |
| Female | 55 | 65 | 64 | 16 | 200 |
|  | (58.0000) | (72.0000) | (53.3333) | (16.6667) |  |
| Total | 87 | 108 | 80 | 25 | 300 |

Test whether the frequencies of observations in the rows are independent of those found in the columns.

**QUESTION FOUR (25 MARKS)**

Write an essay on the topic “The normal distribution” using well labeled illustrations and diagrams.

**QUESTION FIVE (25 MARKS)**

The effectiveness of advertising two rival laboratory test kits (Brand X and Brand Y) was compared. Market research at a local shopping centre was carried out, with the participants being shown two rival brands of the test kit (out of 10 with 10 being “definitely going to buy the product”). Half of the participants gave ratings for one of the kits, the other half gave ratings for the other product. Test if there is a significant difference between the ratings given to each kit.

|  |  |  |  |
| --- | --- | --- | --- |
| Brand X | | Brand Y | |
| Participant | Rating | Participant | Rating |
| 1 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (3) | 1\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (9) |
| 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (4) | 2 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (7) |
| 3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (2) | 3 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (5) |
| 4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (6) | 4 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (10) |
| 5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (2) | 5 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (6) |
| 6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (5) | 6 \_\_\_\_\_\_\_\_\_\_\_\_\_\_ | (8) |

**QUESTION SIX (25 MARKS)**

Describe the measures of dispersion and measures of central tendency using relevant examples and illustrations.