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**UNIVERSITY EXAMINATION 2016/2017**

**SCHOOL OF PURE AND APPLIED SCIENCE**

**DEPARTMENT OF PHYSICAL AND MATHEMATICAL SCIENCES**

**BBM/BCOM/BEDA/BEDS**

**VIRTUAL VARSITY**

**UNIT CODE: BMA3102 UNIT TITLE: BUSINESS STATISTICS II**

**DATE: APRIL 2017 MAIN EXAM TIME**: **2 HOURS**

**Instructions:**

* **Answer Question ONE (Compulsory) and ANY other TWO questions**
* **All Working Must be clearly shown**

**QUESTION ONE (30 marks)**

1. Define the following terms used business statistics.
2. Sample (2 Marks)
3. Sampling (2 Marks)
4. Population (2 Marks)
5. Briefly explain four qualities of a good estimator (4 Marks)
6. A study by the Coca-Cola Company showed that the typical adult Kenyan consumes 18 gallons of Coca-Cola each year. According to the same survey, the standard deviation of the number of gallons consumed is 3.0. A random sample of 64 college students showed they consumed an average (mean) of 17 gallons of Coca-Cola last year. At the 0.05 significance level, can we conclude that there is a significance difference between the mean consumption rate of the college students and the other adults? (10 Marks)
7. A group of 10 accountancy students are tested in Quantitative Techniques (Q.T.) and Law II. Their performance in the two examinations is as follows:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Student | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 |
| Q.T. | 63 | 52 | 56 | 71 | 63 | 39 | 42 | 56 | 77 | 63 |
| Law II | 62 | 81 | 63 | 50 | 72 | 55 | 55 | 67 | 64 | 87 |

**Required:**

Calculate the rank correlation coefficient and hence comment briefly on the value obtained (10 Marks)

**QUESTION TWO**

1. Explain the difference between the paired t-test and the two-sample t-test (4 Marks)
2. Cross Lines Group (CLG) has two factories in different parts of the country. Their Resources, including the labour force skills are regarded as identical and both factories were built at the same time. A random sample of output data during a given period has been taken from each factory and converted to standard hours of output per employee. The data are given below:

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Factory 1 | 42 | 50 | 43 | 39 | 41 | 49 | 52 | 41 | 46 | 48 |
| Factory 2  | 39 | 45 | 36 | 42 | 52 | 37 | 43 | 41 | 40 | 39 |

You are given that for factory 1 mean = 45.1 and variance = 20.10 and that for factory 2 mean = 41.4 and variance = 21.16.

Required:

1. Test the hypothesis that the mean of standard hours for employees in the two factories is the same. (2 Marks)
2. Comment briefly on the conditions of the test and interpret the outcome. (4 Marks)

**QUESTION THREE**

1. Mr. X would like to carry-out a study on the distribution of a certain medicinal tree species that in found in Kenyan forests. From the past records, he has knowledge that the species is found in almost all the forests in the country. He however feels that there are several constraints that may hinder him from carrying out the study in all the forests. Briefly explain any five reasons why the researcher (Mr. X) would prefer to sample and not take the whole population. (10 Marks)
2. A bank wishing to determine the average amount of time a customer must wait to be served took a random sample of 100 customers and found that the mean waiting time was 7.2 minutes. Assuming that the population standard deviation is known to be 15 minutes, find the 90% confidence interval estimate of the mean waiting time for all the bank’s customers. (6 Marks)
3. Distinguish between “point estimation” and “interval estimation” (4 Marks)

**QUESTION FOUR**

1. What is regression analysis (2 Marks)
2. Explain any two applications of regression analysis in the business society today (4 Marks)
3. Abdi Yusuf is an industrial location analyst. He is interested in finding out how the sizes of population in different Counties within the country affect the output of hides and skins. The following array of data has being compiled from the statistical abstracts obtained from the country’s Central Statistical Bureau.

|  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| County | **Marsabit** | **Wajir** | **Meru** | **Kitui** | **Machakos** | **Taita** | **Kajiado** | **Eldoret** | **Siaya** |
| **Population (‘000’ people)** | 23 | 21 | 10 | 51 | 12 | 69 | 23 | 16 | 10 |
| **Annual output (‘000’ metric Tonnes)** | 3 | 1 | 8 | 7 | 2 | 6 | 5 | 5 | 2 |

**Required:**

1. Identify the response and the explanatory variables from the above data (4 Marks)
2. What is the Regression Equation that explains how the output in hides and skins changes with size of population? 8 Marks
3. Briefly comment on the equation in (ii) above (2 Marks)

**QUESTION FIVE**

1. Define the following terms used in business statistics:
2. Null hypothesis (2 Marks)
3. Alternative hypothesis (2 Marks)
4. Two companies A and B have recently conducted aggressive advertising campaigns in order to maintain and possibly increase their respective shares of the market for a particular product. These two companies enjoy a dominant position in the market. Before advertising campaigns began, the market share for company A was 45% while company B had a market share of 40%. Other competitors accounted for the remaining market share of 15%. To determine whether these market shares changed after the adverting campaigns, a marketing analyst solicited the preferences of a random sample of 200 consumers of this product. Of the 200 consumers, 100 indicated a preference for company A’s product, 85 preferred company’s B product and the remainder preferred one or another of the products distributed by other competitors. Conduct a test to determine at the 5% level of significance, whether the market shares have changed from the levels they were at before the advertising campaigns occurred. (16 Marks)