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**UNIVERSITY EXAMINATION 2016/2017**

**SCHOOL OF PURE AND APPLIED SCIENCES**

**DEPARTMENT OF PHYSICAL SCIENCES**

**BBM/BCOM/BEDS**

 **VIRTUAL CAMPUS**

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

**DATE: DECEMBER 2016 MAIN EXAM TIME**: **2 HOURS**

***Instructions:***

* ***Answer Question One (COMPULSORY) and ANY other TWO questions***
* ***All workings Must be clearly shown***

***QUESTION ONE (30MARKS)***

1. Given two samples A and B of 100 and 400 items respectively, they have the means  = 7 ad = 10 and standard deviations of 2 and 3 respectively. Construct confidence interval at 70% confidence level? (6 Marks)
2. Briefly discuss any three reasons why researchers sample and not take the whole population. (6 Marks)

1. In a beauty competition, two assessors were asked to rank the 10 contestants using the professional assessment skills. During the assessment, the marks awarded by each assessor to the contestants are shown in the table below.

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **Contestants** | **A** | **B** | **C** | **D** | **E** | **F** | **G** | **H** | **I** | **J** |
| **1ST Assessor** | 92 | 82 | 60 | 87 | 72 | 60 | 52 | 50 | 47 | 59 |
| **2ND Assessor** | 67 | 88 | 58 | 80 | 69 | 77 | 58 | 60 | 32 | 54 |

1. Assign the ranks to these scores and hence or otherwise find the rank correlation coefficient (6 Marks)
2. Briefly comment on the value obtained (6 Marks)
3. Explain what is meant by the following terms as used in statistical inference:
4. Statistical hypothesis; (2 Marks)
5. Test of a hypothesis; (2 Marks)
6. Type I error; (2 Marks)
7. Type II error; (2 Marks)
8. Level of significance (2 Marks)

**QUESTION TWO (20 MARKS)**

A development economist would like to investigate if there is any relationship between per capita incomes (in US Dollars) and the percentage of labour force employed in agriculture within fifteen developing countries in *2015*

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Country | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 |
| Per capita Income (Hundreds of US $) (Y) | 6 | 8 | 8 | 7 | 7 | 12 | 9 | 8 | 9 | 10 | 10 | 11 | 9 | 10 | 11 |
| Agricultural labour force(millions) | 9 | 10 | 8 | 7 | 10 | 4 | 5 | 5 | 6 | 8 | 7 | 4 | 9 | 5 | 8 |

**Required:**

1. Plot a scatter diagram of this data (6 Marks)
2. Determine the coefficient of correlation of this data and comment on your value (8 Marks)
3. Calculate the equation of the regression of Yi on Xi. Briefly comment on your answer (6 Marks)

**QUESTION THREE (20 MARKS)**

1. Distinguish between ‘point estimation’ and ‘interval estimation’ giving an example in each case (6 Marks)
2. Suppose the Nation TV network is considering replacing one of its prime time dramas with a new family oriented comedy. Before a final decision is made a random sample of 400 prime time viewers is conducted. After seeing a preview of the comedy, 250 indicated that they would watch it.
3. What is the point estimate of the proportion of viewers in the population who will watch the new show? (4 Marks)
4. Develop a 95% confidence interval for the proportion of viewers who will watch the new show (10 Marks)

**QUESTION FOUR (20 MARKS)**

1. Explain the difference between the paired t-test and the two-sample t-test (4 Marks)
2. Trendy Tyres Ltd. has introduced a new brand of tyres which in their advertisements claim to be superior to their only competitor brand. The Roadmaster Tyres. The brand manager of Roadmaster Tyres disputes this claim which he says is an advertisement gimmick. The brand managers of the two companies agree to run a road test for the brands. Ten (10) saloon cars of uniform weight and identical specifications are to be used for the test. Each car is fitted with both brands of tyres: One brand at the front the other brand at the rear. The cars cover a distance of 5,000 kilometers and the trend wear is recorded as follows:

|  |  |  |
| --- | --- | --- |
|  | Trend tyrescentimeters | Roadmaster tyrescentimeters |
| 1 | 1.08 | 1.12 |
| 2 | 1.06 | 1.09 |
| 3 | 1.24 | 1.16 |
| 4 | 1.20 | 1.24 |
| 5 | 1.17 | 1.23 |
| 6 | 1.21 | 1.25 |
| 7 | 1.18 | 1.20 |
| 8 | 1.10 | 1.15 |
| 9 | 1.22 | 1.19 |
| 10 | 1.60 | 1.13 |

**Required:**

1. Determine whether Trendy Tyres Ltd.’s claim is true using α = 0.01 (15 Marks)
2. What are the assumptions you have made in (i) above? (1 Mark)

**QUESTION FIVE (20 MARKS)**

1. In a sample of 200 people where a particular devise was selected, 100 were given a drug and the others were not given any drug. The results are as follows

|  |  |  |  |
| --- | --- | --- | --- |
|  | Drug | No drug | Total |
| Cured | 65 | 55 | 120 |
| Not cured | 35 | 45 | 80 |
| Total  | 100 | 100 |  |

Test whether the drug will be effective or not, at 5% level of significance. (12 Marks)

1. Briefly explain the properties of good estimators? (8 Marks)