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Register Number:

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**ST. JOSEPH’S COLLEGE (AUTONOMOUS), BANGALORE-27**

**M.A. ECONOMICS – II SEMESTER**

**SEMESTER EXAMINATION: APRIL 2017**

**EC 8116: Statistical Methods for Economists**

**Time-2 ½ hrs Max Marks-70**

**This paper contains TWO printed pages and THREE parts**

 **PART A Answer any TEN of the following 2 X10=20**

1. What will happen to Standard deviation if the origin of a variable is changed?
2. What is geometric mean?
3. State the difference between a sample and a population.
4. Define a random variable.
5. Give the meaning of the term mesokurtic distribution.
6. Suppose two coins are tossed simultaneously. Compute the probability of (i) one head, (ii) at least one head.
7. Suppose the random variable X takes the values 1, 2 and 3 with probabilities 0.5, 0.4 and 0.1, respectively. Compute the expected value of X.
8. What are independent events?
9. Write the probability density function of a variable x, which follows normal distribution.
10. Differentiate between Type 1 and Type II error.
11. Give the meaning of the term unbiased estimator.
12. What is consistent estimator?

**PART B Answer any TWO of the following 10 X2=20**

1. A) Define Harmonic mean and state its uses.

B) Milk is sold at the rates 8, 10, 12 and 15 rupees per litre in four different months. Assuming that a family spends equal amount on milk in all the four months, find the average price in rupees per month.

1. A random variable X is defined to be the larger of the two values when two dice are thrown or the value if the values are same. Find the probability distribution for X. Find the expected value of X and variance of X.
2. A) Suppose that a random variable X follows a normal distribution with variance 4. It is hypothesized that the unknown mean μ is equal to 10. Suppose that a researcher gets a mean value of 15 from a sample of 25 observations. Using a 5 percent significant test determine whether you will accept or reject the null hypothesis of μ = 10. (Z 0.05 =1.96)

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B) A certain city abolishes its local sales tax on consumer expenditure. A survey of 20 households shows that in the following month, mean household expenditure increased by $ 160 and the standard error of the increase was$ 60. Find out whether the abolition of the tax had a significant impact on household expenditure or not. The critical value of t with 19 degrees of freedom is 2.09 at the 5 percent significance level.

**PART C Answer any TWO of the following 15 X2=20**

1. Ten competitors in a musical test were ranked by three judges A, B and C in the following order

|  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| Ranks by A | 1 | 6 | 5 | 10 | 3 | 2 | 4 | 9 | 7 | 8 |
| Ranks by B | 3 | 5 | 8 | 4 | 7 | 10 | 2 | 1 | 6 | 9 |
| Ranks by C | 6 | 4 | 9 | 8 | 1 | 2 | 3 | 10 | 5 | 7 |

Using rank correlation method, discuss which pair of judges has the nearest approach to common likings in music.

1. A. State and prove Bayes’ theorem.

B. A company has two machines, which produce cupboards. 75% are produced by the new machine and the remaining 25% by the older machine. In addition, the new machine produces 8% defective cupboards. The old machine produces 23% defective cupboards. i. What is the probability that a randomly chosen cupboard produced by the company is defective? ii. Given that a randomly chosen cupboard has been chosen and found to be defective, what is the probability it was produced by the new machine?

1. To assess the teaching quality of class teachers, a random sample of 6 examination marks was selected from each of the three classes. The examination marks of each of the three classes are listed below. Can we infer from this data that there is no significant difference in the examination marks among all three classes? (The table value of F with degrees of freedom (2,15) is 6.359 at 1 percent level of significance)

|  |  |  |
| --- | --- | --- |
| Class 1 | Class 2 | Class 3 |
| 85 | 71 | 59 |
| 75 | 75 | 64 |
| 82 | 73 | 62 |
| 76 | 74 | 69 |
| 71 | 69 | 75 |
| 85 | 82 | 67 |