



Register Number:

DATE: 23-10-2019

ST. JOSEPH'S COLLEGE (AUTONOMOUS), BENGALURU-27
B.A. ECONOMICS – V SEMESTER
SEMESTER EXAMINATION: OCTOBER 2019
ECADE 5618: ADVANCED STATISTICAL METHODS FOR ECONOMISTS

Time-2 ½ hrs

Max Marks-70

This paper contains 3 printed pages and 3 parts

I. Answer any TEN of the following questions

3x10=30

1. What are descriptive and inferential statistics?
2. Mention types of an event.
3. State central limit theorem.
4. To investigate how often families eat at home, Harris surveyed 496 adults living with children under the age of 18. The survey results are shown in the following table.

| No. of meals per week | 0 | 1 | 2 | 3 | 4 | 5 | 6 | 7 or more |
|-------------------------|----|----|----|----|----|-----|-----|-----------|
| No. of survey responses | 11 | 11 | 30 | 36 | 36 | 119 | 114 | 139 |

Compute the probability that the family eats no meals, at least four meals, and 7 or more meals during the week

5. Mention any three characteristics of Poisson distribution.
6. What is conditional probability?
7. A random sample of size 16 has 53 mean. The sum of the squares of the deviations taken from mean is 135. Can this sample be regarded as taken from the population having 56 as mean? By applying 't' test, test a hypothesis about the difference between the sample mean and population mean (for 15 d.f, $t_{0.05} = 2.13$)

8. State the standard normal distribution.

9. A machine is making engine parts with axle diameter 0.7 inch. A sample of 10 parts shows mean diameter 0.742 inch with standard deviation of 0.04. On the basis of this sample by applying 't' test, would you say that the work is inferior? ($t_{0.05} = 2.262$)

10. The manager of the Danvers-Hilton resort hotel stated that the mean guest bill for a weekend is \$600 or less. A member of hotels accounting staff noticed that the total charges for guest bills have been increasing in recent months. The accountant will use a sample of future weekend guest bills to test the manager's claim.

(a) Which form of the hypothesis should be used to test the manager's claim?

$$\begin{aligned} H_0: \mu &\geq 600, \\ H_a: \mu &< 600 \end{aligned}$$

$$\begin{aligned} H_0: \mu &\leq 600 \\ H_a: \mu &> 600 \end{aligned}$$

$$\begin{aligned} H_0: \mu &= 600 \\ H_a: \mu &\neq 600 \end{aligned}$$

(b) What conclusion is appropriate when H_0 can be rejected?

(c) What conclusion is appropriate when H_0 cannot be rejected?

11. What are type I and type II errors?

12. State the meaning of ANOVA?

PART B

II. Answer any TWO of the following questions.

5x2=10

13. From the data below about the treatment of 250 patients suffering from a disease, state whether the new treatment is superior to the conventional treatment.

| Treatment | Favorable | Not favorable |
|--------------|-----------|---------------|
| New | 140 | 30 |
| Conventional | 60 | 20 |

(Given the d.f=1, Chi square 0.05 is 3.84)

14. Over the past 300 days a motorcycle company experienced 54 days with no automobile sold, 117 days with 1 automobile sold, 72 days with 2 automobile sold, 42 days with 3 automobile sold, 12 days with 4 automobile sold and 3 days with 5 automobile sold.

Construct a PDF of a random variable for number of automobile sold during a day.

15. What are the properties of a good estimator?

PART C

III. Answer any TWO of the following questions.

15x2=30

16. To assess the significance of possible variation in performance in a certain test between the convent schools of a city, a common test was given to a number of students taken at random from the fifth class of each of the four schools concerned. Is the variation in the performance of school children attributable to chance or do these sample indicate actual differences in the means? Construct an one way ANOVA.

(The table value of F for $\nu_1=3$ and $\nu_2=16$ at 5% level of significance is 3.24)

| A | B | C | D |
|----|----|----|----|
| 8 | 12 | 18 | 13 |
| 10 | 11 | 12 | 9 |
| 12 | 9 | 16 | 12 |
| 8 | 14 | 6 | 16 |
| 7 | 4 | 8 | 15 |

17. On Thursday morning between 9am to 10 am customers arrive at a mean rate of 1.7 customers per minute at the oxford university credit union and enter the queue for the teller window. Using Poisson formula with $\lambda=1.7$, construct PDF and CDF.

18. Discuss the procedure of hypothesis testing.