

SHRIMATHI DEVKUNVAR NANALAL BHATT VAISHNAV COLLEGE FOR WOMEN  
(AUTONOMOUS)

(Affiliated to the University of Madras and Re-accredited with 'A+' Grade by NAAC)

Chromepet, Chennai - 600 044.

B.Sc.CSc.(AI) - END SEMESTER EXAMINATIONS - APRIL 2025

SEMESTER - IV

**22UAIAT4004 - Allied Statistics - II**

Total Duration : 2 Hrs.30 Mins.

Total Marks : 60

### Section B

Answer any **SIX** questions ( $6 \times 5 = 30$  Marks)

1. Show the statement of the addition, multiplication theorem of two events.
2. Describe about standard normal distribution .
3. List the properties of probability cummulative distribution function.
4. A nutritionist claims that the average daily sodium intake of adults in a certain city is 2,300 mg. A random sample of 15 adults was taken, and their average sodium intake was found to be 2,500 mg, with a standard deviation of 400 mg. Test the nutritionist's claim at a 5% significance level ( $\alpha = 0.05$ ).  
(Given: t tab value =  $\pm 2.145$ )
5. Obtain the mean and variance of binomial distribution .
6. Examine the mean and variance of normal distribution using cumulant generating function.
7. Give the probability density function of Chi square distribution and  $t$  distribution.
8. From the data given below about the treatment of 500 patients suffering from a disease, determine whether the new treatment is superior to the conventional treatment. Solve using Chi-square test

Treatment	No. of patients		Total
	Favourable	Not favourable	
New	280	60	340
Conventional	120	40	160
Total	400	100	500

(Given:  $\chi^2$  tab value = 3.84)

**Contd...**

## Section C

Answer any **THREE** questions ( $3 \times 10 = 30$  Marks)

9. Illustrate the following events with examples.
- (a) Exhaustive events.                      (b) Mutually exclusive event.  
(c) Equally likely event.                      (d) Independent event.
10. Compute mean and variance of Poisson distribution.
11. Examine the properties of normal distribution.
12. Determine the maximum likelihood estimate (*MLE*) of  $\mu$  and  $\sigma^2$  of normal distribution.
13. A researcher wants to determine if there is a significant difference in the average test scores of students from three different teaching methods: Traditional, Online, and Hybrid. The test scores of students from each group are as follows:

<b>Traditional</b>	<b>Online</b>	<b>Hybrid</b>
85	78	90
88	74	92
84	80	94
90	76	88
87	82	91

Use One-Way ANOVA at  $\alpha = 0.05$  to test whether there is a significant difference between the groups.

(Given: f tab value = 3.89)

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