

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)

- Show that, If A and B are independent events then the following are also independents
i) A' and B' ii) A' and B
- A box contains 6 red, 4 white, and 5 black balls. A person draws 4 balls from the box at random. Find the probability that among the balls drawn there is at least one ball of each colour.
- In a binomial distribution consisting of 5 independent trails, Probabilities of 1 and 2 successes are 0.4096 and 0.2048 respectively. Find the parameter 'p' of the distribution.
- State the properties of Normal Distribution.
- If X is Chi - Square variate with $n.d.f.$, then prove that for large n , $\sqrt{2X} \sim N(\sqrt{2n}, 1)$.
- Derive the mean and variance of Exponential Distribution.
- A survey of 800 families with four children each revealed the following distribution:

No.of Boys	0	1	2	3	4
No.of Girls	4	3	2	1	0
No.of Families	32	178	290	236	64

Is this result consistent with the hypothesis that male and female births are equally probable ?

- Forty people were attacked by a disease and only 33 survived. Will you reject that the survival rate, if attacked by this disease is 85% in favour of the hypothesis that is more, at 5% level.

Contd...

Section C

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

9. Two urns contain respectively 10 white, 6 red and 9 black balls and 3 white, 7 red and 15 black balls. One ball is drawn from each urn. Find the probability that i) Both balls are red. ii) Both balls are of same colour.
10. Derive the mean and variance of Poisson Distribution from its Moments Generating Function.
11. If X and Y are two random variables having joint density function:

$$f(x, y) = \begin{cases} (1/8)(6 - x - y); & 0 \leq x \leq 2, 2 \leq y < 4 \\ 0; & \text{Otherwise} \end{cases}$$

Find (i) $P(X < 1 \cap Y < 3)$ ii) $P(X+Y < 3)$ iii) $P(X < 1/Y < 3)$.

12. Students of a class were given an aptitude test. Their marks were found to be normally distributed with mean 60 and standard deviation 5. what percent of student scored
- i) More than 60 Marks ?
ii) Less than 56 Marks ?
iii) Between 45 and 65 Marks ?
13. The following figures related to production in kgs of three varieties A, B, C of wheat sown on 12 plots.

A:	14	16	18		
B:	14	13	15	22	
C:	18	16	19	19	20

Is there any significant difference is the production of the varieties?
