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.DS - END SEMESTER EXAMINATIONS - NOV'2024
SEMESTER - IV
22UDSAT4004 - Allied Statistics - II

Total Duration : 2 Hrs.30 Mins.   Total Marks : 60

Section B

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

1. Explain the following with examples.

   (i) Exhaustive event
   (ii) Mutually exclusive event
   (iii) Equally likely event
   (iv) Independent event

2. Derive mean and variance of Binomial distribution.

3. A continuous random variable has the pdf

   $$f(x) = \begin{cases} 6x(1-x) & 0 \le x \le 1 \\ 0 & Otherwise \end{cases}$$

   Determine the number b such that $P(X < b) = P(X > b)$

4. Derive the MLE of parameter λ of the poisson distribution.

5. Certain refined edible oil is packed in tins holding 16 kg each. The filling machine can maintain this but with a standard deviation of 0.5 kg. samples 25 are taken from the production line. If a sample mean is 16.35 kg. can we be 95% sure that the sample has come from a population of 16 kg tins?

6. State and prove multiplication theorem.

7. Explain briefly about the properties of Normal distribution.

8. Derive Maximum likelihood estimate of Binomial distribution.

Section C

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

9. Define Axiomatic approach of probability also state and prove addition theorem.

10. Derive mean and variance of Poisson distribution.

Contd...

11. A continuous random variable x has the following pdf $f(x) = \begin{cases} 3x^2 & for 0 < x < 1 \\ 0 & Otherwise \end{cases}$

Verify that it is a pdf and evaluate the following probabilities.

(i) $P\left(X \le \dfrac{1}{3}\right)$ (ii) $P\left(\dfrac{1}{3} \le X \le \dfrac{1}{2}\right)$ (iii) $P\left(X \le \dfrac{1}{2} / \dfrac{1}{3} \le X \le \dfrac{2}{3}\right)$

12. obtain the MLE of μ and σ^2 of normal distribution $N(\mu, \sigma^2)$.

13. The following figures relate to production in kgs. of three variables A, B, C of wheat sown on 12 plots.

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

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