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. Statistics - END SEMESTER EXAMINATIONS APRIL - 2024
SEMESTER - V
20USTCT5012 - Stochastic Processes

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

Section B

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

1. Describe the procedure of classification of stochastic processes.
2. State Ergodic method with example.
3. List the postulates of Poisson process
4. Write down the properties of birth and death process
5. Prove that inter arrival time between two successive arrivals of Poisson process is distributed exponentially with mean $1/\lambda$
6. Derive Yule-Furry process.
7. Explain stationary process with example.
8. Discuss arrival pattern and service pattern of waiting lines.

Section C

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

9. State and prove Chapman-Kolmogorov equation.
10. Consider the Markov chain with three states S = {1,2,3} that has the following transition matric
    $$P = \begin{pmatrix} 1/2 & 1/4 & 1/4 \\ 1/3 & 0 & 2/3 \\ 1/2 & 1/2 & 0 \end{pmatrix}$$
    (i) Draw the state transition diagram for this chain
    (ii) If $P(X_1=1)=P(X_1=2)=1/4$, find $P(X_1=3, X_2=2, X_3=1)$
11. Derive the probability law for the Poisson process.
12. Discuss Linear Growth process.
13. Determine stready state probabilities of $(M/M/1) : (\infty/FIFO)$

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