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BT-7/D-18   37003

STATISTICAL MODELS FOR COMPUTER SCIENCE
CSE-405

Time : Three Hours]   [Maximum Marks : 100

Note : Attempt *Five* questions in all, selecting at least *one* question from each Unit. All questions carry equal marks.

Unit I

1. (a)   State and prove Bayes theorem. Also discuss applications of Bayes theorem.   **10**

    (b)   What do you mean by exhaustive events, independent events, mutually exclusive events and equally likely events ? Explain each using suitable examples.   **10**

2. (a)   A coin is tossed until there are either two consecutive heads or tails or the number of tosses becomes five. Describe the sample space along with the probability associated with each sample point, if every sequence of n tosses has probability 2^{-n}.   **10**

    (b)   State and prove multiplication law of probability.   **10**

Unit II

3. (a)   What is distribution function ? State and prove various properties of distribution functions.   **10**

    (b)   Find the first four moments about the origin of binomial distribution.   **10**

4. (a)   In a distribution exactly normal, 7% of the items are under 35 and 89% are under 63. What are the mean and standard deviation of the distribution ?
10

    (b)   What is Gamma Distribution ? Find the m.g.f. and cumulant generating function of gamma distribution.
10

Unit III

5. (a)   What is Poisson Process ? Derive the equation for poisson distribution   **10**

    (b)   What is Renewal Process ? Explain using suitable example in detail.   **10**

6. What do you mean by stochastic processes ? How can you classify stochastic processes ? Explain in detail. **20**

Unit IV

7. (a) Discuss (M|M|1):(infinity|FCFS) queueing model and find expected line length $E(L_S)$ in the system. **10**

   (b) What do you mean by Markov's chain ? Derive Chapman-Komlogorov equation for discrete time Markov process. **10**

8. (a) What do you mean by birth-death processes with and without special case ? **10**

   (b) Describe the M/G/1 syste in detail. **10**