B.Tech III Year 6th Semester

Year (2023)

Branch ECE

Subject : Probability Theory and Stochastic Processes **CT-1**

Time : 1Hour **M.M : 20**

Note : Attempt All question

1. (i) State and prove Baye's Theorem.
   (ii) A missile can be accidentally launched if two relays A and B both have failed. The probabilities of A and B failing known to be 0.01 and 0.03 respectively. It is also known that B is more likely to fail (probability 0.06) if A failed.
   (a) What is the probability of an accidental missile lauch?
   (b) What is the probability that A will fail if B has failed?
   (c) Are events "A fails" and "B fails" statistically independent?
2. Find the moment generating function of a uniform distribution and hence find its mean.
3. Find the mean of Binomial distribution function.
4. The density function of a random variable X is

   $$f(x) = \begin{Bmatrix} 5e^{-5x}, 0 \le x \le \infty \\ 0, \quad elsewhere \end{Bmatrix}$$

   Find: (i) E[X]. (ii) $E[(X-1)^2]$.