Code No: F- 13040/O/BL/AICTE

FACULTY OF ENGINEERING

B.E. (ECE) III - Semester (AICTE) (Backlog) (Old) Examination, August/September 2024

Subject: Probability Theory & Stochastic Process

Time: 3 Hours | Max. Marks: 70

(Missing data, if any, may be suitably assumed)

PART – A

Note: Answer all the questions. **(10 x 2 = 20 Marks)**

1. State Joint Conditional probability
2. Write axiomatic definition of probability.
3. A box contain 4 white balls and 6 red balls .what is the probability that 3 balls are picked at random contain at least two should be red .
4. What is a random variable? Explain the different types of random variable
5. Define correlation and covariance of two random variables X and Y.
6. If X and Y are independent, then show that $E[XY]=E[X]*E[Y]$
7. State Cross correlation
8. What is Gaussian random variable?
9. Write moment generating function.
10. A Continuous RV has a pdf $f(x)=A\ e^{(-x)}$. if $x \geq 0$ .Determine the constant A .

PART – B

Note: Answer any five questions. **(5 x 10 = 50 Marks)**

11. State and prove Baye's theorem.

12. The Probability Density Function (pdf) of a continuous random variable X that can take values between X = 1 and X = 4 is given by $f(x) = k.(1+x)$ Find (i) k (ii) Mean (iii) Variance

13. If a continuous RV 'X' has a pdf $f_X(x) = 2x;\ 0 < x < 1$. Find the pdf of Y such that $Y = 4X^4$.

14. Find the marginal density function of joint density function
    $F_{xy}(x,y) = 8xy$ where $0 \leq x \leq 1\ 0 \leq y \leq 1$

15. Consider a random process $x(t) = A \sin(wt+\phi)$ where A and ϕ are statistical independent and ϕ is uniform in the interval of $(0,2\pi)$ .Is the process WSS or not ?

16. a) Derive the expressions for mean & variance of binomial random variable.
    b) Write short notes on (i) Central limit theorem (ii) State wss process

17. a) State covariance and its properties .
    b) State conditional probability distribution and properties of it

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