

IV SEMESTER B.TECH. END SEMESTER EXAMINATIONS, JUNE 2024 SUBJECT: ENGINEERING MATHEMATICS IV (MAT – 2221) AERONAUTICAL ENGINERRING

Date of Exam: 14-06-2024

Time of Exam: 2:30:00PM to 5:30PM

Max. Marks: 50

Descriptive Questions

Answer all the questions.

 Q.no BL CO Marks 1. A A class consists of 6 girls and 10 boys. If a committee of 3 chosen at random from the class, Find the probability that i. 3 boys are selected. ii. Exactly 2 girls are selected. B Suppose that the 2-dimensional Random variable (x, y) is uniformly distributed over the shaded region R bounded by y = x and y = x² i. Find its pdf ii. Marginal pdf of x and y. C In a class 2% of boys and 3% of girls have blue eyes. There are 30% girls in the class. If a student is selected and having blue eyes; What is the probability that the student is a girl? 2. A If X₁, X₂, X₃ be uncorrelated random variable having the same standard deviation, find Correlation coefficient between X₁ + X₂ and X₂ + X₃ B Traffic control engineer reports that 75% of the vehicles passing through a check post are from within state. What is the probability that fewer than 4 of the 9 are from out of the state. C In a normal distribution 31% of items are less than 45 and 8% are over 64. Find mean and standard deviation of the distribution. 3. A If x̄ is Mean of random sample of size 5 taken from normal distribution of μ = 0 and σ² = 125 Determine so that p(x̄ < c) = 0.9 B Two Independent random variable X and Y having pdf f(x) = e^{-x}: g(y) = 3 cos 3 2e^{-2y} 0≤ x, y ≤ ∞ Find Pdf of (X+Y). C Find MGF of Poisson's distribution, hence find mean and variance of Poisson's distribution. 4 Compute the median for the following data. Class 0-10 10-20 20-30 30-40 40-50 frequency 5 15 25 8 7 6 Cos 3			Allswel all the questions.									
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- B The number of patients recovering in ICU in a Hospital is a random variable with mean 18 and standard Deviation 2.5. Determine the minimum Probability that the number of patients are between 8 and 28. using Chebyshev's inequality.
- CO1 3

C Fit a parabola for the following data.

X	1	2	3	4	5
У	4	3	6	7	11

3 CO4 4

5.

A Obtain the recurrence relation $\frac{d}{dx}\{x^n J_n(x)\} = x^n J_{n-1}(x)$.

- 3 CO5 3
- B Express $f(x) = x^4 + 3x^3 x^2 + 5x 2$ in terms of Legendre polynomial.
- 3 CO5
- C Solve the given equation by power series method $\frac{d^2y}{dx^2} + xy = 0$.

3 CO5 4