

Engineering Mathematics - IV (MAT 2226)
Assignment 3 | Due date: 20th April 2024

Instructions: All students should write their **NAME - REGISTRATION NO - SECTION-ROLL NO** on the top of each sheet. **Weightage: (2+2+ 2+2+2)**

1. If X is uniformly distributed in the interval $[0, 1]$ then find the pdf of $Y = e^{-x}$.
2. Let (X, Y) is a two-dimensional random variable with the pdf
$$f(x, y) = \begin{cases} x + y & 0 \leq x, y \leq 1 \\ 0 & \text{elsewhere} \end{cases}$$
. Find the pdf of $Z = X - Y$.
3. Let \bar{X} be the mean of random sample of size n from $N(\mu, 10)$. Find n such that the probability is approximately 0.95 that the random interval $\left(\bar{X} - \frac{1}{2}, \bar{X} + \frac{1}{2}\right)$ includes μ .
4. An economist wishes to estimate the average family income in a certain population. The population standard deviation is known to be 4,000 Rs and the economist uses the random sample of size $n = 196$. What is the probability that the sample mean will fall within 700Rs of the population mean?
5. According to the ideal grading curve, the percentages of students receiving grades A+, A, B, C, D, E, and F should be, respectively, 0.1, 2.2, 13.6, 34.1, 34.1, 13.6, and 2.3. In an exam with 2000 students, the numbers of students getting grades A+, A, B, C, D, E, and F are, respectively, 5, 45, 290, 640, 720, 282, 18. Test whether the grade distribution fits the ideal grading curve, using a chi-square test at 5% significance level.