COURSE CODE (CREDITS): 25B11MA313(4) MAX. MARKS: 25
COURSE NAME:: PROBABILITY AND STATISTICAL TECHNIQUES
COURSE INSTRUCTORS: MDS MAX. TIME: 1 Hour 30 Minutes

Note: Note: (a) All questions are compulsory.
(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems.
(c) Scientific calculator is allowed.

Q.No	Question	CO	Marks
Q1	For the following data: **Class** 0-10 / 10-20 / 20-30 / 30-40 / 40-50 / 50-60 **Frequency** 5 / 15 / 25 / 35 / 45 / 55 Calculate (a) Mean (b) Variance.	CO-1	6
Q2	Urn A contains 2 white and 5 black balls and urn B contains 3 white and 6 black balls. A balls is taken out at random from urn A and transferred to urn B. Then a ball is drawn at random from urn B. What is the probability that it is a black ball ?	CO-2	3
Q3	It is estimated that 50% of emails are spam emails. Some software has been applied to filter these spam emails before they reach your inbox. A certain brand of software claims that it can detect 99% of spam emails, and the probability for a false positive (a non-spam email detected as spam) is 5%. Now if an email is detected as spam, then what is the probability that it is in fact a non-spam email ?	CO-2	4
Q4	The probability of the occurrence of an event A is 0.7, the probability of the non-occurrence of an event B is 0.5, and that of at least one of A and B not occurring is 0.6. Find the probability that at least one of A and B occurs?	CO-2	4
Q5	A discrete random variable X has the following distribution: **X** 0 / 1 / 2 / 3 **P(X)** 0.1 / 0.3 / 0.4 / 0.2 Find: (a) $E(X)$ (b) $Var(X)$ (c) $P(X \geq 2)$	CO-2	4
Q6	Let X be a random variable with PDF given by $$f(x) = \begin{cases} kx^2, & if\ -1 \leq x \leq 1 \\ 0, & otherwise \end{cases}$$ Find (a) the constant k (b) E(X) (c) Var(X) (d) $P((X \geq 1/2)$.	CO-2	4