SRM Institute of Science and Technology
Department of Mathematics
18MAB204T-Probability and Queueing Theory
Module – I
Tutorial Sheet - 1

S.No.	Questions
	Part – A
1	For a probability distribution of X given below: x: 1, 2, 3, 4 $p(x)$: 4k, k, 2k, 3k Find (i) k (ii) $P\left(\frac{1}{2} < X < 5 \,/\, X > 1\right)$
2	If $f(x) = kx^2, 0 < x < 3$ is a pdf, find (i) the value of k. (ii) $P(X < 1/2)$ (iii) $P\left(\frac{1}{4} < X < \frac{1}{2}\right)$
3	The probability mass function of a R.V X is given by $p(x) = \begin{cases} \frac{1}{4} for\ x = -2 \\ \frac{1}{4}\ for\ x = 0 \\ \frac{1}{2} for\ x = 5 \\ 0, otherwise \end{cases}$ Find (i)$P(\lvert X\rvert \geq 2)$ $(ii) P(0 \leq X \leq 10)$ (iii) Cumulative Distribution Function
4	If the CDF of a Random variable X is $F(x) = \begin{cases} 0, x \leq 0 \\ 2x^2 - x^3, 0 < x < 1 \\ 1, x \geq 1 \end{cases}$ Find the pdf of X and $P\left(\frac{1}{2} < X < \frac{2}{3}\right)$ using pdf and CDF
	Part - B
5	The probability mass function of a random variable X is given below. x: 0, 1, 2 $p(x)$: $3C^3$, $4C - 10C^2$, $5C - 1$ Find (i) the value of C (ii) the largest value of x such that $F(x) < \frac{1}{2}$ (iii) the smallest value of x such that $F(x) \geq \frac{1}{3}$ (iv) $P(X < 2)\ and\ P(1 < X < 2)$
6	A random variable X has the following pdf, where $k > 0$. $f(x) = \begin{cases} 0, x < 1 \\ k(x-1), 1 \leq x \leq 2 \\ k(3-x), 2 \leq x \leq 3 \\ 0, x > 3 \end{cases}$ Find (i) the value of k (ii) CDF of X.
7	The CDF of a discrete RV X is given by $F(x) = \begin{cases} 0, x < 0` \\ \frac{1}{4},\ 0 \leq x < 1 \\ \frac{3}{4}, 1 \leq x < 2 \\ 1, x \geq 2 \end{cases}$ Find (i) the probability distribution of X (ii) $P(0 < X < 2)$
8	A random variable X has the pdf $f(x) = \begin{cases} 2x, 0 < x < 1 \\ 0, elsewhere \end{cases}$ Find (i) $P\left(X < \frac{1}{2}\right), (ii)\ P\left(\frac{1}{4} < X < \frac{1}{2}\right)$ And (iii) $P\left(X < \frac{3}{4} \lvert X > \frac{1}{2}\right)$