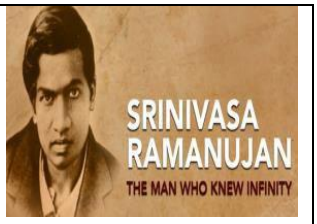
SRM Institute of Science and Technology
Kattankulathur

DEPARTMENT OF MATHEMATICS

18MAB203T Probability and Stochastic Processes

Module – I: Random Variables
Tutorial Sheet - II



Sl.No.	Questions	Answer
	Part – B	
1	The Probability of a component's failure is .05. Out of 14 components what is the probability that (i) atmost three will fail? (ii) at least three will fail?	(i) .9958 (ii) .03006
2	A discrete R. V X has moment generating function $M_X(t)=\left(\frac{1}{4}+\frac{3}{4}e^t\right)^5$ .Find E(X), Var(X) and P(X=2).	(i) 15/4 (ii) 15/16 (iii) .0879
3	In a large consignment of electric bulbs 10% are known to be defective. A random sample of 20 is taken for inspection. Find the probability that (i) all are good bulbs (ii) almost 3 are defective bulbs.	(i) 0.1216 (ii) 0.866
4	The Probability of a bomb hitting a target is 1/5. Two bombs are enough to destroy a bridge. If six bombs are aimed at the bridge. Find the probability that the bridge is destroyed.	0.3446
5	Find the probability that at most 5 defective fuses will be found in a box of 200 fuses if experience shows that 2% of such fuses are defective.	0.781
	Part – C	
6	Out of 2000 families with 4 children each, how many would you expect to have (i) at least 1 boy (ii) 2 boys (iii) no girls	(i) 15/16 (ii) 750 (iii) 125
7	Assuming that the number of cars passing a junction obeys a Poisson distribution. If the probability of no cars pass in 1 minute is 0.20, what is the probability that more than one car pass in 2 minutes?	0.83124
8	In a lot of semiconductor diodes, 1 in 400 diodes is defective. If the diodes are packed in boxes of 100, what is the probability that any given box of diodes will contain (i) no defective (ii) 1 or more defective & (iii) less than 2 defective diodes?	(i) $e^{-0.25}=0.7788$ (ii) 0.2212 (iii) 0.9735
9	If X is a Poisson R.V such that $P(X=2)=9P(X=4)+90P(X=6)$,then find (i) the Variance (ii) SMean, (iii) $E(X^2)$, (iv) $P(X\geq 2)$	(i) 1 (ii) 1 (iii) 2 (iv) $1-2e^{-1}$
10	Suppose you buy a lottery ticket in 50 lotteries in each of which your chance of winning a prize is 1 100. What is the (approximate) probability that you will win a prize (i) at least once (ii) exactly once (iii) at least twice.	λ =0.5 $P(X\geq 1)$ = 0.3935

		$P(X = 1)$ = 0.3037 $P(X \geq 2)$ = 0.0902 I