SRM Institute of Science and Technology
Department of Mathematics
18MAB204T-Probability and Queueing Theory
Module – II
Tutorial Sheet - 4

S.No.	Questions
	Part – A
1	If the moment generating function (MGF) of a RV X is of the form $M_X(t) = (0.4e^t + 0.6)^8$ find (i) $E(X)$ (ii) the MGF of the RV $Y = 3X + 2$.
2	In 100 sets of 10 tosses of an unbiased coin, in how many cases should we expect (i) seven heads and three tails (ii) at least seven heads?
3	The probabilities of a Poisson variate taking the values 3 and 4 are equal. Calculate the probabilities of the variable taking the values 0 and 2.
4	If X is a Poisson variate with $P(X = 2) = \frac{2}{3} P(X = 1)$ find (i) $P(X = 0)$ and (ii) P(X=3).
	Part – B
5	A biased coin was tossed and the experiment was repeated 200 times. The following frequencies of $0, 1, 2, 3, 4, 5$ heads were obtained. Fit a binomial distribution and find the expected frequencies.

Number of heads	0	1	2	3	4	5	Total
Frequencies	12	56	74	39	18	1	200

6	An insurance agent accepts policies of 5 men all of identical age and in good health. The probability that a man of this age will be alive 30 years hence is $2/3$. Find the probability that in 30 years (i) all 5 men (ii)at least one man (iii) at most 3 will be alive.
7	Suppose that the number of telephone calls coming into a telephone exchange between 10 a.m and 11a.m, say X is a Poisson variate with $\lambda_1 = 2$. Similarly calls arriving between 11 a.m and 12 noon, say Y is a Poisson variate with $\lambda_2 = 6$. If X and Y are independent, what is the probability that more than 4 calls come between 10 a.m to 12 noon.
8	A manufacturer of wet grinders wants to buy one-hp motors from a supplier, in a lot of 1000. When fitted to the machine, these motors have the probability of failure 0.001. In a shipment of 1000 motors what is the probability that (i) none are defective (ii) one is defective (iii) at least 2 are defective and (iv) at most three are defective?