Roll No.————————————-, Name————————————-

Department of Mathematics, **1st Class Test - 2015**

Time 55 mins., Max Marks: 10

Subject No. MA20106   Subject Name : Probability & Stochastic Processes

II yr B.Tech. EE/E&ECE/IE/MT

Answer **All** questions

Work out the details for each question as usual in the attached sheets. Write the final answer of each part of the question in the question paper.

1(a) Football clubs F_1 and F_2 are set to play a series of three games against each other to decide the league champion. The probabilities of Club F_1 winning, drawing and losing a game against Club F_2 are $1/2$, $1/8$ and $3/8$ respectively. A club gets 3 points for a win, 1 for a draw and 0 for a loss. What is the probability that (i) Club F_1 wins the league (ii) Club F_2 wins the league, (iii) the league will end in a tie?

1(b) In a production line ICs are packed in vials of 5 and sent for inspection. The probabilities that the number of defectives in a vial is $0,1,2,3$ are $1/3$, $1/4$, $1/4$, $1/6$ respectively. Two ICs are drawn at random from a vial and found to be good. What is the probability that all ICs in this vial are good?

2) Let the r.v. X follows geometric distribution with parameter $p = 0.8$. Find the value of $P(X > 25 | X > 20)$

3) Let X be a random variable with moment generating function

$$M_X(t) = \left(\frac{2e^t}{3 - e^t} \right)^4.$$

Find $P(5 \le X \le 7)$ and $E(X)$.

4) Let the CDF of a mixed type random variable is

$$F(x) \;=\; \begin{cases} 0, & x < 0 \\ \frac{x+1}{2}, & 0 \le x < 1 \\ 1, & x \ge 1 \end{cases}$$

Find $P(X = 1)$, $P(-2 < X \le 1/2)$ and $E(X)$.