Name: En. No.:

Jaypee Institute of Information Technology, Noida

T1 (February 2013)

Sem 4 CSE

Course Name: Probability Theory and Random Processes **Max. Marks: 15**

Course Code: 10B11MA411 **Max. Time: 1 Hr**

Note: All questions are compulsory.

1. The three companies F_1, F_2 and F_3 produce laptops. The production capacity of F_1 is twice that of F_2 while F_2 and F_3 produce equal number of laptops in a given time. The probabilities of producing defective items by companies F_1, F_2 and F_3 are 2 %, 2 % and 4 % respectively. All units produced by these companies are put together in one stockpile and one unit is chosen at random. It is found that this unit is defective. Find the probability that this defective unit comes from company F_3. **(2)**

2. A random variable X can assume values -1, 0 and 1 with equal probabilities. Find the moment generating function and first three central moments of X. **(3)**

3. Prove that Poisson distribution is a limiting case of binomial distribution and state the condition under which it holds. **(3)**

4. Fit a binomial distribution for the following data and hence find the theoretical frequencies: **(3)**

x:	0	1	2	3	4
f:	5	29	36	25	5

5. Determine the value of 'c' that makes the function $f(x,y) = c(x+y)$ a joint probability density function over the range $0 < x < 3$, $x < y < x+2$. Also determine the following: (i) $P(Y > 2)$, (ii) $E(X)$, (iii) $E(Y/X)$. **(4)**

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