## Code No: 113AN

## JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD B.Tech II Year I Semester Examinations, November - 2015

PROBABILITY AND STATISTICS

(Common to ME, CSE, IT, MCT, AME, MIE, MSNT)

Max. Marks: 75 Time: 3 Hours Note: This question paper contains two parts A and B. Part A is compulsory which carries 25 marks. Answer all questions in Part A. Part B consists of 5 Units. Answer any one full question from each unit. Each question carries 10 marks and may have a, b, c as sub questions. Company with the manufacture of the Explain. with suitable examples, discrete and continuous random variables.[2M] Find the first 3 moments about origin from Moment generating function of the b) Binomial distribution. Write the relation between correlation and regression coefficients. Is it possible to c) have two variables x and y with regression coefficient as 2.8 and -0.5? Explain. [2M]can be considered as a joint Is the function f(x)d) 0. Otherwise density function of two random variables X and Y? [3M] Write the standard error of (i) sample mean (ii) difference of two sample means. e) Mean of population = 0.700, mean of the sample = 0.742, standard deviation of f) the Sample = 0.040 sample size = 10. Test the null hypothesis for population Explain queue classification-Kendall's notation. [2M] Write: h) i) the relation between Expected number of customers in the queue and in the system. ii) waiting time of a customer in the queue and in the system iii) the formula for finding the probability that there are more than n customers in the system. [3M] Classify the random processes. **i**) [2M] nagade est locate a se se se esta e a conse y Find the values of x,y,z inorder for 0 = 0 + y to be transition matrix. 1/3 1/4 2

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- Is  $f(x) = \frac{1}{2}x^2e^{-x}$  when  $x \ge 0$  can be regarded as a probability function for a continuous random variable? If, so find Mean and Variance of the random variable.
  - b) Find the moment generating function of the Normal distribution. Show that all odd order moments of a normal distribution are zero.

OR

- In a sample of 1000 cases, the mean of a certain test is 14 and standard deviation 3.a) is 2.5. Assuming the distribution to be normal, find:
  - i) How many students score between 12 and 15?
  - ii) How many score above 18?
  - iii) How many score below 18?
  - Find the Moment generating function of Poisson distribution and find the first 3 moments. **15**+51
- If X and Y are two random variables having joint density function 4.a)

$$f(x,y) = \begin{cases} \frac{1}{8}(6-x-y), 0 \le x \le 2, 2 \le y < 4 \\ 0, \text{ otherwise} \end{cases}$$
Find: (i)  $P\left(\frac{X}{2} \le \frac{1}{2} \le 3\right)$  (ii)  $f_X(x) = f_Y(y)$ .

b) Find the coefficient of correlation between X and Y for the following data. [5+5]

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- 5.a) Joint distribution of X and Y is given by  $f(x, y) = 4xy e^{-(x^2+y^2)}; x \ge 0, y \ge 0$ . Test whether X and Y are independent. Also find conditional density of X given Y=y.
  - b) F or the following data, find equations of the two regression lines.

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Fit a binomial distribution to the following data and test the good ness of fit. 6.a)

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b) A researcher wants to know the intelligence of students in a school. He selected two groups of students. In the first group there 150 students having mean IQ of 75 with a S.D of 15 in the second group there are 250 students having mean IQ of 70 with S.D of 20. Is there a significant difference between the means of two groups? [5+5]