01-Oct-2018
Evening

Roll No.:.....

National Institute of Technology, Delhi

Name of the Examination: B. Tech. (Makeup Exam)

Branch	**: CSE**	**Semester**	**: III**
Title of the Course	**: Probability and Statistics**	**Course Code**	**: MAL241**

Time: 2 Hours **Maximum Marks: 25**

Note1: All Questions are compulsory.

Q. 1. (a) A box contain 4 bad and 6 good tubes. Two are drawn out from the box at a time. One of them is tested and found to be good. What is the probability that the other one is also good.
(b) From 6 positive and 8 negative numbers, 4 numbers are chosen at random (without replacement) and multiplied. What is the probability that the product is positive?

[3+2]

Q. 2. A factory produces a certain a certain type of outputs by three type of machine. The respective daily production figures are:

i. Machine 1 : 3,000 units
ii. Machine 2 : 2,500 units
iii. Machine 3 : 4,500 units

Past experience show that 1% of the output produced by Machine 1 is defective. The corresponding fraction of defectives for the other two machines are 1.2% and 2% respectively. An item is drawn at random from the day's production run and is found to be defective. What is the probability that it comes from the output of machine 2? [5]

Q. 3. Suppose that two dimensional continuous random variable (X,Y) has joint p.d.f. is given by:

$$f(x,y) = 6x^2y \quad 0 < x < 1, 0 < y < 1$$

Find

I. P(X+Y<1)
II. P(X>Y)
III. P(X<1/Y<2)

[1+2+2]

Q. 4. The joint p.d.f. of two random variables X and Y is given by: $f(x,y) = \frac{9(1+x+y)}{2(1+x)^4(1+y)^4}$,

$0 \le x < \infty, \ 0 \le y < \infty$

Find

i. The marginal distribution of X and Y.
ii. The conditional distribution of Y for $X=x$.

[2+3]

Q. 5. You roll a fair six sided die repeatedly until the sum of all numbers rolled is greater than 6. Let X be the number of times you roll the die. Let F be the cumulative distribution function for X. Compute $F(1)$, $F(2)$, and $F(7)$.

[5]