Bachelor level/ B.Sc / 2nd Semester	Full Marks : 60
Time: 3hrs	Pass Marks : 30

Subject : Introduction to probability (STAT325)

Candidates are required to give their answer in their own words as far as practicable. The figures in the margin indicate full marks.

Attempt all question [6×10=60]

1. a) Define classical definition of probability. If A and B are events such that P(A)≠0 and P(B) ≠0 if A is independent of B, then show that B is independent of A.

   b) Sate baye's theorem. In a bolt factory machines A, B, and C manufacturer respectively 25%, 35% and 40% of the total of their output 5, 4, 2 present are defective bolts. A bolt is drawn at random from the product and is found to be defective. What is the probability that it was manufactured by machine A?

2. a) Discuss on probability distribution function. Prove that in binomial distribution mean > variance.
   b) State and prove Boole's inequality.

3. State and prove that multiplicative law of probability. If A and B are not two mutually exclusive events then so that the probability of happening at least one event i.e. A or B is given by P (A∪B) = P (A) + P (B) – P (A∩B).

OR

Define probability mass function. Derive recurrence formula for estimating moment of a poission distribution.

4. Write any three properties of normal distribution. In a normal distribution 31% of the items are under 45 and 8% are over 64. Find the mean and standard deviation of the distribution.

5. If a random variable X has the density function.

$$f(x) = \begin{cases} kx^2 & -3 < x < 3 \\ 0, & Otherwise \end{cases}$$

Find : (i)K (ii) p $(1 \le x \le 2)$ (iii) P(X ≤ 2)   (iv) P (X ≥ 1)

OR

Define moment generating function of uniform distribution. Find mean and variance of hyper geometric distribution.

6. For continuous distribution, prove E(X+Y) = E (X) +E(Y). Define rectangular distribution and also find mean and variance

THE END