Seat No. : _____

JE-106

January-2016

B.Sc., Sem.-I

CC-3 – Paper-101 : Statistics

Time : 3 Hours] **[Max. Marks : 70**

Instructions : (1) **All** questions carry equal marks.

(2) You can use scientific calculator.

1. (a) Define the following terms with illustration :
   (i) Population and its type
   (ii) Parameter and statistic
   (iii) Primary data & Secondary data

   OR

   What do you mean by measures of central tendency ? Explain them in detail. Which is the best among them ? Why ? If $\bar{x} = 8.57$ then find the missing value of x shown by (?) for the following frequency distribution :

x	5	8	9	?	13
f	8	20	30	25	17

   (b) What is the use of tabulation and classification ? How will you prepare a frequency distribution from a given raw data ?

   OR

   Explain Arithmetic Mean, Harmonic Mean, Geometric Mean and median with their merits and demerits.

2. (a) Explain the terms :
   (i) Random Experiment
   (ii) Sample space
   (iii) Mutually exclusive events
   (iv) Equally likely events
   (v) Exhaustive events
   (vi) Elementary events
   (vii) Certain events

   OR

   Define Mathematical probability and then state and prove addition rule of probability of two events.

(b) Define Axiometic approach of probability. If A and B are any two events such that $A \subset B$ then prove that $P(A) \leq P(B)$.

OR

A factory has 3 machines A, B and C producing 1000, 2000 and 3000 bolts per day respectively. Machine A produces 1% defective, Machine B produces 1.5% and Machine C produces 2% defectives. What is the probability that the defective bolt came from Machine A ?

3. (a) What is the demand law ? Explain the limitations of the law of demand. If the demand function and supply function of a commodity are given by :

$D = 19 - 3P - p^2$ and $S = 5P - 1$ respectively then find the equilibrium price and quantity exchanged.

OR

Write short note on Market Equilibrium.

(b) Explain the Elasticity of Demand. If the demand curve is $p = 10.e^{-x/2}$ then prove that the elasticity of demand is $2/x$. Here p is price and x is demand.

OR

Explain the relationship between the elasticity of demand, average revenue and marginal revenue. Given the demand curve is $p = 10 - 3x - 2x^2$, find out total revenue and marginal revenue.

4. (a) Define bivariate data and write a short note on scatter diagram.

OR

Define Karl-Pearson's correlation coefficient and also explain all its types with illustrations.

(b) What do you mean by regression ? Derive the equation of line of regression of y on x.

OR

Prove that the correlation coefficient is independent of change of origin and scale but it is not true for the regression coefficients.

5. Give answers in brief :

(i) Give the relation between correlation coefficient and regression coefficients.
(ii) Give the range of correlation coefficients.
(iii) Define field and borel field.
(iv) Why there are two regression lines.
(v) Give two characteristics of an ideal measures of central tendency.
(vi) Give the principle of least square theory for fitting a straight line.
(vii) Find the arithmetic mean of first n natural numbers.