

Seat No. : _____

DI-105
December-2013
B.Sc. Sem.-I
CC-3 : Statistics
(STA-101)

Time : 3 Hours]

[Max. Marks : 70

- Instruction :** (1) All questions are compulsory.
(2) Each question carries equal marks.
(3) Scientific calculator can be used.

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

OR

- (a) 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

- (b) Explain Arithmetic Mean, Harmonic Mean, Geometric Mean and Median with their merits and demerits.

2. (a) Explain the terms :
(1) Random experiment
(2) Sample space
(3) Mutually exclusive events
(4) Equally likely events
(5) Exhaustive events
(6) Elementary events
(7) Certain events

OR

- (a) Define Mathematical probability and then state and prove addition rule of Prob. for two events.

- (b) Define Axiomatic 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

- (b) 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

- (a) Write short note on Market equilibrium.
- (b) Explain elasticity of demand. If the demand curve is $p = 10.e^{-x/2}$ where p is the price and x is the demand then prove that the elasticity of demand is $2/x$.

OR

- (b) Explain the relationship between the elasticity of demand, average revenue and marginal revenue. Given the demand curve : $P = 10 - 3x - 2x^2$, find out total revenue and marginal revenue.

4. (a) Define Bivariate data and write a short note on Scatter diagram.

OR

- (a) 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

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

5. (a) Answer in brief :

- (i) Give the relation between correlation coefficient and regression coefficients.
- (ii) Give the range within which correlation coefficient lies.
- (iii) Define field and Borel field.
- (iv) Why there are two regression lines ?
- (v) Give 3 requisites or characteristics for an ideal measure of central tendency.
- (vi) Explain the principle of least square theory for fitting a straight line.
- (vii) Find the arithmetic mean of first n natural numbers.