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### Class–B.A/ B.Sc (Eco.) (Sem. IV)
### Subject –Quantitative Technique
### Paper- Theory

Time Allowed : 3 Hrs          Maximum Marks :100

**Note :** Use of simple calculator is allowed. Use of statistical table is allowed.

Attempt all questions of Part A, each question carries 2 marks. Attempt four questions selecting one from each of four units. Each question carries 20 marks.
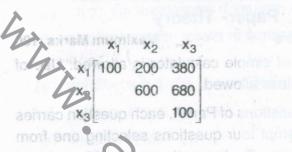
### Section - A

Q1.

(1)   Differentiate between correlation and Regression.

(2)   What do you mean by coefficient of determination.

(3)   Define Standard error.

(4)   What is meant by descrete and continuous random variable.

(5)   Define mutually exclusive and exhaustive events.

(6)   Give the properties of partial and multiple correlation coefficient.

(7)   Differentiate between sampling and non–sampling error.

(8)   What do you mean by logistic regression.

(9)   What is meant by additive law of probability.

(10)  Coefficient of regression for X on Y is 0.53. What will be new regression coefficient if X is changed to X+10 and Y to Y– 5?

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## Unit - I

2. (a) From the following corrected sum of squares and cross product matrix of three variables $x_1, x_2$ and $x_3$

$$\begin{array}{c} \\ x_1 \\ x_2 \\ x_3 \end{array} \begin{array}{ccc} x_1 & x_2 & x_3 \\ \begin{bmatrix} 100 & 200 & 380 \\ & 600 & 680 \\ & & 100 \end{bmatrix} \end{array}$$

$n = 15, \overline{X_1} = 100, \overline{X_2} = 50, \overline{X_3} = 30$.

Find multiple regression of $X_1$ on $X_2$ and $X_3$.

(b) On the basis of given data, calculate $r_{12.3}$. When $r_{12} = 0.8$, $r_{13} = 0.6$ and $r_{23} = 0.4$.

OR

3. Fit the exponential trend $Y = ab^x$ to the following data.

| Year | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|------|------|------|------|------|------|------|------|
| Value | 12 | 14 | 15 | 18 | 22 | 27 | 40 |

## Unit II

4. (a) State and prove multiplication theorem of probability.

(b) In a certain college, the students engage in various sports in the following proportions:

(a) Football (60% of all students)

(b) Basketball (50% of all students)

(c) Both football and basketball (30% of all students)

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If a student is selected at random. What is the probability that he will

(i)    Play football or basket ball

(ii)   Play neither sport.

### OR

5. (a)   A factory has three machines that produce plastic gears. The output of machines $E_1$ is 2 times the output of machine $E_2$ and machine $E_3$. The probability of producing defective gears by machine $E_1$, $E_2$ and $E_3$ are 0.04, 0.02 and 0.06 respectively. The output of three machines is fed into a stock - file and is found to be defective. Find the probability that it was produced by machine $E_3$.

(b)   Explain Baye's theorem in detail.

### Unit - III

6. (a)   What is expectation of number of failures preceeding the first success in an infinite sequence of independent trials with constant probability of success P in each trial and probability of failure q in each trial.

(b)   A and B throw a dice for a prize of Rs. 9900. A person who will first throw 6 will win the prize. If A starts the throw of dice, find their respective expectations of prize.

### OR

7.   What do you mean by Moment Generating Function. Explain its properties, types and advantage. How is it different from characteristic function.

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## Unit - IV

8. (a) A population consists of five numbers 2,3,6,8,11 consider all possible samples of size two which can be drawn with replacement from their population. Calculate mean and standard error of sample mean and relate it to population mean.

   (b) Compare and contrast complete enumeration method and sampling method.

### OR

9. Explain various techniques of sampling along with their merits and demerits. Which sampling technique is better and why?

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