# LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

**M.A.** DEGREE EXAMINATION – **ECONOMICS**

FIRST SEMESTER – **APRIL 2014**

**EC 1809 - MATHS & STATISTICS FOR ECONOMISTS**

Date : 07/04/2014 Dept. No. Max. : 100 Marks
Time : 09:00-12:00

## Part – A

**Answer any FIVE questions.** **(5 x 4 = 20 marks)**

1. What is meant by order of a matrix? Give examples for row and column vector.
2. Define scalar matrix.
3. Write a short note on partial derivative.
4. If AR is Rs. 30 and the price elasticity is 4, find MR.
5. Find the maxima and minima for the function $Y = x^3 - 3x + 1$.
6. What is meant by deseasonalisation?
7. A coin is tossed six times. What is the probability of obtaining four or more heads?

## Part – B

**Answer any FOUR questions.** **(4 x 10 = 40 marks)**

8. Bring out the role of mathematics in economics.
9. If $A = \begin{bmatrix} 3 & 1 \\ -1 & 2 \end{bmatrix}$, show that $A^2 - 5A + 7I = 0$.
10. If $z = x^3 + y^3 - 3xy$, find first, second order partial derivative and also verify that $\frac{\partial^2 z}{\partial x \partial y} = \frac{\partial^2 z}{\partial y \partial x}$.
11. Compute Marginal Utility of x at x = 1 and y = 2 for the Total Utility Function $U = 3x^2y + 4xy^2 + 2x + 2y$.
12. Find out coefficient of correlation in the following case.

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Height of father (in inches): | 65 | 66 | 67 | 67 | 68 | 69 | 71 | 73 |
| Height of son (in inches): | 67 | 68 | 64 | 68 | 72 | 70 | 69 | 70 |

13. Explain the properties of normal distribution.
14. A dice is tossed 120 times with the following results

| Number turned up: | 1 | 2 | 3 | 4 | 5 | 6 | Total |
|---|---|---|---|---|---|---|---|
| Frequency : | 30 | 25 | 18 | 10 | 22 | 15 | 120 |

(Table value of $\chi^2$ 0.05 for 5 d.f = 11.07) Test the hypothesis that the dice is unbiased one.

## Part – C

**Answer any TWO questions.** **(2 x 20 = 40 marks)**

15. Solve the following equation using matrix inversion technique.

$2x - 4y + 3z = 3$

$4x - 6y + 5z = 2$

$-2x + y - z = 1$

16. Given the following Revenue (R) and Cost (C) functions for a firm $R = 20q + q^2$ and $C = q^2 + 8q + 2$, find the equilibrium level of output, price, total revenue, total cost and profit.

17. From the following data obtain the two regression equations and calculate the correlation coefficient

| X: | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|
| Y: | 9 | 8 | 10 | 12 | 11 | 13 | 14 | 16 | 15 |

Estimate the value of Y which should correspond on an average to X= 6.2.

18. To assess the significance of possible variation in performance in a test between the grammar schools of a city, a common test was given to a number of students taken at random from the senior fifth class of each of the four schools concerned. The results are given below. Make an analysis of variance.

| Schools (Samples) | | | |
|---|---|---|---|
| A | B | C | D |
| 8 | 12 | 18 | 13 |
| 10 | 11 | 12 | 9 |
| 12 | 9 | 16 | 12 |
| 8 | 14 | 6 | 16 |
| 7 | 4 | 8 | 15 |

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