LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – NOVEMBER 2015

EC 1809 - MATHS & STATISTICS FOR ECONOMISTS

Date : 11/11/2015 Dept. No. Max. : 100 Marks
Time : 01:00-04:00

PART A

Answer any **FIVE** of the following; (5x4=20marks)

1. Define Partitioned Matrix. Write the formula for finding A^{-1} using Partitioned Matrix.
2. Prove that $MR = AR\left[1-\frac{1}{e}\right]$.
3. A) Define Eigen values. (2 marks)

   B) Calculate the Eigen values for the following matrix A = $\begin{bmatrix} 6 & 3 \\ 3 & -2 \end{bmatrix}$. (2 marks)
4. Write the conditions for Constraint Optimization using the Hessian determinant process.
5. The simple correlation coefficients between two variables out of three is given as r_{12} = 0.86 $r_{13} = 0.65$ $r_{23} = 0.72$. Find $r_{12.3}$ and $r_{23.1}$.
6. 8 coins are tossed at a time, 256 times. Find the expected frequencies of getting a Head and tabulate the result obtained. Also fit the distribution.
7. State the procedure for Testing of Hypothesis.

PART B

Answer any **FOUR** of the following; (4x10=40marks)

8. Examine the significance of Partial differentiation in Economic analyses.
9. Determine the total demand for industries 1, 2 and 3, given the matrix of technical coefficients A and the final demand vector B below:

Output industry

$$A=\begin{array}{c} \\ \\ \end{array}\begin{array}{c} \quad\;\; 1 \qquad 2 \qquad 3 \\ \begin{bmatrix} 0.2 & 0.3 & 0.2 \\ 0.4 & 0.1 & 0.3 \\ 0.3 & 0.5 & 0.2 \end{bmatrix} \end{array}\begin{array}{l} \\ 1 \\ 2\ \text{Input industry} \\ 3 \end{array} \qquad B=\begin{bmatrix} 150 \\ 200 \\ 210 \end{bmatrix}$$

10. A monopolist produces two products Q_1 and Q_2 jointly. His Total Cost function is given by: TC = $Q_1^2 + \frac{1}{2}Q_2^2 + Q_1Q_2 + 10$ and his AR function is given by

    $P_1 = 40 - 2Q_1$

    $P_2 = 34 - 3Q_2$

    Find the profit maximizing output levels Q_1 and Q_2 and the maximum profit.

11. Maximize the following Utility function subject to the given budget constraint:

    $U= x^{0.6}\ y^{0.25}$ given $P_x= 8$, $P_y=5$ and B=680
12. Briefly explain the Analysis of Time Series.
13. Using the following data, obtain the regression equations of Y on X:

X:	16	21	26	23	28	24	17	22	21
Y:	33	38	50	39	52	47	35	43	41

14. The following table gives the Yield on 15 sample fields under three varieties of seeds (viz: A, B,C):

A	B	C
20	18	25
21	20	28
23	17	22
16	25	28
20	15	32

Test at 5% level of significance whether the average yields of land under different varieties of seeds show significant differences. (Table value of F at 5% level of V_1=2 and V_2=12 is 3.88)

PART C

Answer any **TWO** of the following; (2x20=40marks)

15. In a three economy model, we have the following macro-economic relations:

Economy I

$Y_1 = C_1 + (X_1 - M_1) + 1200$

$C_1 = 0.7 \ Y_1 C_2 = 0.8 \ Y_2$

$M_1 = 0.25 \ Y_1 M_2 = 0.15 \ Y_2$

$X_1 = 0.1 \ Y_2 + 0.08 Y_3 X_2 = 0.09 \ Y_1 + 0.1 Y_3$

Economy II

$Y_2 = C_2 + (X_2 - M_2) + 2000$

Economy III

$Y_3 = C_3 + (X_3 - M_3) + 1600$

$C_3 = 0.75 \ Y_3$

$M_3 = 0.15 \ Y_3$

$X_3 = 0.05 \ Y_1 + 0.12 Y_2$

Where, Y, C, X and M represent National Income, Consumption, Exports and Imports respectively Find the equilibrium National Income of all the three economies using Cramer's' rule.

16. A producer has the possibility of discriminating between the domestic and foreign markets for a product where the demands, are:

Q_1=21-0.1P_1

Q_2=50-0.4P_2

Total costs=2000+10Q, respectively, where Q=Q_1+Q_2. What price will the producer charge in order to maximize profits:

a) With discrimination between markets.
b) Without discrimination.
c) Compare the profit differential between discrimination and non-discrimination.

17. a) Ten competitors in a beauty contest are ranked by three judges in the following order:

I[st] Judge	1	4	8	9	6	10	7	3	2	5
2[nd] Judge	4	8	7	5	9	6	10	2	3	1
3[rd] Judge	6	7	1	8	10	5	9	2	3	4

Use correlation coefficient to determine which pair of judges has the nearest approach to common taste in beauty. [10marks]b) In an Industry, 200 workers, employed for a specific job, were classified according to their performance and training received / not received to test independence of a specific training and performance. The data is summarized as follows:

	PERFORMANCE		Total
	GOOD	NOT GOOD	

TRAINED	100	50	150
UNTRAINED	20	30	50
	120	80	200

Use χ^2 test of independence at 5% level of significance and write your conclusion.
(Table value of χ^2 at 1 d:f . 5% = 3.84) (10 marks)

18. A) Define the pdf of Normal distribution. (2 marks)

B) Examine the various properties of Normal distribution. (10 marks)

C) The mean and standard deviations of the wages of 6000 workers engaged in a factory are Rs 1200 and Rs 400 respectively. Assuming the distribution to be normally distributed, estimate:

i) Percentage of workers getting wages above Rs.1600.

ii) Number of workers getting wages between Rs.600 and Rs.900.

iii) Number of workers getting wages between Rs.1100 and Rs.1500.

The relevant values of the area table (under the normal curve) are given below:

Z :	0.25	0.5	0.6	0.75	1.00	1.25	1.5
Area:	0.0987	0.1915	0.2257	0.2734	0.3413	0.3944	0.4332

(8marks).

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