LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034



**M.A.** DEGREE EXAMINATION - **ECONOMICS**

FIRST SEMESTER – **NOVEMBER 2012**

# EC 1809 - MATHS & STATISTICS FOR ECONOMISTS

Date : 09/11/2012 Dept. No. Max. : 100 Marks

Time : 1:00 - 4:00

**PART - A**

Answer any FIVE Questions (5x4=20marks)

1. State any four properties of determinant of a Matrix.
2. Define Partitioned Matrix. Write the formula for finding A-1 using Partitioned Matrix.
3. Prove that .



1. The simple correlation coefficients between two variables out of three is given as r12 = 0.86 r13 = 0.65 r23 = 0.72. Find r12.3 and r23.1.
2. State the condition for unconstrained optimization with two independent variables.
3. Define Eigen values. Calculate the Eigen values for the following matrix A = .



1. State the pdf of Binomial Distribution by highlighting its properties.

**PART – B**

Answer any FOUR Questions (4x10=40marks)

1. Solve the following National income models using Cramers’ rule:

Y = C + I0 + G0

C = α + β(Y-T) (α > 0; 0 < β < 1)

T = γ + δY (γ > 0; 0 < δ < 1)

1. Prove that CES production function being linearly homogenous satisfies Euler’s Theorem.
2. Briefly explain the various applications of derivatives in economics.
3. A firm under perfectly competitive situation produces the products Q1 and Q2 jointly and the Total Cost function is given by:

C =Q12 + Q22 + 2Q1Q2 + 20



If the price of Q1 and Q2 are 20 and 24 respectively, find:

1. Profit maximizing Output.
2. Maximum Profit.
3. The following table gives the yield of 15 sample fields under three varieties of seeds A, B and C:-

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

Test the 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 for V1=2 and V2=12 is

3.88)

1. Given below are the figures of production (in Lakh Kg) of a sugar factory:

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| Year | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 | 2011 |
| Production | 40 | 45 | 46 | 42 | 47 | 50 | 46 |

Fit a Linear Trend line by the Least Square method and tabulate the trend values.

1. 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 χ2 test of independence at 5% level of significance and write your conclusion.

(Table value of χ2 at 1 d:f ; 5% = 3.84)

**PART – C**

Answer any TWO questions (2x20=40 marks)

1. Find the consistent level of sectoral output in dynamic Input-Output frame work given:

A= B= G= F=



1. Given the Utility function U = 2 + X + 2Y + XY and the budget constraint 4X + 6Y = 94, Find out the equilibrium purchase of X and Y in order to maximize the Total Utility.
2. Following is the distribution of students according to their heights and weights:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| Height  in inches | Weight in pounds | | | |
| 90-100 | 100-110 | 110-120 | 120-130 |
| 50-55 | 4 | 7 | 5 | 2 |
| 55-60 | 6 | 10 | 7 | 4 |
| 60-65 | 6 | 12 | 10 | 7 |
| 65-70 | 3 | 8 | 6 | 3 |

Calculate:-

1. The coefficients of regression.
2. The two regression equations.
3. The correlation coefficient.
4. (a) State the various properties of Normal distribution.

(b) 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:

1. Percentage of workers getting wages above Rs.1600.
2. Number of workers getting wages between Rs.600 and Rs.900.
3. 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 |