LOYOLA COLLEGE (AUTONOMOUS), CHENNAI – 600 034

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

FIRST SEMESTER – **NOVEMBER 2019**

PEC 1504 – MATHEMATICS AND STATISTICS FOR ECONOMICS

Date: 07-11-2019 Dept. No. Max. : 100 Marks

Time: 01:00-04:00

PART–A

Answer any FIVE questions in about 75 words each (5x4=20)

1. What are partitioned matrices? Give an example.
2. Find the Total Differential of $Z = x^5y^4 – x^4y^5$
3. Distinguish between homogeneous and non-homogeneous equations with suitable examples.
4. Show that $Z = x^2 + xy – y^2$ has a saddle point at $x = y = 0$.
5. Distinguish between difference equations and differential equations.
6. State the properties of a Good Estimator.
7. A coin was tossed 400 times and the head turned up 216 times. Test the hypothesis that the coin is unbiased. (5% level of significance = 1.96 S.E)

PART–B

Answer any FOUR questions in about 300 words each (4x10=40)

8. Explain the uses of Poisson distribution in practical situations.
9. Find the general solution of the differential equation: $x^5\frac{dy}{dx} = -y^5$.
10. Check the following game for saddle point and determine the value of the game

-15	22	10	8	6	-14	-8
-3	4	-6	0	-4	22	-10
-2	3	4	10	-1	0	-6

11. Determine maxima, minima or saddle point for $Z = y^3 + y^2 – xy + x^2 + 4$.
12. Show that $|A| = 0$ is a necessary condition for the linear homogeneous equations to have a non-trivial solution.
13. Suppose $f(x, y) = 2x + 3y$ and $g(x, y) = x^2 + y^2 \leq 2$. Show that f and g satisfy the Kuhn-Tucker sufficiency conditions and find the maximum of f(x, y).
14. Derive the Domar's macro model using differential equations.

PART–C

Answer any TWO questions in about 1200 words each **(2x20=40)**

15. Solve graphically:

Maximize $f = 2x + 5y$

Subject to $x + 4y \leq 24$

$3x + y \leq 21$

$x + y \leq 9$

$x, y \geq 0$

16. Strength test carried out on samples of two yarns spun to the same count gave the following results:

	Sample size	**Sample Mean**	**Sample variance**
Yarn A	4	52	42
Yarn B	9	42	56

The strengths are expressed in pounds. Is the difference in mean strengths significant of the sources from which the samples are drawn? ($\nu = 11$, $t_{0.05} = 1.796$)

17. Find the maximum or minimum of the function $Z = xy$ subject to the constraint $2–x–2y = 0$ using a Bordered Hessian.
18. Derive the conditions for maxima and minima in case of two independent variables. Compare and contrast the optimization conditions between one variable and two variables.

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