STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted during the academic year 2004–05 & thereafter)

SUBJECT CODE : EC/PE/MM24

M. A. DEGREE EXAMINATION, APRIL 2007
BRANCH III – ECONOMICS
SECOND SEMESTER

COURSE : ELECTIVES
PAPER : MATHEMATICAL METHODS - II
TIME : 3 HOURS **MAX. MARKS : 100**

SECTION – A

ANSWER ANY FIVE QUESTIONS. **(5 X 8 = 40)**

1. Explain the properties of Determinants.
2. (a) Define Diagonal, Identity and Idempotent matrices.

   (b) Find the rank of the matrix

$$A = \begin{bmatrix} 1 & 3 & 4 & -2 \\ 2 & 6 & 8 & -4 \\ 3 & 0 & 3 & 3 \end{bmatrix}$$

3. Explain the Technological coefficient matrix.
4. If β =4 and C = 0.8, Find the time path of Y in Samuelson's trade cycle model.
5. Solve the following LPP with the help of Graphical Method

   Maximise $f = 2x + 5y$

   Subject to $x + 4y \leq 24$

   $3x + y \leq 21$

   $x + y \leq 9$

   x and $y \geq 0$

6. Briefly explain the basic elements of Game Theory.
7. (a) Bring all the rules of transformation to obtain the Dual

   (b) Obtain dual of the following LPP

   Maximise $F = 2x_1 + 3x_2$

   Subject to $x_1 + 3x_2 \leq 12$

   $2x_1 + x_2 \geq 6$

   $x_1 + 5x_2 = 10$

   $x_1, x_2 \geq 0$

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SECTION – B

ANSWER ANY THREE QUESTIONS

(3 X 20 = 60)

8. (a) Find the inverse of the matrix

$$A = \begin{bmatrix} 1 & 4 & 3 \\ 4 & 2 & 1 \\ 3 & 2 & 2 \end{bmatrix}$$

(b) Solve the following equation by Cramer's Rule

$$x - 2y + 3z = 1$$
$$3x - y + 4z = 3$$
$$2x + y - 2z = -1$$

9. Given $A = \begin{bmatrix} 0.1 & 0.3 & 0.1 \\ 0 & 0.2 & 0.2 \\ 0 & 0 & 0.3 \end{bmatrix}$

and final demands are F_1 F_2 & F_3. Find the output levels consistent with the model. What will be output levels if $F_1 = 20$, $F_2 = 0$ & $F_3 = 100$

10. (a) Solve $Y_t = 2y_{t-1} + t$
(b) Explain the cobweb model by using difference equation

11. Maxmise $z = x_1 + 4x_2 + 5x_3$

Subject to the constraints

$3x_1 + 3x_3 \leq 22$
$x_1 + 2x_2 + 3x_3 \leq 14$
$3x_1 + 2x_2 \leq 14$
$x_1 \geq 0, x_2 \geq 0, x_3 \geq 0$

12. (a) Explain Two Person Zero sum game

(b) Solve the following game $\begin{bmatrix} 3 & -5 & -4 \\ -2 & 1 & 2 \\ 1 & 1 & 2 \end{bmatrix}$

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