STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted during the academic year 2009–10)

SUBJECT CODE : EC/PE/MM23

M. A. DEGREE EXAMINATION, APRIL 2010
BRANCH III – ECONOMICS
SECOND SEMESTER

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

SECTION – A

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

1. a) Distinguish between singular matrix and non-singular matrix.
   b) Given $A = \begin{bmatrix} 8 & 3 & 2 \\ 6 & 4 & 7 \\ 5 & 1 & 3 \end{bmatrix}$. Is $[A]$ singular matrix?
2. What are minors and co-factors?
3. Determine the rank of matrix.
$$A = \begin{bmatrix} 5 & -9 & 3 \\ 2 & 12 & -4 \\ -3 & -18 & 6 \end{bmatrix}$$
4. What are the properties of a determinant?
5. Explain the process of finding solution to an open input-output model.
6. Explain Samuelson's Multiplier – acceleration interaction model by using difference equations.
7. Solve the following game.
$$A = \begin{bmatrix} 1 & 7 & 2 \\ 6 & 2 & 7 \\ 5 & 1 & 6 \end{bmatrix}$$

SECTION – B

ANSWER ANY THREE QUESTIONS **(3 X 20 = 60)**

8. a) Given: the IS equation $0.3Y + 100i - 252 = 0$ and
   the LM equation $0.25Y - 200i - 176 = 0$
   Find the equilibrium level of income and rate of interest.
   b) The equilibrium condition for three related markets is given by
   $11P_1 - P_2 - P_3 = 31$
   $-P_1 + 6P_2 - 2P_3 = 26$
   $-P_1 - 2P_2 + 7P_3 = 24$
   Find the equilibrium price for each market by Cramer's Rule.

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9. a) State the Hawkins-Simon conditions.
b) Given a technology co-efficient matrix

$$A = \begin{bmatrix} 0.8 & 0.2 \\ 0.9 & 0.7 \end{bmatrix}$$

Does a solution exist for this system?
c) Given the interindustry transaction demand below:

Sector of Origin	Sector of Destination			Final Demand	Total Demand
	1	2	3		
1	20	60	10	50	140
2	50	10	80	10	150
3	40	30	20	40	130
Value added	30	50	20		
Gross Production	140	150	130		

Find the new level of output if the final demand change to 70 in industry 1, 25 in industry 2 and 50 in industry 3.

10. a) Explain the Cobweb Model by using difference equation.
b) For the data given below, determine
(i) the market price P_t in any time period
(ii) the equilibrium price P_e and
(iii) the stability of the time path

$$Q_{dt} = 180 - 0{,}75\,P_t \qquad Q_{st} = -30 + 0.3\,P_{t-1}$$
$$P_o = 220$$

11. Solve the following LPP by Simplex method

Maximise $Z = 2X_1 + 2X_2 + 3X_3 + 4X_4 + 6X_5$

Subject to $2X_1 + 2X_2 + 1X_3 + 2X_4 + 2X_5 \leq 100$
$2X_1 + 0X_2 + 1X_3 + 1X_4 + 2X_5 \leq 80$
$0X_1 + 1X_2 + 2X_2 + 1X_4 + 2X_5 \leq 150$
$X_1,\ X_2,\ X_3,\ X_4,\ X_5 \geq 100$

12. a) Explain Eigen values with suitable example. (10)
b) Write short notes on (10)
(i) a game (1)
(ii) a strategy (1)
(iii) maximin (1)
(iv) minimax (1)
(v) Two person zero sum game with suitable example (3)
(vi) Dominated strategies with suitable example (3)