

STELLA MARIS COLLEGE (AUTONOMOUS) CHENNAI – 86
(For candidates admitted from the academic year 2011– 2012 & thereafter)

SUBJECT CODE: 11EC/MC/MM24

B. A. DEGREE EXAMINATION, APRIL 2013
BRANCH IV - ECONOMICS
SECOND SEMESTER

COURSE : MAJOR – CORE
PAPER : MATHEMATICAL METHODS FOR ECONOMICS- II
TIME : 3 HOURS **MAX. MARKS: 100**

SECTION – A

ANSWER ALL QUESTIONS. EACH ANSWER NOT TO EXCEED 50 WORDS:
(10 X 2 = 20)

1.If $A = \begin{pmatrix} 2 & 2 \\ 3 & -4 \end{pmatrix}$ and $B = \begin{pmatrix} 0 & -3 \\ 6 & 7 \end{pmatrix}$, Find $4A + 2B$.

2. A costume jeweler makes necklaces x_1 and bracelets x_2 . Necklaces have a profit margin of Rs 32 and bracelets Rs 24. Necklaces take 2 hours for stone cutting, 7 hours for setting and 6 hours for polishing. Bracelets take 5 hours for stonecutting, 7 hours for setting and 3 hours for polishing. The jeweler has 40 hours for stonecutting, 70 hours for setting and 48 hours for polishing. Convert the data to equations and inequalities needed to find the profit maximizing output mix.

3. Give the conditions for multiplication of matrices.

4. Give the transpose of the following matrix $A = \begin{pmatrix} 6 & 7 & 9 \\ 2 & 8 & 4 \end{pmatrix}$

5. What is a symmetric matrix?

6. Find the value of the determinant

$$A = \begin{pmatrix} 1 & 18 & 72 \\ 2 & 40 & 148 \\ 2 & 45 & 150 \end{pmatrix}$$

..2..

7. What are the slack and surplus variables used in the simplex procedure of solving linear programming problem.

8. Check whether saddle point exists for the following pay off matrix.

$$A = \begin{pmatrix} 2 & 1 & 4 \\ -1 & 0 & 6 \end{pmatrix}$$

9. In a zero sum game the pay off matrix of player A is given. Find the pay off matrix of player B

$$A = \begin{pmatrix} 2 & 4 \\ -9 & 5 \end{pmatrix}$$

10. Given the inter- industry transaction demand table below, find the matrix of technical coefficients

Sector of Origin	Sector of destination					
	Steel	Coal	Iron	Auto	Final dd	Total dd
Steel	80	20	110	230	160	600
Coal	200	50	90	120	140	600
Iron	220	110	30	40	0	400
Auto	60	140	160	240	400	1000
Value added	40	280	10	370		
Gross production	600	600	400	1000		

SECTION – B

ANSWER ANY FIVE QUESTIONS. EACH ANSWER NOT TO EXCEED 300 WORDS.

(5 X 8 = 40)

11. If $A = \begin{pmatrix} 1 & 2 & 1 \\ 0 & 1 & -1 \\ 3 & -1 & 1 \end{pmatrix}$ show that $A^3 - 3A^2 - A + 9I = 0$

12. If $A = \begin{pmatrix} 1 & 2 & 3 \\ 1 & 3 & 3 \\ 1 & 2 & 4 \end{pmatrix}$ and $B = \begin{pmatrix} 6 & -2 & -3 \\ -1 & 1 & 0 \\ 1 & 0 & 1 \end{pmatrix}$ Evaluate AB and also BA . Check that $AB=BA$

..3..

13. Use Crammers rule to solve the equations

$$2x - y + 3z = 9$$

$$x + y + z = 6$$

$$x - y + z = 2$$

14. Explain the Hawkins- Simon conditions and how it ensures viability of the system.

15. Discuss some of the applications of linear programming in Economics and Business.

16. Solve the game whose payoff matrix is given

	B1	B2	B3
A1	1	3	1
A2	0	-4	-3
A3	1	5	-1

17. Find the inverse of the matrix

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

SECTION – C

**ANSWER ANY TWO QUESTIONS. EACH ANSWER NOT TO EXCEED 1200 WORDS
(2 X 20 =40)**

18. Determine the total demand for the industries 1, 2 and 3 given the matrix of technical coefficients A and the final demand vector B below.

$$A = \begin{pmatrix} 0.4 & 0.3 & 0.1 \\ 0.2 & 0.2 & 0.3 \\ 0.2 & 0.4 & 0.2 \end{pmatrix} \quad B = \begin{pmatrix} 140 \\ 220 \\ 180 \end{pmatrix}$$

19. Give the properties of determinants.

20. Solve the following equation using matrix inversion method.

$$4x + y - 5z = 8$$

$$-2x + 3y + z = 12$$

$$3x - y + 4z = 5$$

21. A diet for a sick person must contain at least 4000 units of vitamins, 50 units of minerals and 1400 calories. Two foods A and B are available at a cost of Rs 4 and Rs. 3 per unit respectively. If one unit of A contains 200 units of vitamins, 1 unit of mineral and 40 calories and one unit of food B contains 100 units of vitamins, 2 units of minerals and 40 calories, find by graphic method, what combination of foods be used to have least cost.
