

B. A. DEGREE EXAMINATION, APRIL 2009
BRANCH IV - ECONOMICS
SECOND SEMESTER

COURSE : MAJOR – CORE
PAPER : MATHEMATICAL METHODS
TIME : 3 HOURS. MAX. MARKS : 100

SECTION – A

ANSWER ALL QUESTIONS. EACH ANSWER NOT TO EXCEED 50 WORDS:
(10 X 3 = 30)

1. What is a triangular matrix?
2. Show that the matrix $\begin{bmatrix} 1 & -1 \\ 0 & 0 \end{bmatrix}$ is idempotent.
3. State Hawkins Simon conditions.
4. Write a note on closed input-output model.
5. What are convex sets?
6. Give the meaning of Linear programming.
7. Find saddle point and value of the game given the pay off matrix $\begin{bmatrix} 5 & 8 & 6 \\ 12 & 13 & 6 \\ 11 & 10 & 9 \end{bmatrix}$.
8. Briefly explain dominance property.
9. If the total pay off for two person game is Rs.500/- write down the pay off matrix of player B. Give the pay off matrix of player A as
$$A = \begin{bmatrix} 165 & 200 & 350 \\ 480 & 310 & 215 \end{bmatrix}$$
10. What are dominated rows and columns of $\begin{bmatrix} 4 & 7 & 5 \\ 11 & 12 & 5 \\ 10 & 9 & 8 \end{bmatrix}$

SECTION – B

ANSWER ANY FIVE QUESTIONS. EACH ANSWER NOT TO EXCEED 300 WORDS.
(5 X 6 = 30)

11. Explain any three properties of determinants.
12. Solve by Cramer's Rule
$$2x + y - z = 0$$
$$x - 5y + 3z = 31$$
$$6x + 2y - 5z = 3$$
13. $A = \begin{bmatrix} 2 & 3 \\ 4 & 5 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 1 \\ 2 & 5 \end{bmatrix}$ $C = \begin{bmatrix} 1 & 0 \\ 0 & 1 \end{bmatrix}$ Find AB, AB', 2A+3B+2C.

14. Solve Graphically
 minimize $C = 12x_1 + 42x_2$
 Subject to $x_1 + 2x_2 \geq 3$
 $x_1 + 4x_2 \geq 4$
 $3x_1 + x_2 \geq 3$

and $x_1, x_2 \geq 0$

15. Given the following Input-Output transactions matrix find the Input Output coefficient matrix

(Rupees)

SECTORS	S1	S2	S3	FINAL DEMAND	TOTAL OUTPUT
S1	50	25	25	100	200
S2	40	50	10	200	300
S3	100	50	150	300	600

16. Find the matrix X such that $A - X = 3B$
 where $A = \begin{bmatrix} 1 & 2 & 0 & 4 \\ 2 & 4 & -1 & 8 \end{bmatrix}$ $B = \begin{bmatrix} 2 & 1 & 0 & 3 \\ 1 & -1 & 2 & 5 \end{bmatrix}$

17. Show that $\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3$

SECTION - C

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

18. Solve the following set of equations by matrix inversion method
 $x + y + z = 1$
 $x + 2y + 3z = 6$
 $x + 3y + 4z = 6$
19. Following table shows technology matrix. Find the output vector and labour requirement for each sector
- | Inputs | Outputs | | |
|----------|----------|----------|--------------|
| | Sector 1 | Sector 2 | Final Demand |
| Sector 1 | 0.1 | 0.3 | 100 |
| Sector 2 | 0 | 0.2 | 100 |
20. Solve by simplex method
 Maximise $z = 6x + 4y$
 Subject to $2x + 4y \leq 48$
 $4x + 2y \leq 60$
 $3y \leq 36$
 and $x, y \geq 0$
21. Define the operations of multiplication of any two matrix and discuss the Properties with numerical illustrations.

