



M 6209

Reg. No. :

Name :

IV Semester B.A. Degree (CCSS – Regular/Suppl./Impro.)
Examination, May 2014
Complementary Course in Economics
Paper – 4 C04 ECO : MATHEMATICAL ECONOMICS – II
(2011 and Earlier Admn.)

Time : 3 Hours

Max. Weightage : 30

Instruction : Answers may be written in **English** or in **Malayalam**.

PART – A

Objective type questions (in bunches of **two**)

Choose the correct answer.

1. The functional form $Y = ax^b$ is a _____ function.
a) linear b) non linear c) quadratic d) none of these
2. If m denotes the number of rows and n denotes the number of columns in a matrix and $m = n$, the matrix is called _____ matrix.
a) rectangular b) singular c) orthogonal d) square
3. In simplex method if the inequality is \leq type, then the variable introduced to change it into equality is known as
a) Surplus variable b) Slack variable
c) Slack or Surplus variable d) Both slack and surplus variable

4. The dimension of the matrix $X = \begin{bmatrix} 40 \\ 20 \\ 10 \end{bmatrix}$

- a) 3×1 b) 1×3 c) 4×1 d) 1×4

(Bunch Weightage : 1)



5. The total population I of India is a function of the time t , and the function form is written as
a) $I = f(t)$ b) $T = f(I)$ c) IT d) None of these

6. Game theory was largely developed by
a) Joseph Stiglitz b) J V Neumann
c) Chamberlin d) None of these

7. Matrix addition satisfies
a) Commutative law b) Associative law
c) Both a & b d) None of these

8. A square matrix is said to be singular if its determinant value is
a) zero b) non zero c) unity d) none of these

(Bunch Weightage : 1)

PART - B

Short answer questions. Answer **any ten** of the following questions **not** exceeding **50** words **each**. **Each** question carries **1** weightage.

9. Distinguish between symmetric and skew-symmetric matrices.
10. Discuss Hawkins-Simon conditions.
11. Explain the properties of saddle point solution.
12. Define the rank of a matrix.
13. What do you mean by linear programming ?
14. Explain the concepts in a Mathematical Model.
15. Define an orthogonal matrix.
16. Define game theory.
17. Distinguish between slack and surplus variables.

18. What is a Leontief matrix ?
19. Define inverse of a matrix.
20. Explain mixed strategies.

(Weightage 1×10)

PART – C

(Short Essay)

Answer **any five not** exceeding **150 words each**. Each question carries **2** weightage.

21. Define Nash Equilibrium. Explain with an example a situation where Nash equilibrium can be reached.
22. Explain the formation of mathematical model into a linear programming problem.
23. Explain the difference between open and closed Input-Output model.
24. Describe basic feasible solution in LPP. Write down the dual of the following

$$\text{Maximise } Z = 5X_1 + 10X_2 + 15X_3$$

Subject to the constraints

$$X_1 + 2X_2 + X_3 \leq 2$$

$$X_1 + 3X_3 \leq 5$$

$$X_1 + X_2 \leq 2$$

$$X_1, X_2, X_3 \geq 0$$

25. Discuss Prisoner's Dilemma in game theory.
26. Bring out the relation between primal and dual problem in linear programming.
27. Examine whether the Input Output system with the following coefficient matrix

is feasible $\begin{bmatrix} .2 & .2 \\ .7 & .2 \end{bmatrix}$.

(Weightage 2×5)



PART - D

(Long Essay)

Answer **any two** questions **not** exceeding **450** words. **Each** question carries **4** weightage.

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

28. Find the determinant of matrix A =
29. Explain dominant strategy, dominant equilibrium and Nash equilibrium. Whether dominant equilibrium leads to Nash equilibrium, substantiate the argument with an example.

30. Maximize

$$Z = 2X_1 + 5X_2$$

$$X_1 = 4$$

$$X_2 = 3$$

$$X_1 + 2X_2 = 8$$

$$X_1 \geq 0, X_2 \geq 0$$

Solve using simplex method.

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

$$A = \begin{bmatrix} 0.3 & 0.4 & 0.1 \\ 0.5 & 0.2 & 0.6 \\ 0.1 & 0.3 & 0.1 \end{bmatrix} \quad B = \begin{bmatrix} 20 \\ 10 \\ 30 \end{bmatrix}$$

(Weightage 4x2)