(b) Solve the following by Simplex method :

Minimise $C = 0.6x_1 + x_2$

subject to, $10x_1 + 4x_2 \geq 20$

$5x_1 + 5x_2 \geq 20$

$2x_1 + 6x_2 \geq 12$

$x_1, x_2 \geq 0$

OR

(c) Consider a triangular matrix :

$$A = \begin{bmatrix} 0.4 & 0.2 & 0.3 \\ 0 & 0.1 & 0.3 \\ 0 & 0 & 0.2 \end{bmatrix}$$

Calculate $(I - A)^{-1}$.

(d) Solve the following game :

$$A = \begin{bmatrix} -2 & 0 & 0 & 5 & 3 \\ 4 & 2 & 1 & 2 & 5 \\ -4 & -3 & 0 & -3 & 6 \\ 5 & 1 & -5 & -2 & -6 \end{bmatrix}$$

to obtain the Saddle point.

(e) Explain Hawkins-Simon condition.

(f) Explain pay off matrix strategies.

M.A. (Part—II) Examination

Group—B

ECONOMICS

Paper—IV

(Mathematical Economics)

Time—Three Hours] [Maximum Marks—100

Note :— (1) Attempt all **FIVE** questions.

(2) All questions carry equal marks.

1. "The price effect is the sum of Income effect and Substitution effect." Explain. Mathematically explain the concept of consumer's surplus.

OR

Derive the Slutsky equation. What are the strong and weak axioms of revealed preference ?

2. (a) Explain the properties of Cobb-Douglas production function.

(b) Define homogeneous and non-homogeneous production function.

(c) Explain Adding up problem.

(d) Write a note on multi-product firm.

OR

(e) Explain the properties of CES production function.

(f) If $Q = K^2 + 2KL + 1^3$ is a production function, find the Marginal product of K at K = 3 and L = 2.

(g) Write a note on production possibility curve.

(h) Explain the concept of Laws of return and returns to scale.

3. (a) Given the following Revenue (R) and Cost (C) functions for a firm $R = 20q - q^2$ and $C = q^2 + 8q + 2$. Find the equilibrium level of output, price, total revenue, total cost and profit.

(b) A firm has the Total cost function $C = \frac{1}{3}Q^3 - 7Q^2 + 111Q + 50$ and demand function $Q = 100 - P$. Find the output that maximises profit. What is the Maximum Profit, Total Revenue, Average Revenue, Marginal Revenue, Total Cost Average Cost, and Marginal Cost ?

(c) Given the demand function and supply function as D = 9P + 20 and S = 11P + 14. Find out the price and output level of the market.

(d) Explain general equilibrium system of Walras.

OR

(e) If D = S where D = 32 – 4P and S = –10 + 15P. Find equilibrium price (P) and quantities of demand and supply.

(f) Given the following demand function for two separate markets and the total cost function of the monopole firm.

$P_1 = 16 - 2x$, $P_2 = 29 - y^2$ and $C = 8x + 2y + 9$.

What will be the prices, outputs and maximum profit ?

(g) The demand function and cost function of a firm are given below :

$P = 40 - 0.2q_1 - 0.2q^2$

$C_1 = 2q_1$ and $C_2 = 0.2q_2^2$.

Determine the quantities of output and Maximise profit and also find price and maximum profit.

(h) Explain the concept of Marshallian equilibrium condition.

4. Explain Solow's neoclassical model of growth.

OR

Explain Meade's neoclassical model of growth.

5. (a) In an economy of two industries A and B, the data in millions of rupees is given below :

		Buying Sector		Final Demand	Total Output
		A	B		
Selling Sector	A	18	8	10	36
	B	9	24	15	48

Determine the total output, if the final demand changes to 30 for A and 40 for B.