

Cutting, Overwriting, Erasing, Fluid painting and use of Lead Pencil will earn no marks.
 Write answer of the Question No.1 and 2 on this sheet and handover it to the supervisory staff of examination within first 35 minutes.

Time Allowed: 35 Minutes

(OBJECTIVE PART)

Max. Marks: 32

**Sign of
Supdt.**

1- a) Encircle the correct answer:

1x4

- i) A diagonal matrix $A = [a_{ij}]$ is called identity matrix if:
- a) All $a_{ij} = 0$ when $i = j$ b) All $a_{ij} = 1$ when $i = j$
 c) All $a_{ij} = d$ when $i = j$ d) None of these.
- ii) The $\text{Log}^n \sqrt{x} =$
- a) $\frac{x}{y}$ b) $n \text{Log } a^x$
 c) $\frac{1}{n} \log x$ d) a and c
- iii) If $(x^4)^3$ is equal to
- a) x^{4+3} b) $x^{4/3}$
 c) $x^{3/4}$ d) $x^{3 \times 4}$
- iv) The function whose base is constant and power is a variable is called
- a) Trigonometric function b) Logarithmic function
 c) Exponential function d) None of these

b) Encircle true or false.

1x8

- i) The variable whose value is determined in framework of economic-model is called endogenous variable. **TRUE / FALSE**
- ii) If A is any matrix then additive inverse of A is A^{-1} . **TRUE / FALSE**
- iii) $\frac{dy}{dx} = \frac{-f_x}{f_y}$ represent the derivative of implicit function rule. **TRUE / FALSE**
- iv) If given $Q = \frac{K}{P^n}$ then the point elasticity of demand is -n. **TRUE / FALSE**
- v) If $Y = e^{0.07t}$ then the rate of growth is 8%. **TRUE / FALSE**
- vi) $f_x - f_y = 0$ is the necessary condition for maxima. **TRUE / FALSE**
- vii) The CES production displays constant return to scale. **TRUE / FALSE**
- viii) The determinant of a Matrix 'A' is equal to its Transpose i.e. $|A| = |A'|$. **TRUE / FALSE**

c) Fill in the blanks meaningfully:

1x4

- i) If $A = \begin{bmatrix} x & 1 \\ 2 & 1 \end{bmatrix}$ is singular then value of x is _____.
- ii) If $Y = 2^{-3}$ then $Y =$ _____.
- iii) If A is a square matrix of order 3 then $|KH| =$ _____.
- iv) The necessary condition for constrained optimization is _____.

(Continued Overleaf)

2- Give short answers of the following questions:

2x8

i) What are Endogenous and Exogenous variables?

ii) Define Minors and Co-factors.

iii) What is difference between Matrix and Determinant?

iv) Define free Optimization and Constraint Optimization.

v) What is Exponential Function?

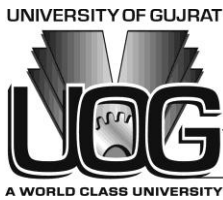
vi) Differentiate between Definite and Indefinite.

vii) Introduce Input-Output Analysis.

viii) Explain economic meaning of a DUAL.

Total Marks = 68+32 = 100

Pass Marks = 40%



(M.A/M.Sc Part-I)

Roll No: _____

(Economics) Mathematical Economics

Time Allowed : 2:25 hrs
Max. Marks : 68

Attempt any **FOUR** Questions. All questions carry equal marks

SUBJECTIVE PART

- 3- Given the following model 10
 $Y = C + I_0 + G_0$
 $C = a + b(Y - T) \quad (a > 0, 0 < b < 1). \quad [T: \text{taxes}]$
 $T = d + ty \quad (d > 0, 0 < t < 1) \quad [t: \text{income tax rate}]$
 a) How many endogenous variables are there?
 b) Find Y^* , T^* and C^* 7
- 4- a) Explain the basic Properties of Determinants with relevant numerical examples. 7
 b) Use Cramer's rule to solve the equation systems: 10

$$\begin{matrix} -x_1 + 3x_2 + 3x_3 = 24 \\ X_1 + x_3 = 6 \\ 5x_2 - x_3 = 8 \end{matrix}$$
- 5- Total cost function of a firm is $TC = 31 + 24Q - 5.5Q^2 + \frac{1}{3}Q^3$ 17
 Find the output level at which the function is minimized and also find slope of AC, AFC, AVC and MC.
- 6- Given $Q = 100 - 2P + 0.02Y$, where Q is quantity demanded, P is price and Y is income, and given $P = 20$ and $Y = 5000$. Find
 a) Price Elasticity of demand
 b) Income Elasticity of demand 17
- 7- Given the average-cost function $AC = Q^2 - 4Q + 174$, find the MC function.
 a) Is the given function more appropriate as a long-run or a short-run function? Why? 10
 b) Write a note on Jacobian determinant. 07
- 8- Assume that $U = (x+2)(y+1)$, but this time assign no specific numerical values to the price and income parameters.
 a) Write the Lagrangian Function. 07
 b) Find X^* , Y^* and π^* in terms of parameters P_x , P_y and B. 05
 c) Check the second-order sufficient condition for maximum. 05
- 9- Solve the following linear problem using graphic method. 17
 $\text{Max } p = 24x_1 + 8x_2$
 S.t $2x_1 + 5x_2 \leq 40$
 $4x_1 + x_2 \leq 20$
 $10x_1 + 5x_2 \leq 60$
 And $x_1, x_2 \geq 0$