

(i) Printed Pages : 4

Roll No.

(ii) Questions : 9

Sub. Code :

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Exam. Code :

3	0	7
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M.A. 1st Semester

1125

ECONOMICS

Paper : MAECO-103 : Quantitative Methods-I

Time Allowed : Three Hours]

[Maximum Marks : 80

Note :- The **first** question is compulsory. Answer any **ten** short answer type questions. Each question is of 2 marks. Attempt **one** question each from the remaining four Units. Simple, non-scientific and non-programmable calculator is allowed.

1. Attempt any **ten** of the following questions in **25-30** words each :
 - (i) State the Euler's theorem.
 - (ii) Distinguish between total and partial derivative.
 - (iii) Diff. $(3x + 2)^{1/3} (x + 1)$ with respect to x .
 - (iv) Prove that for the demand curve $a p^{-a} = b$, where a, b are constants, elasticity of demand $= -a$.
 - (v) What do you mean by Present Value ?
 - (vi) Distinguish between Simple Growth Rate and Compound Growth Rate.
 - (vii) Define Linear Dependence of vectors.

- (viii) Explain adjoint of a Matrix.
- (ix) Distinguish between Multiple and Partial correlation.
- (x) Distinguish between R^2 and adjusted R^2 .
- (xi) What do you mean by Time Series Analysis ?
- (xii) Explain Expected Value.
- (xiii) Distinguish between classical and axiomatic definitions of probability.
- (xiv) Explain modified exponential curve.
- (xv) What are the limitations of Index Numbers ? $10 \times 2 = 20$

UNIT-I

2. (a) Verify that $fx^y = fy^x$ when $u = x^y + y^x$.
- (b) Examine the following function for maximum and minimum

$$U = 2x^2 + 2y^2 + 9 - 6x - 5y - 2xy.$$
8,7
3. (a) Verify that elasticity of demand $(\eta) = \frac{AR}{AR - MR}$ for the
 Linear Demand Curve $P = a - bx$.
- (b) If the demand function is $P = \sqrt{9 - Q}$, find at what level of
 output Q , the total revenue TR will be maximum and what
 will it be ? 8,7

UNIT-II

4. (a) A manufacturer may obtain a machine either by leasing it for
 6 years (useful life) at annual rent of Rs. 3,000 or by purchasing

the machine for Rs. 8,500. If the company can borrow money at 10% per annum, which alternative is preferable ?

- (b) Write the quadratic form corresponding to the symmetric

$$\text{matrix} \begin{bmatrix} 2 & 5 & 3 \\ 5 & 0 & -2 \\ 3 & -2 & 1 \end{bmatrix} \quad 8,7$$

5. (a) Find the adjoint of matrix :

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

- (b) Solve the following equations by using matrix inverse method

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

$$x + y + z = 6$$

$$x - y + z = 2$$

8,7

UNIT-III

6. (a) If $r_{13} = 0.65$, $r_{23} = 0.6$ and $r_{12} = 0.4$, calculate the value of $r_{12,3}$ and $R_{1,2,3}$.

- (b) Given the following, find the regression equation of X_1 on X_2 and X_3 .

$$X_1 : \quad 12 \quad 22 \quad 32 \quad 28$$

$$X_2 : \quad 6 \quad 12 \quad 16 \quad 22$$

$$X_3 : \quad 4 \quad 6 \quad 12 \quad 18$$

7,8

7. (a) Explain any one method of measuring seasonal indices or time series.

(b) The sales of a company in lakhs of rupees for the years 1997 to 2003 are given below :

Year :	1997	1998	1999	2000	2001	2002	2003
Sales :	32	47	65	92	132	190	275

Find trend values by using the equation $Y = ab^x$ and estimate the value for 2004. 8,7

UNIT-IV

8. (a) In a single throw with two dice, find the chance of throwing
(i) 8 and, (ii) 11

(b) Calculate first four moments about the mean :

Marks :	0-10	10-20	20-30	30-40	40-50	50-60	60-70
No. of students :	8	12	20	30	15	10	5

8,7

9. (a) Explain the various tests to be satisfied by a Good Index number.

(b) Calculate Laspeyre's, Paasche's and Fisher's Ideal Index number from the following data :

Commodity	1990		1991	
	Price	Exp.	Price	Exp.
A	10	100	8	96
B	16	96	14	98
C	12	36	10	40
D	15	60	5	25

6,9