Exam.Code:0307
Sub. Code: 2658

2022

M.A. (Economics) First Semester

MAECO-103: Quantitative Methods - I

Time allowed: 3 Hours Max. Marks: 80

NOTE: *Attempt five questions in all, including Question No. I which is compulsory and selecting one question from each Unit.*

x-x-x

I. Answer any ten of the following in 25 - 30 words each:-

a) A bag contains 6 white and 4 black balls. Two balls are drawn at random one after another without replacement. Find the probability that both drawn, balls are white.

b) Explain Euler's Theorem

c) Find the rank of the matrix $\begin{bmatrix} 3 & 2 & 1 \\ 3 & 4 & 3 \\ -1 & 2 & 2 \end{bmatrix}$

d) Differentiate (5 - 2x) $(2x^3 + 3)$ w.r.t. x

e) What is splicing?

f) Differentiate between R^2 and adjusted R^2.

g) Show that the vectors $V_1 = (5, 7, 11)$, $V_2 = (2,1,3)$ and $V_3 = (3,6,8)$ are linearly dependent.

h) An unbiased coin is tossed 5 times and if x denote the number of tails obtained, find the probability distribution of x.

i) Find the value of $r_{1.23}$ if $r_{12} = 0.7$, $r_{13} = 0.61$ and $r_{23} = 0.4$

j) What do you mean by Time Series Analysis?

k) What is deflating of Index Number?

l) Find the adjoin of matrix $A = \begin{bmatrix} 1 & 2 & 3 \\ 2 & 3 & 2 \\ 3 & 4 & 4 \end{bmatrix}$

m) What is exponential growth rate?

n) Find the elasticity of demand, when demand is $q = \frac{40}{p+1}$ at $p = 4$.

o) Explain any two difference between simple linear regression and multiple regression. (10x2)

UNIT – I

II. a) Find $\frac{dy}{dx}$ of $y = x^2\sqrt{\frac{2x-1}{x+1}}$

b) Given the utility function U = (x + 2) (y + 1) and P_x = Rs. 4, P_y = Rs. 6 and income = Rs. 130. Find the optimum consumption of the two goods x and y. What does the value of Langrange multiplier indicate? (5,10)

P.T.O.

III. a) Find $\frac{dz}{dt}$ if $z = \frac{1}{X+Y}$ where $x = e^t$ and $y = e^{-t}$

b) The demand functions for two related goods are given by: $q_1 = 4p_1^{-2}.p_2^2$, $q_2 = 2p_2^3.p_1^2$ Find partial elasticities. Are the two goods competitive or complementary? (2x7½)

UNIT – II

IV. a) Solve the following system of equations using Gauss Elimination method.

$x - 2y + 3z = 1$

$3x - y + 4z = 3$

$4x + y - 2z = -1$

b) If $A = \begin{bmatrix} 2 & 3 & 1 \\ 1 & 2 & 3 \\ 3 & 1 & 2 \end{bmatrix}$, find a matrix B such that AB = I. (2x7½)

V. a) Compute the growth rate 'm' for variable Y using following detail.

T	1996	1997	1998	1999	2000	2001	2002	2003
Y	32	47	65	88	132	190	275	300

Where $y = a10^{mT}$

b) Define present value. Explain its application. (2x7½)

UNIT – III

VI. From the following data:-

$r_{12} = 0.8$
$r_{13} = 0.5$
$r_{23} = 0.3$
$S_1 = 8.5$
$S_2 = 4.5$
$S_3 = 2.1$

a) Obtain the regression equation of X_1 on X_2 and X_3 with $\bar{X}_1 = 70$ Kg, $\bar{X}_2 = 22$ years, $\bar{X}_3 = 150$cm.

b) Estimate value of X_1 on $X_2 = 25$ years and $X_3 = 140$ cm.

c) Find coefficient of multiple determination $R^2_{1.23}$. What does R^2 indicate? (15)

VII. a) Calculate Seasonal index for the data given below by ratio to trend method.

Year	Q_1	Q_2	Q_3	Q_4
2002	65	58	56	61
2003	68	63	63	67
2004	70	59	56	52
2005	80	55	51	58

b) Explain the concept of decomposition of time series. (10,5)

UNIT – IV

VIII. Using suitable formula (ideal) construct price index from the following data:-

Commodity	2009		2014	
	Price	Expenditure	Price	Expenditure
A	1.00	60.00	1.25	62.50
B	1.50	37.50	2.50	50.00
C	2.00	20.00	3.00	30.00
D	12.00	36.00	18.00	72.00
E	0.10	41.00	0.15	9.00

Examine whether it satisfies time reversal and factor reversal test. (15)

IX. a) When two dice are rolled, find the probability of getting a greater number on first dice than the one on the second, given that sum should be 8.

b) Three groups of children consists of 3 girls and 1 boy, 2 girls and 2 boys, 1 girl and 3 boys respectively. One child is selected at random from each group. Find the chance that group 3 selected consists of

i) 1 girl and 2 boys

ii) 2 girls and 1 boy (2x7½)

x-x-x