XX-2018

Seat No._____

M. Com. (Part - I) Examination

April / May – 2003

Advance Statistics : Paper - II

Time : **3** Hours] [Total Marks : **100**

સૂચના **સરખા**

ગુણ

૧ ૧૦

$$\hat{\beta} = \left(X'X\right)^{-1} X'Y$$

(Multi Collinearity) ૧૦

અથવા

૧ ૮

$$V\left(\hat{\beta}\right) = \left(X'X\right)^{-1}\sigma^2$$

૧૨

(Dummy variables)

૨ ૮

$y = f(x)$ x E ૧૨

x $f(x)$ $\frac{f(x)}{x}$

$E+1$ $E-1$

અથવા

૨ ૧૦

૧૦

→ / ↓	A	B	C	F_i	X_i
A	30	16	18	36	100
B	20	8	45	00	80
C	20	32	18	20	90

A, *B* *C* 40, 15 25

A, *B* *C*

૩ ૧૦

૧૦

બ

(i) $q = A x_1^{\alpha} x_2^{\beta}$ (ii) $q = \frac{2 H x_1 x_2 - A x_1^2 - B x_2^2}{C x_1 + D x_2}$

(iii) $\boldsymbol{q = \sqrt{2 H x_1 x_2 - A x_1^2 - B x_2^2}}$

અથવા

૩ $V_{opt} \leq V_{prop} \leq V_{ran}$ ૧૦

(Non Sampling error) ૧૦

૪ ૧૦

n m ૧૦

$\bar{\bar{y}}$

$\bar{\bar{\boldsymbol{y}}}$ $V(\bar{\bar{y}})$

અથવા

૪ (Two-stage Sampling Method) ૧૦

૧૦

N=2500, d=3, S=15, $\alpha = 0.05$ t=2

S d

૫ ૨૦

અથવા

५ (Cross-section ६
data)

१४

ENGLISH VERSION

Instructions : (1) **Each** question **carries** same marks.
(2) Figures to the **right** side denotes marks.
(3) Statistical **table** and simple calculator can be used.

1 (a) What is mean by 'General Linear Model' ? Mention necessary assumptions for it and in usual notation prove that $\hat{\beta} = \left(X'X\right)^{-1} X'Y$. **10**

(b) What is mean by 'Multi-Collinearity' ? Give reasons responsible for it and mention steps to decrease it. **10**

OR

1 (a) In usual notations prove that $V\hat{\beta} = \left(X'X\right)^{-1}\sigma^2$. **8**

(b) Write short note : **12**
(1) Durbin Watson test (2) Dummy variables.

2 (a) What is mean by 'Monopoly' and 'Duopoly' ? Explain any two cases for effect of taxes on a monopoly. **8**

(b) (1) If E is the elasticity of a function $y = f(x)$ subject to (x) then prove that elasticity of functions $x\ f(x)$ and $\frac{f(x)}{x}$ are respectively $E+1$ and $E-1$. **12**

(2) Write short note on, 'Engel's curve'.

OR

2 (a) What is Input-Output analysis ? State the assumptions which are necessary for the analysis. Explain the Leontief's closed model. **10**

(b) Obtain the technical coefficient matrix for the following Input-Output table : **10**

Input → / Output ↓	Industry			Final Demand	Total Production
	A	*B*	*C*	*Fi*	*Xi*
A	30	16	18	36	100
Industry *B*	20	8	45	00	80
C	20	32	18	20	90

If final demand of *A*, *B* and *C* is respectively 40, 15 and 20 then find total production for industry *A*, *B* and *C*.

3 (a) Explain :

(1) Cobb-Douglas production function **10**

(2) Geometric interpretation of elasticity of demand.

(b) (1) State and Prove Euler's theorem for homogeneous functions. **10**

(2) Check whether the following functions are homogeneous or not ? If it then mention their power. (any **two**)

(i) $q = A x_1^{\alpha} x_2^{\beta}$ (ii) $q = \frac{2 H x_1 x_2 - A x_1^2 - B x_2^2}{C x_1 + D x_2}$

(iii) $\boldsymbol{q = \sqrt{2 H x_1 x_2 - A x_1^2 - B x_2^2}}$.

OR

3 (a) In usual notation, show that $V_{opt} \leq V_{prop} \leq V_{ran}$. **10**

(b) What are "Non sampling errors" ? Describe the origin and effect of these errors in sampling. **10**

4 (a) Explain with illustration, "stratified sampling method." **10**

(b) If n primary units and m subunits choosen from each primary unit are selected randomly. Prove that $\bar{\bar{y}}$ is an unbiased estimate of $\bar{\bar{y}}$ find $V(\bar{\bar{y}})$ also. **10**

OR

4 (a) What is, "Two-stage sampling method" ? Mention its advantages and limitations. **10**

(b) Explain stein's method for deciding sample size. **10**
If N=2500, d=3, S=15, $\alpha = 0.05$ and t=2 given then estimate the size of the sample where S : Standard deviation and d : tolerable error quantity.

5 (a) In reference to 'Time-series' explain : **20**
(1) Variate Difference Method
(2) Auto Regressive Series
(3) Stationary Time Series.

OR

5 (a) Clarify the difference between 'Time-series' and 'Cross-section data.' **20**

(b) Write short note :

(1) Correlogram Analysis

(2) Periodogram Analysis.
