

(i) Printed Pages : 4

Roll No.

(ii) Questions : 9

Sub. Code :

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Exam. Code :

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B.A./B.Sc. (General) 4th Semester

1046

ECONOMICS

Paper : Quantitative Methods

Time Allowed : Three Hours]

[Maximum Marks : 90

- Note :-**
- (1) Attempt **five** questions in all.
 - (2) Q. No. **1** is compulsory.
 - (3) Attempt **one** question from each Unit.
 - (4) Use of simple calculator is allowed.

1. Attempt any **nine** of the following :

(i) Define disjoint set.

(ii) If $f(x) = \frac{x-1}{x+1}$, show that $f[f(x)] = -1/x$.

(iii) Differentiate $y = \log(\log x)$ w.r.t. x .

(iv) Does $AB = 0$ always imply either $A = 0$ or $B = 0$, here A and B are matrices.

(v) If $A = \begin{bmatrix} 1 & 1 & 2 \\ 2 & 1 & 0 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2 \\ 2 & 0 \\ -1 & 1 \end{bmatrix}$

show that $(AB)(AB)' = B'A'$.

- (vi) If sum and difference of two quartiles are 22 and 8 respectively, find the coefficient of skewness when $M = 10.5$.
- (vii) Give the properties of regression coefficients.
- (viii) Explain the difference between regression and correlation.
- (ix) Components of time series.
- (x) Define Interpolation.
- (xi) Why Fisher's Index is called Ideal ?
- (xii) Merits and demerits of Least Square Method. $9 \times 2 = 18$

UNIT-I

2. (a) Find derivative of $\sqrt{\frac{1-x}{1+x}}$ w.r.t. x .
- (b) Given $\pi = aq^2 + bq + c$. Find AC and MC and hence show that slope of AC = $\frac{1}{q}(MC - AC)$. 9+9
3. (a) Find the maximum and minimum values of the function $x^3 - 2x^2 + x + 6$.
- (b) If $f(x) = \log \frac{1+x}{1-x}$ show that $f\left(\frac{2x}{1+x^2}\right) = 2f(x)$. 9+9

UNIT-II

4. (a) Find the inverse of the matrix :

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 5 & 7 & 4 \\ 2 & 1 & 3 \end{bmatrix} \text{ also prove that } AA^{-1} = A^{-1}A = I.$$

- (b) Find the Karl Pearsons coefficient of Skewness :

| Class | 0-10 | 10-20 | 20-30 | 30-40 | 40-50 |
|-----------|------|-------|-------|-------|-------|
| Frequency | 14 | 23 | 27 | 21 | 15 |

9+9

5. (a) Solve the following equation by matrix method :

$$x + y + z = 1$$

$$x + 2y + 3z = 6$$

$$x + 3y + 4z = 6.$$

- (b) The mean and standard deviation of a set of 100 observations were found to be 40 and 12 respectively. On checking it was found that two observations were wrongly taken as 23 and 15 instead of 43 and 18. Find correct mean and SD.

9+9

UNIT-III

6. (a) Find the coefficient of rank correlation :

| X | 15 | 20 | 28 | 12 | 40 | 60 | 20 | 80 |
|---|----|----|----|----|----|----|----|----|
| Y | 40 | 30 | 50 | 30 | 20 | 10 | 30 | 60 |

- (b) Using Newton's Advancing Differences Method, interpolate the expected life at the age of 22 :

| Age | 15 | 20 | 25 | 30 | 35 |
|-----------------|------|------|----|------|------|
| Life Expectancy | 32.2 | 29.1 | 26 | 23.1 | 20.4 |

9+9

7. (a) From the following data, find the two regression equations :

| | Marks in Economics | Marks in Statistics |
|--------------------|--------------------|---------------------|
| Mean | 62.5 | 39 |
| Standard Deviation | 9.5 | 10 |

Coefficient of correlation is 0.6. Estimate the marks in Statistics when marks in Economics is 70.

- (b) Using Lagranges formula of interpolation, find number of workers earning between Rs. 30 and Rs. 40 :

| Earning (Rs.) | 15-20 | 20-30 | 30-45 | 45-55 | 55-70 |
|----------------|-------|-------|-------|-------|-------|
| No. of Workers | 75 | 100 | 115 | 145 | 150 |

9+9

UNIT-IV

8. Fit a straight line trend for the following series :

| Year | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 | 1991 |
|--------------------|------|------|------|------|------|------|------|------|
| Sales ('000 Units) | 38 | 40 | 65 | 72 | 69 | 60 | 87 | 95 |

18

9. Calculate Fisher's Ideal Index of Prices and show that it satisfies Time Reversal Test :

| Commodity | Base Year | | Current Year | |
|-----------|-----------|----------|--------------|----------|
| | Price | Quantity | Price | Quantity |
| A | 10 | 12 | 12 | 15 |
| B | 7 | 15 | 5 | 20 |
| C | 5 | 24 | 9 | 20 |
| D | 16 | 5 | 14 | 4 |

18