

(i) Printed Pages : 4 Roll No.

(ii) Questions : 14 Sub. Code :

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Exam. Code :

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Bachelor of Commerce (FYUP) 3rd Semester
(2125)

BUSINESS MATHEMATICS & STATISTICS

Paper : NBCM303 [Common with B.Com. Tax Planning & Management & B.Com. Accounting & Finance (FYUP) 3rd Sem.]

Time Allowed : Three Hours] [Maximum Marks : 80

Note :— Attempt **FOUR** short-answer questions from Section A. Each question carries **5** marks. Attempt **TWO** questions each from Sections B and C, respectively. Each question carries **15** marks.

SECTION—A

1. The population of a country has increased from 84 million in 1983 to 108 million in 1993. Find the annual rate of growth of the population.
2. Find $\frac{dy}{dx}$ when $y = \log(\log x)$.
3. Discuss the limitations of statistics.

4. Calculate the Median from the following data:

X	1-10	11-20	21-30	31-40	41-50
F	4	12	20	9	5

5. Express matrix $A = \begin{pmatrix} -3 & 6 & 0 \\ 4 & -5 & 8 \\ 0 & 7 & 2 \end{pmatrix}$ as the sum of a symmetric matrix and a skew-symmetric matrix.
6. Discuss the various properties of Standard Deviation with one practical example.

SECTION—B

7. Define Matrices. Discuss the various types of matrices with one practical example.
8. Show that:

$$\text{If } A = \begin{bmatrix} 0.3 & 0.4 & 0.2 \\ 0.2 & 0.0 & 0.5 \\ 0.1 & 0.3 & 0.1 \end{bmatrix}, D = \begin{bmatrix} 100 \\ 40 \\ 50 \end{bmatrix}, \text{ find } X \text{ if } (I - A)X = D.$$

9. Differentiate the following function:

$$\frac{(x^2 + 4)(x - 1)}{(3x^2 + 5x + 10)} \text{ w.r.t. } x.$$

10. Find the maximum and minimum values of $Y = (x - 3)^3 (x + 1)^2$.

SECTION—C

11. Below are given the figures for the sales of a sugar factory.

Year	Sales ('000 Rs.)
2001-02	10
2002-03	12
2003-04	15
2004-05	16
2005-06	18
2006-07	19

- (a) Fit a straight line by the method of least squares.
(b) Convert the annual trend equation into a monthly and Quarterly trend equation.
(c) What is the monthly increase in Sales?

12. Calculate Fisher's Index number from the following data. Also show that the method satisfies the factor reversal test:

Commodity	Base Year		Current Year	
	Price	Expenditure	Price	Expenditure
A	10	120	12	144
B	5	40	6	54
C	20	60	25	100
D	8	80	8	72

13. Discuss the various properties of the Arithmetic Mean with one practical example.

14. Find the combined missing values from the data given below:

Group	Group I	Group II	Group III	Combined
Number of Items	50	?	90	200
Standard Deviation	6	7	?	7.746
Arithmetic Mean	113	?	115	116