

11/Dec/23(E)

(i) Printed Pages : 3

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(ii) Questions : 9

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Exam. Code :

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Bachelor of Commerce 3rd Semester

(2123)

BUSINESS MATHEMATICS AND STATISTICS

Paper : BCM-304

Time Allowed : Three Hours]

[Maximum Marks : 80

Note :—Attempt **four** short answer type 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

I. Attempt any four of the following :

(i) Skew- Symmetric Matrix.

(ii) Show that
$$\begin{vmatrix} 1+a & b & c \\ a & 1+b & c \\ a & b & 1+c \end{vmatrix} = 1+a+b+c.$$

(iii) Explain the scope of Statistics.

(iv) In a class of 50 students 10 have failed and their average of marks is 2.5. The total marks secured by the entire class were 281. Find the average marks of those who have passed.

(v) For a distribution, Bowley's coefficient of skewness is -0.56, $Q_1 = 16.4$ and Median = 24.2. Find Q_3 and coefficient of quartile deviation.

(vi) From the following fixed base index prepare Chain base index :

Year	1981	1982	1983	1984	1985	1986
FBI	110	150	180	250	300	440

$$5 \times 4 = 20$$

SECTION—B

II. Use matrices, to solve following system of equations :

$$3x + 4y + 5z = 18, 2x - y + 8z = 13, \text{ and } 5x - 2y + 7z = 20$$

15

III. (a) Properties of determinants.

(b) Explain the working rule for finding Maximum and Minimum values of a function.

8,7

IV. Find the maximum and minimum values of the following function : $y = x^3 - 6x^2 + 9x - 8$.

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V. Differentiate the following function :

(i) $y = x^e + e^x + x^x + e^e$.

(ii) $\sqrt{\frac{1-x}{1+x}}$

(iii) Find elasticity of demand for the demand function

$$p = x^2 e^x.$$

15

SECTION—C

VI. The scores of two batsmen A and B in ten innings during a certain match are :

A :	32	28	47	63	71	39	10	60	96	14
B :	19	31	48	53	67	90	10	62	40	80

15

VII. Distinguish between primary data and secondary data. Explain briefly the various methods of collecting primary data. 15

VIII. Calculate Price Index Number by Laspeyre's, Paasche's and Fisher's Ideal index from the data given below and show that it satisfies the time reversal and factor reversal tests :

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

15

IX. Fit a straight line trend by the method of least squares to the following data :

Year	2000	2001	2002	2003	2004	2005
Profit	10	20	30	56	40	60

- (i) Estimate the profit for the year 2007.
- (ii) Convert the annual trend equation into monthly trend equation.
- (iii) What is the rate of growth of profit per month ? 15