(i) **Printed Pages: 3** **Roll No. .....**

(ii) **Questions : 14** **Sub. Code : 0820**

Exam. Code : 0013

Bachelor of Commerce 3rd Semester

(1129)

BUSINESS MATHEMATICS AND STATISTICS

Paper—BCM-304

Time Allowed : Three Hours] **[Maximum Marks : 80**

Note :— (1) Attempt any ***four*** questions from Section-A.

(2) Attempt any ***two*** questions from Section-B.

(3) Attempt any ***two*** questions from Section-C.

SECTION—A

I. Define Elementary Column transformation and show that :

$$\begin{vmatrix} 1 & a & b+c \\ 1 & b & c+a \\ 1 & c & a+b \end{vmatrix} = 0.$$

II. Define inverse of a matrix and verify :

$(AB)^{-1} = B^{-1}A^{-1}$ for the matrices

$$A = \begin{bmatrix} 2 & 1 \\ 5 & 3 \end{bmatrix}, B = \begin{bmatrix} 4 & 5 \\ 3 & 4 \end{bmatrix}.$$

III. If $e^x + e^y = e^{x+y}$ then show that,

$$\frac{dy}{dx} = e^{y-x}.$$

IV. Define average and discuss its objectives in brief.

V. From the following, compute Q_1 and Q_3 :

X	=	10	20	30	40	50	60	70
Y	=	2	3	5	10	5	3	2

VI. Give in brief the methods of collecting Primary Statistical data.

4×5=20

SECTION—B

VII. Given $A = \begin{bmatrix} 2 & 0 & 1 \\ 0 & 1 & 2 \\ 1 & 2 & 3 \end{bmatrix}$, verify that $AA^{-1} = A^{-1}A = I_3$

where I_3 is identity matrix of order 3.

VIII. (a) Show that :

$$\begin{vmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{vmatrix} = (a+b+c)^3 .$$

(b) Solve the following system of equations by inverse method :

$$2x_1 - x_2 + 3x_3 = 9$$
$$x_2 - x_3 = -1$$
$$x_1 + x_2 - x_3 = 0$$

IX. Differentiate $(\log x)^{\log x} + (1 + x)^{2x}$ w.r.t. x.

X. Find maxima and minima of $\frac{(x-1)(x-6)}{x-10}$ or $\frac{x^2-7x+6}{x-10}$ or $\frac{2x^2-14x+12}{2x-20}$.

2×15=30

SECTION—C

XI. Define Index Number and discuss its types.

XII. Calculate Karl Pearson's coefficient of skewness from the following data :

Marks	0–10	10–20	20–30	30–40	40–50
Frequency	8	11	26	9	6

XIII. Define primary and secondary data. Explain various methods of collecting primary data.

XIV. Fit a straight line to the following data taking X as the independent variable :

X	2011	2012	2013	2014	2015	2016
Y	1	1.8	3.3	4.5	6.3	10

2×15=30