(i) Printed Pages: 4 Roll No. .....

(ii) Questions : 14 Sub. Code : 0 8 2 0

Exam. Code : 0 0 1 3

Bachelor of Commerce 3rd Semester

1128

BUSINESS MATHEMATICS AND STATISTICS

Paper : BCM-304

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

Note :— (1) Attempt any **FOUR** questions from Section-A of 20.

(2) Attempt any **TWO** questions from Section-B of 30

(3) Attempt any **TWO** questions from Section-C of 30.

SECTION—A

1. If $A=\begin{bmatrix}1 & 5\\ 7 & 12\end{bmatrix}$ and $B=\begin{bmatrix}9 & 1\\ 7 & 8\end{bmatrix}$, find a matrix C such that $3A + 5B + 2C$ is a null matrix.

2. Without expanding, show that :

$$\begin{bmatrix}b^2c^2 & bc & b+c\\ c^2a^2 & ca & c+a\\ a^2b^2 & ab & a+b\end{bmatrix}=0$$

3. A train runs non-stop from Delhi to Pune at a speed of 75 kmph and returns the same way at a speed of 60 kmph. Calculate the average speed for up and down journey.

4. The mean and standard deviation of a set of 100 observations were worked out as 49 and 5 respectively by a computer which by mistake took the value 50 in place of 40 for one observation. Find correct mean and variance.

5. Calculate weighted moving average of order 3 with weights 1, 4, 1 for following data :

Year	Consumption of cotton
2009	656
2010	804
2011	836
2012	765
2013	777

6. Differentiate the following w.r.t. x :

$$\frac{(x-1)(x-2)}{(x-3)(x-4)}$$

SECTION—B

7. Find the values of x, y and z given :

$$x + y + z = 6$$

$$2x + 5y + 5z = 27$$

$$2x + 5y + 11z = 45$$

8. Explain the concept of "Maxima" and "Minima" giving their managerial application. Clearly state the conditions for maxima and minima.

9. Find derivative of following w.r.t. x :

(a) $(4x - 7)^5 (2x + 9)^7$

(b) $\frac{2}{x-1} - \frac{x^2}{3x-1}$

10. Prove that :

$$\begin{vmatrix} (b+c)^2 & a^2 & a^2 \\ b^2 & (c+a)^2 & b^2 \\ c^2 & c^2 & (a+b)^2 \end{vmatrix} = 2abc\,(a+b+c)^2$$

SECTION—C

11. For a group containing 100 observations, the arithmetic mean and standard deviation are 8 and $\sqrt{10.5}$. For 50 observations selected from these 100 observations the mean and standard deviation are 10 and 2 respectively. Find mean and standard deviation of other half.

12. Define moments. How can you find out Skewness and Kurtosis with the help of moments ?

13. Find out mean, median and mode for following series :

X	Y
0–10	5
10–20	4
20–30	3
30–40	2
40–50	6
50–60	10

14. Fit a straight line trend by moving average method taking 4 years moving cycle :

Year	Production
1980	12
1981	18
1982	16
1983	15
1984	13
1985	19
1986	20
1987	25
1988	30