

1M6113

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Total No of Pages: **3****1M6113**

M. B. A. I Sem. (Main/Back) Exam., Jan. 2016
M-103A Business Mathematics and Statistics

Time: 3 Hours**Maximum Marks: 70****Min. Passing Marks: 28***Instructions to Candidates:*

- (i) *The question paper is divided in two sections.*
- (ii) *There are sections A & B. Section A contains 6 questions out of which the candidate is required to attempt any 4 questions. Section B contains short case study / application based question which is compulsory.*
- (iii) *All questions carry equal marks.*

1. NIL

2. NIL

SECTION-A

Q.1 (a) For the two matrices $A = \begin{bmatrix} 2 & 1 \\ 3 & 4 \end{bmatrix}$, $B = \begin{bmatrix} 1 & -2 \\ -1 & 4 \end{bmatrix}$, verify $(AB)^T = B^T \cdot A^T$. [7]

(b) If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$, show that $A^2 - 4A - 5I = 0$ Hence or otherwise, Find

A^{-1} . [7]

Q.2 (a) If $\begin{vmatrix} 1 & 2 & 0 \\ 0 & 2 & x \\ 1 & 0 & 2 \end{vmatrix} = 6$ find the value of x. [7]

(b) Solve the following system of linear equations by matrix inversion method:

$$2x + y + 4z = 2, \quad 2 + 4y + 2z = 3, \quad 2x + 3y + z = -6 \quad [7]$$

Q.3 (a) The profits and losses of a business concern for the years 2011-2015 are given below: . [4]

Year	Profit (in Rs.)	Loss (in Rs.)
2011	3000	
2012	4000	
2013	2500	
2014		2000
2015	6000	

Represent the above data by a Bar graph

(b) Calculate the arithmetic mean and the median of the frequency distribution given below. Hence calculate the mode using the empirical relation between the three. [10]

Class-Limits	130-134	135-139	140-144	145-149	150-154	155-159	160-164
Freq.	5	15	8	24	17	10	1

Q.4 (a) Six dice are thrown 729 times. How many times do you expect at least three dice to show a 5 or 6? [7]

(b) Find the standard deviation and coefficient of variation from the following table giving the marks of 150 students: [7]

Marks	Number of Students	Marks	Number of Students
1-10	5	51-60	22
11-20	12	61-70	15
21-30	20	71-80	6
31-40	25	81-90	4
41-50	40	91-100	1

- Q.5 (a) What is meant by an Index number? Explain briefly any two methods of construction of Index numbers. [7]
- (b) The following table gives the change in the price and consumption of three commodities. Compute Fisher's ideal price index number. [7]

Commodity	2005		2015	
	Price (Rs.)	Quantity (Rs.)	Price (Rs.)	Quantity (Rs.)
Wheat	100	10	110	6
Rice	150	15	170	18
Cloth	5	50	4	30

- Q.6 Calculate the coefficient of correlation from the following data:

X:	1	2	3	4	5	6	7	8	9
Y:	9	8	10	12	11	13	14	16	15

- Also obtain the equations of line of regression and obtain an estimate of Y which should correspond on the average to $X = 6.2$. [14]

SECTION-B

- Q.7 (a) Suppose a manufacturing firm produces steel pipes in three plants with daily production volume of 500, 1000 and 2000 units respectively. According to past experience it is known that the fractions of defective output produced by the three plants are respectively 0.005, 0.008 and 0.010. If a pipe is selected from a day's total production and found to be defective. Find out what is the probability that it came from the first plant. [7]
- (b) Assume a certain factory turning out razor blades, there is a small chance $1/500$ for any blade to be defective. The blades are supplied in packets of 10. Use the Poisson distribution to calculate the approximate number of packets containing no defective, one defective and two defective blades respectively in a consignment of 10000 packets given that $e^{-0.02} = 0.9802$ [7]