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M.B.A. I sem. (Main&Back) Examination Dec.- 2016

M-103 A 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 base 1 question which is compulsory.

*iii) All question are carrying **equal** marks.*

Section - A

1. a) Find $A^2 - 3A + 9I$, if

$$A = \begin{bmatrix} 1 & -2 & 3 \\ 2 & 3 & -1 \\ -3 & 1 & 2 \end{bmatrix}, \text{ where } I = \begin{bmatrix} 1 & 0 & 0 \\ 0 & 1 & 0 \\ 0 & 0 & 1 \end{bmatrix}$$ (7)

b) If $A = \begin{bmatrix} 1 & -1 & 0 \\ 2 & 1 & 3 \\ 3 & 1 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 & 3 \\ -1 & 0 & 1 \\ 1 & 0 & 1 \end{bmatrix}$.

Find i) A^T ii) B^T iii) $(A+B)^T$ iv) $(2A)^T$ (7)

2. a) Compute the inverse of the matrix

$$A = \begin{bmatrix} 1 & 2 & -1 \\ -2 & 1 & 1 \\ 3 & -3 & 2 \end{bmatrix}$$ (7)

b) Solve the following system of equations by using determinants (Cramers rule)

$$x - 4y - z = 11$$
$$2x - 5y + 2z = 39$$
$$-3x + 2y + z = 1$$ **(7)**

3. a) Find the mode and the median for the following Distribution. (7)

Variable	0-5	5-10	10-15	15-20	20-25	25-30	30-35	35-40
Frequency	2	5	7	13	21	16	8	3

b) The following table shows the number of workers in a factory whose weekly earnings are given against them. Determine the mean valves of weekly earnings and standard deviation. (7)

Range of weekly earnings in Rs.	Number of workers in factory
4-6	74
6-8	376
8-10	304
10-12	110
12-14	18
14-16	0
16-18	9
18-20	9
20-22	0

4. a) Ten competitors in beauty contest are ranked by three judges in the following order.

First judge	1	6	5	10	3	2	4	9	7	8
Second judge	3	5	8	4	7	10	2	1	6	9
Third judge	6	4	9	8	1	2	3	10	5	7

Use the rank of correlation to discuss which pair of judges have the nearest approach to common tastes in beauty. (7)

b) The equations of two regression lines obtained in a correlation analysis of 60 observations are $5x=6y+24$ and $1000y = 768x - 3708$

i) What is the correlation coefficient and what is its propable error?

ii) Show that the ratio of the coefficient of variability of x to that of y is 5/24

iii) What is the ratio of variances of x and y? (7)

5. a) From a pack of cards, a card is drawn what is the probability of drawing red card or a king? (7)

b) In a bolt factory, machines A, B and C manufacture 25, 35 and 40 percent of the total of their output 5,4 and 2 percent are defective. A bolt is drawn at random and is found to be defective. What are the probabilities that it was manufactured by the machines A, B and C? **(7)**

6. a) From the chain base index numbers given below, prepare fixed base index numbers. **(7)**

1945	1946	1947	1948	1949	1950
92	102	104	98	103	101

b) 10% of screws produced by a machine are defective. Find the probability of the following when they are checked at random by examining samples of 5 :

i) None is defective

ii) One is defective

iii) Atmost one is defective **(7)**

Section - B

7. a) A driven has two taxies, which he hires out day by day. The number of demands for a taxi on each day is distributed as a poisson variate with mean 1.5. Calculate the porportion of days on which

i) Neither the car is used

ii) Some demand is refused **(7)**

b) "Construct with the help of data given below Fishers Ideal Index and show it satisfies the factor Reversal Test.

	Estimated total produce in thousand tons in saran district		Harnest price per marnd in saran district			
	1931-32	1932-33	1931-32		1932-33	
			Rs.	As.	Rs.	As.
Winter Rice	71	26	3	8	3	2
Barley	107	83	2	0	2	0
Maize	62	48	2	9	2	9

(7)

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