



BRAINWARE UNIVERSITY

Course – MBA

Business Mathematics and Statistics (MBA104 / MBA 105)

(Semester – 1)

Time allotted: 3 Hours

Full Marks: 70

[The figure in the margin indicates full marks. Candidates are required to give their answers in their own words as far as practicable.]

Group –A

(Multiple Choice Type Question)

1. Choose the correct alternatives for the following:

10 x 1 = 10

i) Which of the following sets are null sets?

- a) $\{0\}$ b) \emptyset c) $\{ \}$ d) Both b and c

ii) If there is a very strong correlation between two variables then the correlation coefficient must be

- a) any value larger than 1
b) much smaller than 0, if the correlation is negative
c) much larger than 0, regardless of whether the correlation is negative or positive
d) None of the above.

iii) In how many different ways can the letters of the word “APPLE” be arranged?

- a) 50 ways b) 60 ways c) 100 ways d) 120 ways

iv) Coefficient of Correlation values lies between

- a) -1 and +1 b) 0 and 1 c) -1 and 0 d) None of these

v) The mean of a distribution is 14, and s.d is 5 then what is the value of coefficient of variation?

- a) 60.4% b) 48.3% c) 35.7% d) 27.8 %

vi) 6P_4 is equal to

- a) 6 b) 36 c) 360 d) 4

vii) The value of the determinant $\begin{vmatrix} a & b \\ c & d \end{vmatrix}$ is

- a) $db - ca$ b) $da - bc$ c) $dc - ba$ d) $da + cb$

viii) If $|A| = 0$, then A is

- a) zero matrix b) singular matrix c) non-singular matrix d) 0

ix) The formula $\frac{\sum P_0 Q_x}{\sum P_0 Q_0} \times 100$ is used to calculate:

- a) Paasche price index b) Laspeyres price index
c) Laspeyres quantity index d) Paasche quantity index

x) Secular trend can be measured by

- a) 2 methods b) 3 methods c) 5 methods d) 4 methods

Group - B

(Short Answer Type Questions)

Answer any three of the following

3 x 5 = 15

2. Compute the value of Q_3 and Q_1 from the following:

x	20-29	30-39	40-49	50-59	60-69	70-79	80-89	90-99
f	5	12	15	20	18	10	6	4

3. Show that the matrix $A = \begin{bmatrix} 2 & -1 \\ -1 & 2 \end{bmatrix}$ satisfies the equation $A^2 - 4A + 3I = 0$. Hence obtain A^{-1} .

4. Construct Fisher's ideal index number for the following data:

Commodity	1960		1980	
	Price	Quantity	Price	Quantity
A	8	6	12	5
B	10	5	11	6
C	7	8	8	5

5. Solve the following set of equations by using Cramer's Rule: $x - 3y = 4$, $5x + 7y = 8$

6. Briefly discuss the components of Time Series.

Group C

(Long Answer Type Questions)

Answer any three of the following

3 x 15 = 45

7. The heights (in centimeters) and weight (in kilograms) of 10 basketball players on a team are:

Height (X)	186	189	190	192	193	193	198	201	203	205
Weight (Y)	85	85	86	90	87	91	93	103	100	101

Calculate:

- The regression line of y on x.
- The coefficient of correlation.
- The estimated weight of a player who measures 208 cm.

[7+5+3]

8. a) Ten students obtained the following marks in Mathematics and Statistics. Calculate the rank correlation coefficient.

Roll No	1	2	3	4	5	6	7	8	9	10
Marks in Maths	78	36	98	25	75	82	90	62	65	39
Marks in Stat	84	51	91	60	68	62	86	58	53	47

b) Assuming a four-yearly cycle, calculate the trend by the method of moving averages from the following data relating to the production of tea in India:

Year	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000
Weight (Y)	85	85	86	90	87	91	93	103	100	101

[8+7 =15]

9. Find the two lines of regression from the following data:

Age of Husband (x)	25	22	28	26	35	20	22	40	20	18
Age of Wife (y)	18	15	20	17	22	14	16	21	15	14

Estimate,

i) The age of husband when the age of wife is 19

ii) The age of wife when the age of husband is 30

iii) The correlation coefficient.

[6+6+3]

10. a) The expenditure of 1000 families is given below:

Expenditure	40-59	60-79	80-99	100-119	120-139
No. of families	5	18	F_3	F_4	8

The mean for the distribution is Rs 87.5. Calculate the missing frequencies.

b) The mean age of a combined group of men and women is 30 years. If the mean age of the group of men is 32 and that of the group of women is 27, find out the percentage of men and women in the group. [8+7=15]

11. a) A sample of 100 observations had mean 64 and s.d. 7.5. Two observations whose values were 14 and 18 were wrongly recorded as 24 and 24. Make necessary correction of mean and s.d.

b) If $A = \begin{bmatrix} 1 & 6 & 5 \\ 2 & 3 & 1 \\ 0 & 2 & 4 \end{bmatrix}$ Find out the Inverse of matrix A.

[5+10 = 15]