

D.K.M.COLLEGE FOR WOMEN (AUTONOMOUS) VELLORE-1.

BUSINESS MATHEMATICS AND STATISTICS-2

I- BBA

UNIT-I

SECTION-A

1. Define Matrix?
2. Define equal matrix?
3. Define diagonal matrix?
4. Define scalar matrix?
5. Define unit matrix?
6. Define transpose of matrix?
7. Define singular matrix?
8. Find $A+B$ and $A-B$ if $A = \begin{bmatrix} 2 & 3 \\ 4 & 1 \end{bmatrix}$, $B = \begin{bmatrix} 2 & 1 \\ 3 & 1 \end{bmatrix}$.
9. If $A = \begin{bmatrix} 4 & 5 & 2 \\ 2 & 4 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 2 & 3 \\ 3 & 2 & 1 \end{bmatrix}$ find $A+B$ and $A-B$
10. Define inverse of matrix..?

SECTION-B

5 MARKS

1. If $A = \begin{bmatrix} 2 & 3 & 4 \\ 1 & 2 & 3 \\ -1 & 1 & 2 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 3 & 0 \\ -1 & 2 & 1 \\ 0 & 0 & 2 \end{bmatrix}$ than prove that $AB \neq BA$.
2. If $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ show that $A^2 - 4A - 5I = 0$.
3. If find the $A = \begin{bmatrix} 1 & 2 & 2 \\ 2 & 1 & 2 \\ 2 & 2 & 1 \end{bmatrix}$ Inverse of A.
4. $A = \begin{bmatrix} 2 & 3 & 4 \\ 5 & 2 & 1 \\ 4 & 6 & -5 \end{bmatrix}$, $B = \begin{bmatrix} 1 & 4 & 7 \\ -2 & 3 & 8 \\ 6 & -3 & 4 \end{bmatrix}$ show that $(A+B)^T = A^T + B^T$
5. If $A = \begin{bmatrix} 2 & 2 & 5 \\ 5 & 3 & -1 \end{bmatrix}$, $B = \begin{bmatrix} 4 & 7 \\ 2 & 5 \\ 3 & -2 \end{bmatrix}$ verify $(AB)^T = B^T A^T$

SECTION-B**10 MARKS**

1. Show that the matrix $A = \begin{pmatrix} 2 & -1 & 1 \\ -1 & 2 & -1 \\ 1 & -1 & 2 \end{pmatrix}$ Satisfies the equation

Solve the $A^3 - 6A^2 + 9A - 4I = 0$.

2. Find the adjoint of $\begin{pmatrix} 3 & 1 & 2 \\ 2 & 2 & 5 \\ 4 & 1 & 0 \end{pmatrix}$.

3. If $A = \begin{pmatrix} 1 & 1 & 1 \\ 1 & 2 & -3 \\ 2 & -1 & 3 \end{pmatrix}$ Prove that $A(\text{adj}A) = |A|I$.

4. Find the inverse of $\begin{pmatrix} 3 & 1 & 2 \\ 2 & 2 & 5 \\ 1 & 1 & -2 \end{pmatrix}$.

5. Find the inverse of the matrix by the method of reduction $\begin{pmatrix} 1 & 2 & 3 \\ 3 & -2 & 1 \\ 4 & 2 & 1 \end{pmatrix}$

UNIT-II SECTION-A

1. Define correlation
2. Write the formula of correlation
3. Write the formula of rank correlation
4. Write the formula of concurrent deviation
5. Define scatter diagram
6. Write the properties of correlation co-efficient
7. Find the correlation co-efficient $N=10, \Sigma x = 305, \Sigma x^2 = 400, \Sigma y^2 = 60, \Sigma y^2 = 580$.
8. Find the co-efficient $\Sigma x^2 = 120, \Sigma y^2 = 184, \Sigma xy = -92$
9. Find the correlation co-efficient $\Sigma x^2 = 290, \Sigma y^2 = 300$

SECTION-B 5 Marks

1. Find the co-efficient of the correlation from the following data

X	12	9	8	10	11	13	7
Y	14	18	16	9	11	12	3

2. Calculate karl pearl and co-efficient of correlation using 44 and respectively

X	43	44	46	40	42	45	42	38	40	52	57
Y	29	31	19	18	19	27	27	41	30	26	10

3. Calculate the sphereman rank correlation in accountancy and satatistics

Marks in accounts	48	35	77	23	47
Marks in statistics	45	20	40	25	48

4. Calculate the rank correlation for the co-efficient

X	2	1	5	3	4	7	6
Y	1	3	2	4	7	5	6

5. Find the rank correlation for the co-efficient

X	92	89	87	86	86	77	71	63	53	50
Y	86	83	91	77	68	85	52	82	37	57

6. Calculate co-efficient of correlation by the method of concurrent deviation from the following data

X	84	85	62	48	84	95	103	100	85	115
Y	20	23	19	21	25	25	28	27	26	30

7. Find co-efficient of correlatio

X	70	65	71	62	58	69	78	64
Y	91	76	65	83	90	64	55	48

7. Write the limitations of correlation.

SECTION-C 10 Marks

1. Use the methods of rank correlation co-efficient to determine which pair of have the nearest approach to common test in the beauty.
2. Find rank correlation between x_1, x_2, x_3

x_1	6	4	9	8	1	2	3	10	5	7
x_2	1	6	5	10	3	2	4	9	7	8
x_3	3	5	8	4	7	10	2	1	6	9

3. The following are the marks secured by 15 students in the mathematics and statistics. Calculate the correlation co-efficient and the rank correlation co-efficient.

Marks in maths	18	78	46	37	47	56	82	48	46
Marks in statistic	46	81	38	44	38	47	75	58	63
Maths	28	46	75	81	49	50			
Statistic	71	64	78	95	45	67			

UNIT III SECTION-A 2 MARKS

1. Define regression equation.
2. Write the regression equation on y on x.
3. Write the regression equation on x on y.

SECTION-B 5 MARKS

1. Calculate regression equation of x on y and y on x

X	1	2	3	4	5	8	10
Y	9	8	10	12	14	16	15

2. The following data to give marks in subject A and B in a certain examination mean mark in A $\bar{X} = 39.5$, mean mark in B $\bar{Y} = 47.5$ standard deviation of marks in A is 10.8, standard deviation of marks is B 16.8, co-efficient of correlation between the marks in A and B is 0.42 give the estimate of marks in B for a candidate to secure 51 marks in A.
3. Find two regression co-efficient b_{yx} , b_{xy} and hence find the correlation co-efficient for the following data.

$$\Sigma x = 24, \Sigma y = 214, \Sigma xy = 306, \Sigma x^2 = 164, \Sigma y^2 = 576, N = 4.$$

SECTION-C 10 MARKS

1. A Panel of judges A and B graded 7 debtors and independently awarded the following marks.

Marks by A	40	34	28	30	44	38	31
Marks by B	32	39	26	30	38	34	28

And the 8th debtor was awarded 36 marks by judge A while judge b was not present. If judge B where also present how many marks would expect into awarded him to 8th debtor assuming that the same degree of relation exist in there judgement.

2. Find the equation of regression line for the following data

X	25	28	35	32	36	36	29	38	34	32
Y	43	46	49	41	36	32	31	30	33	39

3. For the two variables x and y the equation of regression lines are $9Y - X - 288 = 0$ and $X - 4Y + 38 = 0$. Find i) The mean value of X and Y
 ii) The co-efficient of correlation between X and Y.
 iii) The ratio of the standard deviation y to that of x.
 iv) The most propable value of y when $x=145$.
 v) The most propable value of x when $y=35$.

UNIT IV

SECTION-A

2 MARKS

1. Define t-test.
2. Write the formula for t-test.
3. Define CHI-square test.
4. Define F-test.
5. Write the formula F-test.
6. Write uses of t-test?
7. Write the properties of sampling distribution of t.
8. Define sample.

SECTION-B**5 MARKS**

1. The machine is designed to produce insulating washer for electronic device of average thickness of 0.025 cm, a random sample of 10 washers was found to be 0.024 cm and a standard deviation of 0.002 cm. Test the deviation value of t for 9 degrees of freedom @5% level is 2.2624.

2. The random sample of 10 boys has the following marks 70, 120, 110, 101, 88, 83, 95, 98, 107, 100. To this data support the assumptions of the population mean mark of 100

3. The height of 10 males of given locality are found to be 175, 168, 155, 170, 175, 160, 160, 165. Based on this sample of 10 items, test the hypothesis that \bar{x} height of male is 170 cm.

4. A random sample of 27 pairs of observation from a normal population gave a correlation coefficient of 0.6. Is this significance of correlation in the population.

5. An IQ was administered to 5 persons before and after they were trained. Results are given below.

Candidate	I	II	III	IV	V
IQ before training	110	120	123	132	125
IQ after training	120	118	125	136	121

Test whether there is any change in the after training programme.

6. From the following data the difference between variance is significant at 5% level is significance.

Sample	A	B
Sum of square of deviation from \bar{x}	84.4	102.6
Size (n)	8	10

SECTION-C**10 MARKS**

1. A sample of 10 house owners is drawn and the following values of the incomes are obtained: mean Rs. 6000, Standard deviation Rs. 650. Test the hypothesis that the average income of houseowner of the town is Rs. 5500.

2. Certain refined edible oil is packed in tins holding 16 kg each. The filling machine can maintain this but with a standard deviation of 0.5 kg. Samples of 25 are taken from the production line. If a sample mean is

i) 16.35kgs ii) 15.8kgs can we be 95% sure that the sample has come from a population of 16kg tins.

3. The different normal population and their given below

S_1	40	45	25	35	55	65	25	75	45	50
S_2	55	80	20	55	35	65	40	60	70	15

Test the population \bar{x} could be equal.

4. Two sales man A and B working in a certain district from a sample survey conducted by head office. The following results were obtained, state if there is any significance difference in the average sales between two sales man.

	A	B
No.of.sales	20	18
Average sales	170	205
Standard deviation	20	25

5. Compute the co-efficient of correlation and apply T-test for its significance.

X	102	105	102	108	130	146	109	124
Y	120	102	138	115	106	116	122	108

6. A Company arranged an insentive training course for its team of salesman. A random sample of 10 salesman was selected and value of their sales we made in the beats immediately before and after the course are shown in the table test whether there is an increase in mean sales

Salesman	1	2	3	4	5	6	7	8	9	10
Before training	12	23	5	18	10	21	19	15	8	4
After training	18	22	15	21	13	22	17	19	12	16

7. The value of variance is two samples are given below.

S_1	5	6	8	1	12	4	3	9	6	10
S_2	2	3	6	8	1	10	2	8		

Test the significance of difference between 2 sample mean and 2 sample variance .

UNIT-V SECTION-A 2 MARKS

1. Define ANOVA
2. State any two assumption of ANOVA
3. Write the types of ANOVA.
4. Write the ANOVA table.
5. Define one-way classification
6. Define two-way classification.

SECTION-B 5 MARKS

7. Explain procedure of one way classification.
8. Write the procedure of two way classification.
9. Perform one way classification for the given data.

Plots of land	Variety of wheat		
	A_1	A_2	A_3
1	6	5	5
2	7	5	4
3	3	3	3
4	8	7	4

10. Perform two way classifications for the following data.

Varieties	Blocks			
	1	2	3	4
A	4	8	6	8
B	5	5	7	8
C	6	7	9	5

SECTION-C 10 MARKS

11. Setup two way ANOVA table for the data given below without any interpretation.

Treatment-1	Treatment-2			
	A	B	C	D
I	30	27	31	30
II	35	30	29	31
III	34	32	35	28

Use coding method subtracting 40 from the given numbers.

12. Three different machines are used for a modulation. On the basis of the outputs, set up one-way ANOVA table and test whether the machines are equally effective.

OUTPUTS		
Machine-1	Machine-2	Machine-3
10	9	20
15	7	16
11	5	10
10	6	14

13. Perform a two-way ANOVA on the data given below.

Treatment-1	Treatment-2		
	A	B	C
1	30	26	38
2	24	29	28
3	33	24	35
4	36	31	30
5	27	35	33

Use coding method subtracting 30 from the given numbers.