

DEPARTMENT OF B.COM – BANKING AND INSURANCE

18 UBI 2A2–BUSINESS MATHEMATICS AND STATISTICS

K1 – LEVEL

MULTIPLE CHOICE QUESTIONS:

UNIT - I

1. A set of numbers arranged in a specific order is called as _____

Series

Sequence

Term

Order of elements

2. The Successive terms of a sequence are connected by plus or minus sign, the sequence is called as _____

Series

Sequence

Term

Order of elements

3. Generally a sequence is written as _____

$u_1, u_2, u_3 \dots$

$a, a+d, a+2d \dots$

$a, a-d, a+2d \dots$

$a, a+d, a-2d \dots$

4. The n^{th} term of an general term is denoted in Arithmetic Progression is _____

t_n

a

d

$a+d$

5. In Arithmetic Progression 'd' is denoted by

Common Difference

First term

Second term

Last term

6. If the successive terms increase or decrease by a constant factor , the series is called _____

Arithmetic Mean

Geometric Progression

Geometric Mean

Arithmetic Progression

7. In the sequence let 'a' is denoted by _____

Common Difference

First term

Second term

Last term

8. When d is positive the series is an _____

Decreasing Series

Sequence

Increasing Series

Term

9. In an arithmetic series 7th and 9th terms are 16 and 20. What is nth term

$t_n = 4 + 2n$

$t_n = 2 + 2n$

$t_n = 3 + 2n$

$t_n = 5 + 2n$

10. In Geometric Progression the 'r' is denoted as _____

Common Ratio

First term

Second term

Last term

UNIT - II

11. The buyer of the goods on credits accepts and sign across _____

Discount

Facevalue

Bill of exchange

All the above

12. The period of time between the legally due date of discounting of a bill is _____

Discounting period

Face value

Bill of exchange

All the above

13. The value due on the due date from a bill of exchange is _____

Discount

Facevalue

Bill of exchange

All the above

14. The value which a banker or a broker pays for a bill of exchange while discounting _____

Discount
Face value
Bill of exchange
Cash Value

15. _____ is an arrangement of elements (numbers) in rows and columns
Determinant

Matrix

Series

Sequence

16. The ad joint matrix of the square matrix A denoted by _____

$|A|$

A^T

A^1

Adj A

17. The inverse of square matrix A is denoted by _____

$|A|$

A^T

A^1

Adj A

18. _____ of a matrix is the order of the largest square sub matrix determinant is not zero.

Order

Column

Row

Rank

19. The rank of a matrix A is denoted by _____

$|A|$

A^T

A^1

None of these

20. Example for zero matrix _____

$A = \begin{bmatrix} 2 & 8 & 5 \end{bmatrix}$

$A = \begin{bmatrix} 4 & 9 & 6 \end{bmatrix}$

$A = \begin{bmatrix} 0 & 0 \\ 0 & 0 \end{bmatrix}$

$$A = \begin{pmatrix} 1 & 0 & 0 \\ 0 & 0 & 1 \end{pmatrix}$$

UNIT - III

21. Who defined statistics is an quantitative data?

Yule and Kendall

Webster

Bowley

Tuttle

22. Statistics deals with _____ data

Qualitative

Quantitative

Primary

Secondary

23. Only a _____ of items is considered in statistics

Set

Single

Group

Similar

24. Measures of central tendency is also known as _____

Measures of averages

Measures of dispersion

Measures of location

Measures of product

25. Calculate mean 30,70,10,500,90

140

165

160

175

26. Median is the value of _____ item

Middle

First

Second

Last

27. The symbol for indicating median is _____

A^1

X

X

M

28. Calculate Median 2,0,5,6,7

2

0

6

5

29. Mode is the value which has the _____ frequency

Greatest

Lower

Middle

Small

30. Determine the mode 2,5,7,2,7,5,2,9

2

5

7

9

UNIT – IV

31. Dispersion is the measure of the _____

Variation of the item

No variation of the item

Separation of the item

All of these

32. The difference between the greatest and the smallest value is called as _____

Range

Smaller value

Larger value

Middle value

33. In symbols how to indicate range?

S-L

L-S

M-L

L-M

34. In symbols how to Largest value?

L

S

M
Z

35. In symbols how to Smallest value?

L
S
M
Z

36. Formula for co-efficient of range is

$$\frac{L - S}{S - L}$$

$$\frac{L - S}{S - L}$$

$$\frac{S - L}{S - L}$$

$$\frac{S - L}{S - L}$$

$$\frac{S - L}{S - L}$$

37. Find the value of range 8,10,5,9,12,11

5
8
11
7

38. Find the value of range 2,9,8,10,12

10
5
7
8

39. Find the value of co-efficient of range 2,9, 10,12,8

0.5
0.8
0.3
0.7

40. Correlation refers to the relationship between the _____

Variables

Values

One variable

Two variables

UNIT - V

41. A time series is a collection of _____

Variables
Values
One variable
Obsevation

42. The series of values might have been observed at _____ intervals

Regular

Negative
Simple
Group

43. Variables have _____ at different points of time.

Positive values

Different values

Simple values
Same values

44. An index number is designed to show changes in a _____

Variable

Location

Time

Price

45. Index number is a _____

Single ratio

Group ratio

Location ratio

Time ratio

46. Price index number is designed to show changes in a _____

Variable

Price

Location

Time

47. What is the formula for calculating Laspeyre's price index?

$$\frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$$

$$\frac{\sum p}{\sum p} \times 100$$

$$\frac{\sum p}{\sum p} \times 100$$

$$\frac{\sum p}{\sum p} \times 100$$

48. What is the formula for calculating Paache's price index?

$$\frac{\sum p}{\sum p} \times 100$$

$$\frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$$

$$\frac{\sum p}{\sum p} \times 100$$

$$\frac{\sum p}{\sum p} \times 100$$

49. In index numbers weighted aggregative method is classified into ____ types

4

2

3

5

50. In index numbers unweight /simple aggregative method is classified into ____ types

4

2

3

5

K2 – LEVEL

SHORT ANSWERS

UNIT - I

1. What is sequence?

A set of numbers arranged in a specific order is called as sequence.

2. What is series?

The Successive terms of a sequence are connected by plus or minus sign the sequence is called as series.

3. What is finite series?

A series is called a finite series if it contains finite number of terms.

4. What is infinite series?

A series is called a infinite series if it contains infinite number of terms.

5. What are the types of series?

- i. Arithmetic series or Arithmetic Progression
- ii. Geometric series or Geometric Progression

6. How to denote the n^{th} term of an Arithmetic Progression?

t_n

7. In Arithmetic Progression how 'd' is denoted?

Common Difference

8. What is Arithmetic Progression?

If the successive terms increase or decrease by a constant factor, the series is called as Arithmetic Progression

9. In the sequence how 'a' is denoted?

First term

10. What is Increasing Series?

When d is positive the series is an Increasing Series.

UNIT - II

11. What is meant by matrix?

Matrix is an arrangement of elements (numbers) in rows and columns.

12. What is a Square Matrix?

When a number of rows and columns in a matrix are equal then the matrix is called as Square Matrix.

13. What is a zero Matrix?

All the elements in the matrix are zeros, the matrix is called as zero matrix or null matrix.

14. What is a unit Matrix?

A square matrix whose diagonal elements are 1 each and non-diagonal elements are zero is called a unit matrix or an identity matrix.

15. What is a row Matrix?

Only one row in the matrix is called as row matrix.

16. What is a column Matrix?

Only one column in the matrix is called as column matrix.

17. How to denote Unit matrix or Identity matrix?

I

18. If $A = \begin{bmatrix} 2 & 3 \\ 10 & 15 \end{bmatrix}$ and $B = \begin{bmatrix} 4 & 7 \\ 8 & 5 \end{bmatrix}$ find $A+B$.

$$A+B = \begin{bmatrix} 6 & 10 \\ 18 & 20 \end{bmatrix}$$

19. Find the value of determinant: $\begin{bmatrix} 6 & 1 \\ 4 & 3 \end{bmatrix}$

$$|A| = 14$$

20. Find the rank of $\begin{bmatrix} 3 & 2 \\ 7 & 8 \end{bmatrix}$

The rank of a given matrix is 2.

UNIT - III

21. Define statistics.

Statistics defines as the science of collection, presentation, analysis and interpretation of numerical data.

22. What are the functions of statistics?

Collection

Numerical presentation

Comparison

Forecasting

Estimation

23. What are the characteristics of statistics?

Statistics is a quantitative data

It never consider as a single item

The value should be different

24. How statistics is useful to industry?

Statistical method help in the maintenance of records of inventory, purchase, production and marketing.

Each and every activity of an industry can be determined by using statistical method.

25. Who defined statistics is a quantitative data?

Yule and Kendall

26. Define arithmetic mean.

Arithmetic mean is the total of the values of the items divided by their numbers.

27. Calculate arithmetic mean: 30,70,10,75,500,8,42,250,40,36.

106.10

28. Define median.

Median is the value of middle most item when all items in the order of magnitude.

29. Calculate Median 9,7,21,9,32

9

30. Calculate median 5,2,6,8,2,5,7,9,2,5

2 and 5

UNIT - IV

31. What is the formula for co-efficient of range?

$$\frac{L - S}{L + S}$$

32. Find the value of range 8,10,5,9,12,11

7

33. Find the value of co-efficient of range 8,10,5,9,12,11

0.4

34. Find the value of co-efficient of range 2,9, 10,12,8

0.7

35. What is meant by Correlation?

Correlation refers to the relationship between the variables.

36. What is meant by simple correlation?

Simple correlation refers to the relationship between the two variables.

37. What is meant by positive correlation?

When the value of two variables changes in the same direction, it is called as positive correlation.

38. What is meant by negative correlation?

When the value of two variables changes in the same direction, it is called as negative correlation.

39. Ranking of 10 trainees at the beginning (X) and at the end (Y) of a certain course are given below:

Trainees	A	B	C	D	E	F	G	H	I	J
X	1	6	3	9	5	2	7	10	8	4
Y	6	8	3	7	2	1	5	9	4	10

Calculate Spearman's rank correlation coefficient.

= 0.3939

40. Calculate the correlation coefficient between aptitude score and productivity index.

Aptitude Score	57	58	59	59	60	61	62	64
Productivity Index	67	68	65	68	72	72	69	71

$r = 0.6030$

UNIT - V

41. What is meant by Index?

An index number is designed to show changes in a Price.

42. What is Price index number?

A price index number is the percentage of change in the price of one commodity or one group of commodities in the current year compared with the base year.

43. What are the uses of Index numbers?

1. Index numbers provide scope for comparisons
2. Index numbers serve as guides
3. Index numbers are the pulse of an economy

44. What is the formula for calculating Laspeyre's price index?

$$\frac{\sum p_1 q_0}{\sum p_0 q_0} \times 100$$

45. What is the formula for calculating Paache's price index?

$$\frac{\sum p_1 q_1}{\sum p_0 q_1} \times 100$$

46. What is time series?

A time series is a collection of observations made sequentially in time.

47. How the values are observed?

The series of values might have been observed at regular intervals of time such as daily sales, annual profits and decennial census.

48. Is the values differ in different points?

Variables such as Sales, production, Profit and Population have different values at different points of time.

49. What is another name of secular trend?

Secular trend is also called as long-term trend or trend.

50. What are Short-term variations?

1. Seasonal Fluctuations
2. Cyclical Fluctuations
3. Irregular Variations

K3 LEVEL

UNIT - I

1. Find the simple interest on the sum of Rs. 6,000 at 10% p.a. for 3 years.
2. Calculate the total amount that will be received from the debtor when the principal Rs. 10,000 is lent to him on interest for 4 years at 9%p.a.
3. A certain sum amounts to Rs. 4,000 at the end of 5 years at 12% p.a. interest. Find the sum.
4. Find the compound interest on Rs. 20,000 for 5 years at 20% p.a. What will be the simple interest in the above case?
5. The bankers gain on a sum due 10 months hence at 6% p.a. is Rs. 25. Find the sum due.
6. A bill for Rs. 1,825 was drawn on 22nd January at 6 months date and discounted on 16th April at the rate of 10% p.a. Find the sum for which the bill was discounted and the banker's gain.
7. In an Arithmetic series, the seventh and the ninth terms are respectively 16 and 20. Find the nth term.
8. The fourth and seventh terms of an A.P. are 3 and 36. Find the A.P. and its fifteenth term.
9. If the third and the seventh terms of a G.P are 2 and $\frac{1}{8}$, find the G.P. and its tenth term.
10. Find the 20th term of the series 4, 9, 14 . . .

UNIT - II

11. If $A = \begin{bmatrix} 4 & 6 & 9 \\ 3 & 5 & 10 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 0 & 1 \\ 4 & -7 & -3 \end{bmatrix}$ find $A+B$ and $B+A$.
12. If $A = \begin{bmatrix} 4 & 6 & 9 \\ 3 & 5 & 10 \end{bmatrix}$ $B = \begin{bmatrix} 5 & 0 & 1 \\ 4 & -7 & -3 \end{bmatrix}$ find $A-B$ and $B-A$.
13. If $A = \begin{bmatrix} 2 & 3 & 5 \\ 4 & 7 & 9 \\ 1 & 6 & 4 \end{bmatrix}$ $B = \begin{bmatrix} 3 & 1 & 2 \\ 4 & 2 & 5 \\ 6 & -2 & 7 \end{bmatrix}$ show that $5(A+B) = 5A+5B$.
14. If $A = \begin{bmatrix} 3 & 5 & 6 \end{bmatrix}$ and $B = \begin{bmatrix} 4 \\ 1 \\ 2 \end{bmatrix}$ find AB .
15. Solve the following equations by Cramer's rule.

$$3x+2y = 8$$

$$5x-3y = 7$$

16. Find the minors and cofactors of all the elements of $\begin{vmatrix} 3 & 2 \\ 5 & 0 \end{vmatrix}$

17. Find the inverse of $A = \begin{bmatrix} 2 & 2 \\ 3 & 5 \end{bmatrix}$

18. Find the Determinant of $\begin{vmatrix} 1 & 2 & 3 \\ 2 & 4 & 5 \\ 3 & 5 & 6 \end{vmatrix}$

19. Find the rank of $\begin{vmatrix} 3 & 2 & -1 \\ 7 & 8 & 0 \\ 4 & 6 & 1 \end{vmatrix}$

20. Find the adjoint of the matrix $A = \begin{vmatrix} 3 & 1 & 2 \\ 2 & 5 & 3 \\ 1 & 3 & 1 \end{vmatrix}$

UNIT - III

21. The expenditure of 10 families in Rupees are given below.

Family	A	B	C	D	E	F	G	H	I	J
Expenditure	30	70	10	75	500	8	42	250	40	36

Calculate the arithmetic mean using direct method.

22. The expenditure of 10 families in Rupees are given below.

Family	A	B	C	D	E	F	G	H	I	J
Expenditure	30	70	10	75	500	8	42	250	40	36

Calculate the arithmetic mean using Short cut method.

23. Calculate the mean number of persons per house. Given

No. of persons per house	2	3	4	5	6	Total
No. of houses	10	25	30	25	10	100

24. Calculate the arithmetic mean.

Marks	40	50	54	60	68	80	Total
No. of Students	10	18	20	36	15	8	110

25. Calculate arithmetic mean for the following:

Marks	20-30	30-40	40-50	50-60	60-70	70-80
No. of Students	5	8	12	15	6	4

26. Find median for the following:

6 9 21 5 7 -2 0 32 9

27. Find median for the following:

57 58 61 42 38 65 72 66

28. Determine the mode.

3, 6, 7, 5, 8, 4, 9.

29. Find the value of range and its coefficient for the following data:

8 10 5 9 12 11

30. 77,73,75,70,72,76,75,72,74,76.

Give standard deviation for the numbers given above.

UNIT - IV

31. Find mean deviation for the data given below.

X	2	4	6	8	10
f	1	4	6	4	1

32. Compute the coefficient of correlation between X-Advertisement Expenditure and Y-Sales.

X	10	12	18	8	13	20	22	15	5	17
Y	88	90	94	86	87	92	96	94	88	85

33. Ranking of 10 trainees at the beginning (X) and at the end (Y) of a certain course are given below:

Trainees	A	B	C	D	E	F	G	H	I	J
X	1	6	3	9	5	2	7	10	8	4
Y	6	8	3	7	2	1	5	9	4	10

Calculate Spearman's rank correlation coefficient.

34. For the data given below, calculate the rank correlation coefficient.

X	21	36	42	37	25
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Y	47	40	37	42	43
---	----	----	----	----	----

35. Find the rank correlation coefficient for the percentage of marks secured by a group of 8 students in Economics and Statistics.

Marks in Economics	50	60	65	70	75	40	70	82
Marks in Statistics	80	71	60	75	90	82	70	50

36. Find the coefficient of correlation for the data given below:

X	10	12	18	24	23	27
Y	13	18	12	25	30	10

37. Find out Pearson's coefficient of correlation:

X	10	14	15	28	35	48
Y	74	61	50	54	43	36

38. What are the uses of simple linear regression?

39. Distinguish between regression and correlation.

40. From the following statistics, construct the regression equation of Y on X.

$$n = 12; \sum x = 23; \sum y = 28; \sum xy = -432; \sum x^2 = 921; \sum y^2 = 734$$

UNIT - V

41. Draw a trend line by the method of semi-averages.

Year	1987	1988	1989	1990	1991	1992	1993
Production – in tonnes	90	110	130	150	100	150	200

42. Calculate 5 yearly moving average of number of students studying in a commerce college as shown by the following figures:

Year	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996
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No.of students	332	311	357	392	402	405	410	427	405	438
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43. Using three year moving averages determine the trend and short-term fluctuation.

Year	1983	1984	1985	1986	1987	1988	1989	1990	1991	1992
Production	21	22	23	25	24	22	25	26	27	26

44. Explain the characteristics of index numbers.

45. Explain the various uses of index numbers.

46. From the following data construct an index for 1995 taking 1994 as base.

Commodities	A	B	C	D	E
Price in 1994 (Rs.)	50	40	80	110	20
Price in 1995 (Rs.)	70	60	90	120	20

47.

Products	p_0	q_0	p_1	q_1
A	12	100	20	120
B	4	200	4	240
C	8	120	12	150
D	20	60	24	50

For the data given above, find the index number by Paasche's method .

48.

Products	p_0	q_0	p_1	q_1
A	12	100	20	120

B	4	200	4	240
C	8	120	12	150
D	20	60	24	50

For the data given above, find the index number by Laspeyre's method.

49. Construct an index numbers of price from the following data by applying Fisher's method.

Commodities	1999		1998	
	Price	Quantity	Price	Quantity
A	4	6	2	8
B	6	5	5	10
C	5	10	4	14
D	2	13	2	19

50. Calculate price index number by simple geometric mean method.

Item	A	B	C	D	E
Weight	40	25	15	10	10
Price in 1991-Rs.	25	50	40	10	20
Price in 2001-Rs.	40	80	60	20	40

K4 / K5 LEVEL

UNIT - I

1. Mr. Somasundaram deposits a total of Rs. 45,000 in two different banks which give 10% and 15% interest respectively. If the amounts repayable by the two banks at the end of 10 years are to be equal, determine the individual amounts of deposit.
2. The difference between the compound interest and the simple interest for 3 years at 5% p.a. on a certain sum of money was Rs.610. find the sum.
3. The difference between true discount and bankers discount on a bill due after 6 months discounted at 6% per annum is Rs. 27. Find the True Discount, Banker's Discount and the Face Value of the bill.
4. If $\frac{1}{x}, \frac{1}{y}, \frac{1}{z}$ are in A.P., prove that x, y, z are also in A.P.
5. Find the sum of n terms of the following series: $7+77+777+\dots$

UNIT - II

6. Solve the following system of simultaneous equations by Cramer's Rule:

$$2x+3y+3z = 22$$

$$x - y + z = 4$$

$$4x+2y-z = 9$$

7. If $A = \begin{bmatrix} 3 & 1 & 2 \\ 0 & 5 & 7 \\ 9 & 1 & -4 \end{bmatrix}$ $B = \begin{bmatrix} 7 & 1 & 9 \\ 3 & 0 & -1 \\ 4 & -6 & 2 \end{bmatrix}$ show that $A+B = \frac{1}{2}(2A+2B)$

8. Find the minors and cofactors of all the elements of $\begin{bmatrix} 5 & 6 & 7 \\ 0 & 1 & -3 \\ -2 & 4 & 9 \end{bmatrix}$

9. Find the inverse of the matrix $A = \begin{bmatrix} 1 & 0 & -1 \\ 3 & 4 & 5 \\ 0 & -6 & -7 \end{bmatrix}$

10. Find the rank of $\begin{bmatrix} -2 & 1 & 34 \\ 0 & 1 & 12 \\ 1 & 3 & 47 \end{bmatrix}$

UNIT - III

11. Calculate the arithmetic mean by all the three methods and compare the results.

Middle Income (Rs. 000)	6	8	10	12	14	16	18
No. of employees	21	55	124	180	136	73	11

12. Find the mean, median and mode.

159,152,155,168,175,172,160,163,158,167

13. Calculate the median height.

Height	145-150	150-155	155-160	160-165	165-170	170-175
No.of.Students	2	5	10	8	4	1

14. Calculate the mode.

Daily wages in Rs.	50-60	60-70	70-80	80-90	90-100
NO.ofLabourers	40	62	75	100	65

15. Daily earnings in RS.(X) of 10 coolies are given. Calculate all the three mean deviation and the corresponding relative measures

X	32	51	23	46	20	78	57	56	57	30
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UNIT - IV

16. The following table gives aptitude test scores and productivity indices of 8 randomly selected workers

Aptitude score	57	58	59	59	60	61	62	64
Productivity index	67	68	65	68	72	72	69	71

Calculate the correlation coefficient between aptitude score and productivity index .

17. Compute coefficient of correlation between X and Y.

X	10	12	18	8	13	20	22	15	5	17
Y	88	90	94	86	87	92	96	94	88	85

18. Marks obtained by 8 students in Accountancy (X) and Statistics (Y) are given below. Compute rank correlation.

X	15	20	28	12	40	60	20	80
---	----	----	----	----	----	----	----	----

Y	40	30	50	30	20	10	30	60
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19. From the following data, obtain the two regression equations:

x	6	2	10	4	8
y	9	11	5	8	7

20. Find the two regression equations for the data given above.

X	40	38	35	42	30
Y	30	35	40	36	29

UNIT - V

21. Using four yearly moving averages, calculate the trend values and short term fluctuation:

Year	1981	1982	1983	1984	1985	1986	1987	1988	1989	1990
Production	464	515	518	467	502	540	557	571	586	612

22. Fit a straight line trend equation to the following data by the methods of least squares and estimate the values of sale for the year 1985.

Year	1979	1980	1981	1982	1983
Sales (in Rs.)	100	120	140	160	180

23. Fit a straight line trend equation to the following time series.

Year	1990	1991	1992	1993	1994	1995
Production	72	75	74	78	83	82

24. Compute (i) Laspeyre's (ii) Paasche's and (iii) Fisher's index numbers.

Item	Price		Quantity	
	Base year	Current year	Base year	Current year
A	6	10	50	50

B	2	2	100	120
C	4	6	60	60
D	10	12	30	25

25. Construct index numbers of price from the following data by applying (i) Laspeyre's (ii) Paasche's and (iii) Fisher's index numbers.

Commodities	1999		1998	
	Price	Quantity	Price	Quantity
A	4	6	2	8
B	6	5	5	10
C	5	10	4	14
D	2	13	2	19