

NGM COLLEGE
DEPARTMENT OF COMPUTERSCIENCE (SF)
COURSE TITLE: MATHEMATICS-I
COURSE CODE: 18UCS1A1
UNIT-1

1. The determinant of identity matrix is :
 - a) **1**
 - b) 0
 - c) Depends on the matrix
 - d) None of the mentioned

2. If determinant of a matrix A is Zero than:
 - a) **A is a Singular matrix**
 - b) A is a non-Singular matrix
 - c) Can't say
 - d) None of the mentioned

3. For a skew symmetric even ordered matrix A of integers, which of the following will not hold true:
 - a) $\det(A) = 9$
 - b) $\det(A) = 81$
 - c) **$\det(A) = 7$**
 - d) $\det(A) = 4$

4. For a skew symmetric odd ordered matrix A of integers, which of the following will hold true:
 - a) $\det(A) = 9$
 - b) $\det(A) = 81$
 - c) **$\det(A) = 0$**
 - d) $\det(A) = 4$

5. Let $A = [ka_{ij}]_{n \times n}$, $B = [a_{ij}]_{n \times n}$, be an $n \times n$ matrices and k be a scalar then $\det(A)$ is equal to:
 - a) $K \det(B)$
 - b) **$K^n \det(B)$**
 - c) $K^3 \det(b)$
 - 4) None of the mentioned

6. Which of the following property of matrix multiplication is correct:
 - a) Multiplication is not commutative in genral
 - b) Multiplication is associative

c) Multiplication is distributive over addition

d) All of the mentioned

7. Transpose of a rectangular matrix is a

A. rectangular matrix

B. diagonal matrix

C. square matrix

D. scalar matrix

8. Transpose of a column matrix is

A. zero matrix

B. diagonal matrix

C. column matrix

D. row matrix

9. If A and B matrices are of same order and $A + B = B + A$, this law is known as

a) distributive law

b) commutative law

c) associative law

d) cramer's law

10. Generally matrices are denoted by

a) capital letters

b) numbers

c) small letters

d) operational signs

Unit-II

11. Difference of mode and mean is equal to

A. 3(mean-median)

B. 2(mean-median)

C. 3(mean-mode)

D. 2(mode mean)

12. If mean is 11 and median is 13 then value of mode is

- A. 15
- B. 13
- C. 11
- D. 17**

13. Distribution in which values of median, mean and mode are not equal is considered as

- A. experimental distribution
- B. asymmetrical distribution**
- C. symmetrical distribution
- D. exploratory distribution

14. If value of three measures of central tendencies median, mean and mode then distribution is considered as

- A. negatively skewed modal
- B. triangular model
- C. unimodel**
- D. bimodel

15. If value of mode is 14 and value of arithmetic mean is 5 then value of median is

- A. 12
- B. 18
- C. 8**
- D. 14

16. Most frequent observation in a data set is called

- a) mode**
- b) median
- c) range
- d) mean

17. The range of the correlation coefficient is?

- a. -1 to 0.
- b. 0 to 1.
- c. -1 to 1.**
- d. None of the above.

18. Standard deviation of first 50 natural numbers is

- A. 45.43
- B. 14.43**
- C. 20.43
- D. 16.43

19. If value of first quartile is 49 and value of third quartile is 60 then value of inter quartile range is

- A. 21
- B. 31
- C. 11**
- D. 41

20. If large number of values lies in central part of data table then spread of values is measured by

- A. percentile range
- B. inter quartile range**
- C. quartile range
- D. deciles range

Unit-III

21. A Type I error occurs when we

- a. reject a false null hypothesis
- b. reject a true null hypothesis**
- c. do not reject a false null hypothesis
- d. do not reject a true null hypothesis

22. A Type II error occurs when we

- a. reject a false null hypothesis
- b. reject a true null hypothesis
- c. do not reject a false null hypothesis**
- d. do not reject a true null hypothesis

23. If a hypothesis is rejected at the 0.025 level of significance, it

- a. must be rejected at any level
- b. must be rejected at the 0.01 level

c. must not be rejected at the 0.01 level

d. may or may not be rejected at the 0.01 level

24. If we reject the null hypothesis, we conclude that:

a. there is enough statistical evidence to infer that the alternative hypothesis is true

b. there is not enough statistical evidence to infer that the alternative hypothesis is true

c. there is enough statistical evidence to infer that the null hypothesis is true
d. the test is statistically insignificant at whatever level of significance the test was conducted at

25. Which of the following p-values will lead us to reject the null hypothesis if the significance level of the test is 5%?

a. 0.15

b. 0.10

c. 0.06

d. 0.025

26. The purpose of hypothesis testing is to:

a. test how far the mean of a sample is from zero

b. determine whether a statistical result is significant

c. determine the appropriate value of the significance level

d. derive the standard error of the data

27. Regardless of the difference in distribution of sample and population, the mean of the sampling distribution must be equal to

A. degree of freedom

B. statistic error

C. population mean

D. standard error

28. In statistical analysis, sample size is considered large if

A. $n > \text{or} = 30$

B. $n < \text{or} = 30$

C. $n > \text{or} = 50$

D. $n < \text{or} = 50$

29. All values in the sample distribution that can freely vary in a selected random sample from the population are indicated as

A. degree of freedom

B. degree of error

C. degree of statistic

D. degree of possibility

30. Standard deviation of a sampling distribution is also classified as

A. standard error

B. statistic error

C. sampling error

D. probability error

Unit-III

31. **What is probability of drawing two clubs from a well shuffled pack of 52 cards?**

a. $13/51$

b. $1/17$

c. $1/26$

d. $13/17$

32. **When two coins are tossed simultaneously, what are the chances of getting at least one tail?**

a. $3/4$

b. $1/5$

c. $4/5$

d. $1/4$

33. **In a drawer there are 4 white socks, 3 blue socks and 5 grey socks. Two socks are picked randomly. What is the possibility that both the socks are of same color?**

a. $4/11$

b. 1

c. $2/33$

d. $19/66$

34. **What is the possibility of having 53 Thursdays in a non-leap year?**

a. $6/7$

b. $1/7$

c. $1/365$

d. $53/365$

35. A box has 5 black and 3 green shirts. One shirt is picked randomly and put in another box. The second box has 3 black and 5 green shirts. Now a shirt is picked from second box. What is the probability of it being a black shirt?

a. $4/9$

b. $29/72$

c. $8/72$

d. $3/16$

36. On rolling a dice 2 times, the sum of 2 numbers that appear on the uppermost face is 8. What is the probability that the first throw of dice yields 4?

a. $2/36$

b. $1/36$

c. $1/6$

d. $1/5$

37. There are 2 pots. One pot has 5 red and 3 green marbles. Other has 4 red and 2 green marbles. What is the probability of drawing a red marble?

a. $9/14$

b. $31/48$

c. 1

d. $1/2$

38. A pot has 2 white, 6 black, 4 grey and 8 green balls. If one ball is picked randomly from the pot, what is the probability of it being black or green?

a. $3/4$

b. $7/10$

c. $4/3$

d. $1/10$

39. Three unbiased coins are tossed. What is the probability of getting at least 2 tails?

a. 0.75

b. 0.5

c. 0.25

d. 0.2

40. Two dice are tossed simultaneously. Find the probability that the total is a prime number.

- a. $7/9$
- b. $5/12$
- c. $1/6$
- d. $5/9$

Unit-V

41. The convergence of which of the following method is sensitive to starting value?

- A.False position
- B.Gauss seidal method
- C.Newton-Raphson method
- D.All of these

42. Newton-Raphson method is used to find the root of the equation $x^2 - 2 = 0$.

If iterations are started from - 1, then iterations will be

- A.converge to -1
- B.converge to $\sqrt{2}$
- C.converge to $-\sqrt{2}$
- D.no coverage

43. To solve $x^2 - 2 = 0$ by Newton Raphson technique. If initial guess is $x_0 = 1.0$, subsequent estimate of x (i.e. x_1) will be

- A.1.414
- B.1.5
- C.2.0
- D.None of these

44. Using Newton-Raphson method, find a root correct to three decimal places of the equation $x^3 - 3x - 5 = 0$

- A.2.275
- B.2.279
- C.2.222
- D.None of these

45. Double (Repeated) root of $4x^3 - 8x^2 - 3x + 9 = 0$ by Newton-raphson method is

- A.1.4
- B.1.5
- C.1.6
- D.1.55

46. The two-segment trapezoidal rule of integration is exact for integrating at most _____ order polynomials.

- (A) first
- (B) second
- (C) third
- (D) fourth

47. The highest order of polynomial integrand for which Simpson's $1/3$ rule of integration is exact is

- (A) first
- (B) second
- (C) third
- (D) fourth

48. The root of $x^3 - 2x - 5 = 0$ correct to three decimal places by using Newton-Raphson method is

- A.2.0946
- B.1.0404
- C.1.7321
- D.0.7011

49. Newton-Raphson method of solution of numerical equation is not preferred when

- A.Graph of A(B) is vertical
- B.Graph of x(y) is not parallel
- C.The graph of f(x) is nearly horizontal-where it crosses the x-axis.
- D.None of these

50. Newton-Raphson method is applicable to the solution of

- A.Both algebraic and transcendental Equations
- B.Both algebraic and transcendental and also used when the roots are complex
- C.Algebraic equations only

D. Transcendental equations only

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1. Define matrix.

A matrix is a collection of numbers arranged into a fixed number of rows and columns.

2. Define Row matrix.

A row matrix is a matrix with only one row.

Example: E is a row matrix of order 1×1

3. Define column matrix

A column matrix is a matrix with only one column.

Example: C is a column matrix of order 1×1

4. What is Zero matrix.

A zero matrix or a null matrix is a matrix that has all its elements zero.

5. Define diagonal matrix.

A diagonal matrix is a square matrix that has all its elements zero except for those in the diagonal from top left to bottom right; which is known as the leading diagonal of the matrix.

6. Define Scalar matrix.

A scalar matrix is a diagonal matrix where all the diagonal elements are equal. For example:

7. What is upper triangular matrix?

An upper triangular matrix is a square matrix where all the elements located below the diagonal are zeros.

7. What is lower triangular matrix?

A lower triangular matrix is a square matrix where all the elements located above the diagonal are zeros

8. Define Unit matrix.

A unit matrix is a diagonal matrix whose elements in the diagonal are all ones.

9. What is Symmetric matrix?

A matrix whose transpose is the same as the original matrix is called a symmetric matrix. Only a square matrix can be a symmetric matrix

10. Define transpose of a matrix.

Suppose A is a given matrix, then the matrix obtained by interchanging its rows into columns is called the transpose of A. It is denoted by A^t

UNIT -2

11. Define Mean.

The mean (or average) is the most popular and well known measure of central tendency. It can be used with both discrete and continuous data, although its use is most often with continuous data (see our [Types of Variable](#) guide for data types). The mean is equal to the sum of all the values in the data set divided by the number of values in the data set.

12. What is median?

In the data center, means and medians are often tracked over time to spot trends, which inform capacity planning or power cost predictions. The statistical median is the middle number in a sequence of numbers. To find the median, organize each number in order by size; the number in the middle is the median.

13. Define mode.

The mode is the number that occurs most often within a set of numbers. For the server power consumption examples above, there is no mode because each element is different.

14. Define Range.

The range is the difference between the highest and lowest values within a set of numbers. To calculate range, subtract the smallest number from the largest number in the set.

15. Define standard deviation.

The standard deviation is a statistic that measures the dispersion of a dataset relative to its mean and is calculated as the square root of the variance. It is calculated as the square root of variance by determining the variation between each data point relative to the mean.

16. Define variance

The Variance is defined as **the average of the squared differences from the Mean.**

17 Define correlation.

Correlation is a bivariate analysis that measures the strength of association between two variables and the direction of the relationship. In terms of the strength of relationship, the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables.

18. Define regression.

Regression is a statistical measurement used in finance, investing and other disciplines that attempts to determine the strength of the relationship between one dependent variable (usually denoted by Y) and a series of other changing variables (known as independent variables).

19. What is the best correlation coefficient?

In terms of the strength of relationship, the value of the correlation coefficient varies between +1 and -1. A value of ± 1 indicates a perfect degree of association between the two variables. As the correlation coefficient value goes towards 0, the relationship between the two variables will be weaker.

20. Define quartile deviation.

The quartile deviation is a slightly better measure of absolute dispersion than the range, but it ignores the observations on the tails. If we take different samples from a population and calculate their quartile deviations, their values are quite likely to be sufficiently different.

UNIT -3

21. What is large sample test?

A Z-test is any statistical test for which the distribution of the test statistic under the null hypothesis can be approximated by a normal distribution. ... Therefore, many statistical tests can be conveniently performed as approximate Z-tests if the sample size is large or the population variance is known.

22. What is an acceptable standard error?

The standard error is a statistical term that measures the accuracy with which a sample represents a population. In statistics, a sample mean deviates from the actual mean of a population; this deviation is the standard error.

23. What is a good standard error of measurement?

The standard error of measurement is a function of both the standard deviation of observed scores and the reliability of the test. When the test is perfectly reliable, the standard error of measurement equals 0.

24. What is standard error?

The standard error (SE) of a statistic (usually an estimate of a parameter) is the standard deviation of its sampling distribution^[1] or an estimate of that standard deviation. If the parameter or the statistic is the mean, it is called the standard error of the mean (SEM).

25. What is the Student t test used for?

'Student's' t Test is one of the most commonly used techniques for testing a hypothesis on the basis of a difference between sample means. Explained in layman's terms, the t test determines a probability that two populations are the same with respect to the variable tested.

26. What are the 3 types of t tests?

There are three types of t-test:

- One-sample t-test
- Independent samples t-test
- Paired samples t-test
- Checklist
- Non-parametric.

27. What is the value for Level of Significance?

- The level of significance may be fixed at either 5% or 1%
-

28. Define Large sample theory

- The sample size n is greater than 30 ($n \geq 30$) it is known as large sample. For large samples the sampling distributions of statistic are normal (Z test). A study of sampling distribution of statistic for large sample is known as large sample theory.

29. Discuss Small sample theory

- If the sample size n is less than 30 ($n < 30$), it is known as small sample. For small samples the sampling distributions are t , F and χ^2 distribution. A study of sampling distributions for small samples is known as small sample theory.

30. Discuss **Expected value or critical value**

In case of test statistic Z , the expected value is

$Z_e = 1.96$ at 5% level

2.58 at 1% level Two tailed test

$Z_e = 1.65$ at 5% level

2.33 at 1% level One tailed test

UNIT-4

1. Define probability.

Probability is a branch of mathematics that deals with calculating the likelihood of a given event's occurrence, which is expressed as a number between 1 and 0. An event with a probability of 1 can be considered a certainty.

2. What is the formula of permutation ?

A permutation is an ordered combination. The number of permutations of n objects taken r at a time is determined by the following formula: $P(n,r) = n!(n-r)!$

3. What is combination?

Combination : It is the different selections of a given number of elements taken one by one, or some, or all at a time. For example, if we have two elements A and B, then there is only one way select two items, we select both of them.

4. How many words can be formed by using 3 letters from the word “DELHI” ?

Solution : The word “DELHI” has 5 different words.

Therefore, required number of words = ${}^5P_3 = 5! / (5 - 3)!$

=> Required number of words = $5! / 2! = 120 / 2 = 60$

5. There are 10 questions in an exam. In how many ways can a person attempt at least one question?

Solution: A person can attempt 1 question or 2 questions ortill all 10 questions. One question out of ten questions can be attempted in ${}^{10}C_1 = 10$ ways. Similarly, two questions out of ten questions can be attempted in ${}^{10}C_2 = 45$ ways. Going ahead by the same logic, all ten questions can be attempted in ${}^{10}C_{10} = 1$ way. Hence the total number of ways = $10 + 45 + 120 + \dots + 10 + 1 = 1023$ ways (Using the formula of Combination).

6. A person has 6 friends to be invited for dinner through invitation cards, and he has 3 servants. In how many ways can he extend the invitation card?

Solution: We can see that the 1st friend has 3 options to receive the card, i.e. either from 1st servant or 2nd or 3rd. Similarly, 2nd friend also has 3 options to receive the card, i.e. either from 1st servant or 2nd or 3rd. So we can say that each of the 6 friends has 3 options to receive the card. Hence the answer would be $3 \times 3 \times 3 \times 3 \times 3 \times 3 = 3^6 = 729$ ways.

7. What is the OR rule in probability?

Addition Rule 1: When two events, A and B, are mutually exclusive, the probability that A or B will occur is the sum of the probability of each event. $P(A \text{ or } B) = P(A) + P(B)$ Addition Rule 2:

When two events, A and B, are non-mutually exclusive, there is some overlap between these events.

8. What is an event?

An operation which can produce some well-defined outcomes is called an experiment. Each outcome is called an event.

9. Define sample space.

A sample space of an experiment is the set of all possible results of that random experiment.

For example; in throwing a die possible results are $\{1, 2, 3, 4, 5, 6\}$.

10. What is exhaustive events.?

All the possible outcomes of the experiments are known as exhaustive events.

For example; in throwing a die there are 6 exhaustive events in a trial.

UNIT-5

1. Why we use Gauss Seidel method?

In numerical linear algebra, the Gauss–Seidel method, also known as the Liebmann method or the method of successive displacement, is an iterative method used to solve a linear system of equations

2. What is meant by trapezoidal rule?

In mathematics, and more specifically in numerical analysis, the trapezoidal rule (also known as the trapezoid rule or trapezium rule) is a technique for approximating the definite integral. .

The trapezoidal rule works by approximating the region under the graph of the function as a trapezoid and calculating its area.

3. What is H in the trapezoidal rule?

The Trapezium Rule. ... The trapezium rule works by splitting the area under a curve into a number of trapeziums, which we know the area of. If we want to find the area under a curve between the points x_0 and x_n , we divide this interval up into smaller intervals, each of which has length h

4. Is the trapezoidal rule more accurate than Simpson's rule?

The Trapezoid Rule is nothing more than the average of the left-hand and right-hand Riemann Sums. It provides a more accurate approximation of total change than either sum does alone. Simpson's Rule is a weighted average that results in an even more accurate approximation.

5. Write the formula for Simpson's 3/8 rule.

$$SE(f, h) = \frac{3h}{8} (f(x_0) + 3f(x_1) + 3f(x_2) + f(x_3))$$

6. What is Simpson's rule?

Simpson's Rule is a numerical method for approximating the integral of a function between two limits, a and b . It's based on knowing the area under a parabola, or a plane curve. In this rule, N is an even number and $h = (b - a) / N$. The y values are the function evaluated at equally spaced x values between a and b .

7. What is Newton's method of approximation?

Newton's Method (also called the Newton-Raphson method) is a recursive algorithm for approximating the root of a differentiable function. ... As you recursively calculate, the x_{n+1} 's often become increasingly better approximations of the function's root.

8. What is interpolation?

Interpolation is the technique of estimating the value of a function for any intermediate value of the independent variable,

9. What is extrapolation.?

the process of computing the value of the function outside the given range is called extrapolation.

10. Define forward differences.

The differences $y_1 - y_0, y_2 - y_1, y_3 - y_2, \dots, y_n - y_{n-1}$ when denoted by $dy_0, dy_1, dy_2, \dots, dy_{n-1}$ are respectively, called the first forward differences.

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1. Explain the types of matrix
2. Distinguish between Matrices and Determinants
3. Find the rank of matrix $A = \begin{bmatrix} 2 & 3 & 4 \\ 3 & 1 & 2 \\ -1 & 2 & 2 \end{bmatrix}$
4. Find adjoint of matrix $A = \begin{bmatrix} 1 & 1 & 1 \\ 2 & 2 & 3 \\ 1 & 4 & 9 \end{bmatrix}$
5. If $A = \begin{bmatrix} 3 & -2 \\ 1 & -1 \end{bmatrix}$ $B = \begin{bmatrix} 1 & 2 \\ 1 & 1 \end{bmatrix}$ prove that $A^2 + AB + BA + B^2 = (A+B)^2$
6. How to find the rank of a Matrix
7. Find determinant of matrix $A = \begin{bmatrix} & & - \\ & & \\ & & \end{bmatrix}$
8. Find inverse of matrix $A = \begin{bmatrix} 1 & 0 & 5 \\ 2 & 1 & 6 \\ 3 & 4 & 0 \end{bmatrix}$
9. Find inverse of matrix $A = \begin{bmatrix} 3 & 0 & 2 \\ 2 & 0 & -2 \\ 0 & 1 & 1 \end{bmatrix}$
10. Find eigen value of matrix $A = \begin{bmatrix} 3 & 2 & 4 \\ 2 & 0 & 2 \\ 4 & 2 & 3 \end{bmatrix}$

Unit-II

11. Calculate the Mean from the following data

(i) Direct Method (ii) short cut Method

R.No.:	1	2	3	4	5	6	7	8	9	10
Marks :	40	50	55	78	58	60	73	35	43	48

12. Calculate the Mean from the following data

Value.:	1	2	3	4	5	6	7	8	9	10
Frequency :	21	30	28	40	26	34	40	9	15	57

13. Find out the median of the following items:

X: 10 15 9 25 19

14. 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

15. Calculate median for the following table

Marks	10-25	25-40	40-55	55-70	70-85	85-100
Frequency	6	20	44	26	3	1

16. Calculate semi-inter quartile range and quartile co-efficient from the following

Age in years	20	30	40	50	60	70	80
No.of members	3	61	132	153	140	51	3

17. Calculate standard deviation from the following data

marks	10	20	30	40	50	60
No.of.students	8	12	20	10	7	3

18. Following are the rank obtained by 10 students in 2 subjects (Statistics and mathematics).Find the rank correlation coefficient.

Statistics:	1	2	3	4	5	6	7	8	9	10
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Mathematics:	2	4	1	5	3	9	7	10	6
	8								

19. Calculate standard deviation from the following data

14, 22, 9, 15, 20, 17, 12, 11

20. Calculate coefficient of correlation from the following data:

X	12	9	8	10	11	13	7
Y	14	8	6	9	11	12	3

Unit-III

21. In a hospital 480 male and 520 female babies were born in a week. Do these figures confirm the hypothesis that males and females are born in equal number.

22. The following results are obtained from a sample of 10 boxes of biscuits.

Mean weights of contents = 490 gms

Standard deviation of the weight = 9 gms

Could the sample come from a population having a mean of 500 gms.

23. calculate standard error of mean from the following data, showing amt paid by 100 firms in Calcutta on the occasion of durga puja.

Mid values(rs)	39	49	59	69	79	89	99
No of firms	2	3	11	20	32	25	7

24. Productivity test of two food articles –paddy and wheat gives the following data

	Mean yield tonnes	Standard deviation	No.of.hectares
Paddy	80	10	120
wheat	75	12	90

25. Sample of two different type of bulbs were tested for length of life and following data were obtained.

	Type I	Type II
Sample size	8	7
Sample Mean	1234 hours	1136 hours

Sample of sd	36 hours	40 hours
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Is the difference in mean significant?(significant value @5% level of significant for 13 is 2.16)

26. In 600 throws of a six faced dice, odd points appeared 360 times. Would you say that the dice is fair at 5% level of significance?

27. In a sample of 400 population from a village 230 are found to be eaters of vegetarian items and the rest non-vegetarian items. Can we assume that both vegetarian and non vegetarian food are equally popular?

28. A wholesaler in apples claims that only 4% of the apples supplied by him are defective. A random sample of 600 apples contained 36 defective apples. Test the claim of the wholesaler.

29. A man buys 50 bulbs of Philips and 50 bulbs of HMT. He finds that Philips bulbs give an average life of 1,500 hours with a standard deviation of 60 hours and HMT bulbs gave an average life of 1,512 hours with a standard deviation of 80 hours. Is there a significant difference in the mean life of the two makes of bulbs?

30. A coin is tossed 400 times and it turns up head 216 times. Discuss whether the coin may be an unbiased one, and explain briefly the theoretical principles you would use for this purpose.

Unit-IV

31. There are 6 books on Economics, 3 on maths, and 2 on accountancy. In how many ways can these be placed on a shelf if the books on the same subject are to be together.

32. A bag contains 7 red, 12 white and 4 green balls. What is the probability that

i) 3 balls drawn are all white

ii) 3 balls drawn are one of each other?

33. A bag contains 4 white, 3 black and 5 red balls, What is the probability of getting a white or red ball at random in a single draw?

34. In how many ways can 3 girls and 5 boys be arranged in a row so that all the 3 girls are together?

35. A bag contains 7 red balls and 5 white balls. 4 balls are drawn at random. What is the probability that (i) all of them are red; (ii) two of them are red and two white?

35. Two cards are drawn from the pack of 52 cards. Find the probability that both are diamonds or both are kings.

36. Three dice are rolled together. What is the probability as getting at least one '4'?

37. Suppose a coin is flipped 3 times. What is the probability of getting two tails and one head?

38. What is the probability of drawing a king and a queen consecutively from a deck of 52 cards, without replacement.

39. In a class, 40% of the students study math and science. 60% of the students study math. What is the probability of a student studying science given he/she is already studying math?

40. In a class, there are 15 boys and 10 girls. Three students are selected at random. What is the probability of selecting 1 girl and 2 boys ?

Unit-V

41. Find the positive root of $f(x)=2x^3 -3x-6=0$ by Newton raphson method ,correct to 5 decimal places

42. Find the values of y at $x=21$ and $x=28$ from the following data (using forward & backward interpolation).

X:	20	23	26	29
Y:	0.3420	0.3907	0.4384	0.4848

43. Evaluate integral $I = \int_1^x \frac{dx}{x}$ using trapezoidal rule and Simpson's rule

44. Solve the following system of equation by Gauss-Seidal method correct to decimal places

$$\begin{aligned}28x+4y-z&=32 \\x+3y+10z&=24 \\2x+17y+4z&=35\end{aligned}$$

45. Write the formula for the following rules

- i) Trapezoidal rule
- ii) Simpson 1/3 rule
- iii) Simpson 3/8 rule

46. Solve the following system of equation by Gauss-Seidal method correct to 5 decimal places

$$10x-5y-2z= 3$$

$$4x-10y+3z= -3$$

$$x+6y+10z= -3$$

47. By using Newton's Raphson method find the root of $x^4-x-10=0$. correct up to 3 decimal places.

48. Find the + ve root of the equation $xe^x-\cos x=0$ correct to 4 places of decimals using Newton Raphson method.

49. Find the value of $f(1.02)$ by using interpolation formula from following table

X	1.0	1.1	1.2	1.3	1.4
f(x)	1.841	1.891	0.932	0.964	0.985

50. Write the Newton's forward interpolation formula and Backward interpolation formula.

NGM COLLEGE
DEPARTMENT OF COMPUTERSCIENCE (SF)
COURSE TITLE: MATHEMATICS-I
COURSE CODE: 18UCS1A1
UNIT-1

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

2. Find Eigen values and Eigen vectors of matrix $A = \begin{bmatrix} 8 & -6 & 2 \\ -6 & 7 & -4 \\ 2 & -4 & 3 \end{bmatrix}$

3. Discuss the types of matrix with example

4. Find determinant of matrix $A = \begin{bmatrix} 1 & 5 & 2 \\ 0 & -1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$

5. Find inverse of matrix $A = \begin{bmatrix} 1 & 5 & 2 \\ 0 & -1 & 2 \\ 0 & 0 & 1 \end{bmatrix}$

Unit-II

1. Calculate the two regression equations of X on Y and Y on X from the data given below, taking deviations from actual means of X and Y

Price(Rs)	10	12	13	12	16	15
Amount demanded	40	38	43	45	37	43

Estimate the likely demand when the price is Rs.20

2. Compute the Standard Deviation from the following data

Class(X)	0-10	10-20	20-30	30-40	40-50	50-60	60-70
Frequency(f)	8	12	17	14	9	7	4

3. Calculate the Mode from the following series.

Size	:	10	11	12	13	14	15	16	17	18
Frequency	:	10	12	15	19	20	8	4	3	2

4. Find Karl Pearson's coefficient of correlation from the following data:

Wages:	100	101	102	102	100	99	97	98	96	95
Cost of living:	98	99	99	97	95	92	95	94	90	91

5. Calculate the arithmetic mean and standard deviation for the following data

Marks	6	9	12	15	18
No. of Students	7	12	13	10	8

UNIT-3

1. A machine puts out 16 imperfect articles in a sample of 500. After the machine is overhauled, it puts out 3 imperfect articles in a batch of 100. Has the machine improved?

2. The heights of six randomly chosen soldiers are in inches: 76, 70, 68, 69, 69 and 68. Those of six randomly chosen sailors are 68, 64, 65, 69, 72 and 64. Discuss in the light of these data throw on the suggestions that soldiers are, on the average, taller than sailors. Use t-test.

3. A man buys 50 bulbs of Philips and 50 bulbs of HMT. He finds that Philips bulbs give an average life of 1500 hours with a standard deviation of 60 hours and HMT bulbs gave an average life of 1512 hours with a standard deviation of 80 hours. Is there a significant difference in the mean life of the two makes of bulbs?

4. The sales data of an item in six shops before and after a special promotional campaign are as under:

Shops	1	2	3	4	5	6
Before campaign	53	28	31	48	50	42
After campaign	58	29	30	55	56	45

Can the campaign be judged to be a success? Test at 5% level of significance.

5. One thousand articles from a factory are examined and found to be 3% defective. Fifteen hundred similar articles from a second factory are found to be only 2% defective. Can it reasonably be concluded that the product of the first factory is inferior to the second?

Unit-IV

1. Two dice are thrown. Find the probability that

- a) the total of the numbers on the dice is 8.
- b) the first die shows 6.
- c) the total of the numbers on the dice is greater than 8.
- d) the total the numbers on the dice is 13.
- e) both the dice show the same number
- f) the sum of the numbers shown by the dice is less than 5
- g) the sum of the numbers shown by the dice is exactly 8

2. Two cards are drawn at random from a well-shuffled pack of 52 cards. What is the probability that

- a) both are aces b) both are red c) atleast one is an ace.

3. An urn contains 8 white and 3 red balls. If two balls are drawn at random, find the probability that (a) both are white, (b) both are red and (c) one is of each color.

4. A ball is drawn at random from a box containing 6 red balls, 4 white balls and 5 blue balls. Determine the probability that it is: (i) Red (ii) White (iii) Blue (iv) Not Red and (v) Red or White

5. Three bags contain 3 red, 7 black; 8 red, 2 black, and 4 red & 6 black balls respectively. 1 of the bags is selected at random and a ball is drawn from it. If the ball drawn is red, find the probability that it is drawn from the third bag.

Unit-V

1. Solve the following system by using Gauss- Seidal method

$$10x-5y-2z=3; 4x-10y+3z=-3; x+6y+10z=-3$$

2. Apply Newton-Raphson method to determine a root of equation $f(x)=\cos x-xe^x=0$

3. For the following data, calculate differences and obtain the forward and backward difference interpolate $x=0.25$ and $x=0.45$

x	0.1	0.2	0.3	0.4	0.5
F(x)	1.40	1.56	0.76	2.00	2.28

4. Find the value of y at $x=1.05$ by using interpolation formula from following table

x	1.0	1.1	1.2	1.3	1.4	1.5
f(x)	0.841	0.891	0.932	0.964	0.985	1.015

5. Evaluate integral $I = \int_0^1 x^4 dx$ using trapezoidal rule and Simpson's rule

NGM COLLEGE
DEPARTMENT OF COMPUTERSCIENCE (SF)
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COURSE CODE: 18UCS1A1
UNIT-1

1. Find inverse of matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 4 \\ 3 & 0 & 1 \end{bmatrix}$

2. Find eigen value and eigen vector of matrix $A = \begin{bmatrix} 2 & -3 & 0 \\ 2 & -5 & 0 \\ 0 & 0 & 3 \end{bmatrix}$

3. Find determinant of matrix $A = \begin{bmatrix} & & \\ & & \\ & & \end{bmatrix}$ -

4. Find inverse of matrix $A = \begin{bmatrix} 1 & 0 & 2 \\ 0 & 1 & 4 \\ 3 & 0 & 1 \end{bmatrix}$

5. Find eigen value and eigen vector of matrix $A = \begin{bmatrix} 1 & -1 & 0 \\ -1 & 2 & -1 \\ 0 & -1 & 1 \end{bmatrix}$

Unit-II

1. Calculate the arithmetic mean, standard deviation and coefficient of variation for the following data

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

2. Find the median and mode for the following data

Wages (Rs.)	50	75	100	150	250
No. of Labors	8	14	10	5	3

3. Calculate the median and mode for the following data

Class interval	0-5	5-10	10-15	15-20
Frequency	5	3	2	1

4. Find the range, coefficient of range, Quartile deviation and coefficient of Quartile deviation for the following data 25, 36, 72, 15, 48, 12, 98, 54, 78

5. Find range, Q.D, Coefficient of range and coefficient of Q.D for the following data

Daily pocket Money	15	20	25	40	60	100
No of boys	34	39	70	72	81	69

Unit-III

1. Intelligence test on two groups of boys and girls gave the following results:

	Mean	Standard deviation	N
Girls	75	15	150
Boys	70	20	250

2. In a sample of 1000 items the mean is 17.5 and the standard deviation 2.5. In another sample of 800 the mean is 18 and standard deviation 2.7. Assuming that the samples are independent, discuss whether the two samples can have come from a population which have the same standard deviation.

3. You are working as a purchase manager for a company. The following information has been supplied to you by two manufacturers of electric bulbs:

	Mean	Standard deviation
Mean life (in hours)	75	15
S.D(in hours)	82	93
Sample size	100	100

Which brand of bulbs are you going to purchase if you desire to take a risk of 5%?

4. A simple sample of the height of 6,400 Englishmen has a mean of 67.85 inches and a S.D of 2.56 inches while a simple sample of heights of 1600 Austrians has a mean of 68.55 inches and a S.D of 2.52 inches. Do the data indicate that the Austrians are on the average taller than the Englishmen? Give reasons for the answer.

5. An operator claims that he produces 40 articles in an hour. A sample of 10 random hours the turns out as 43,45,38,37,41,42,44,39,43 and 38. Is the claim of the operator reasonable at 5% significance level? Assume the distribution of hourly turnout of the operator to be normal and critical region at 5% level employing one tailed test for 9 df to be 1.833.

Unit-IV

1. In a class, there are 15 boys and 10 girls. Three students are selected at random. What is the probability that 1 girl and 2 boys are selected?

2. From a pack of 52 cards, two cards are drawn together at random. What is the probability of both the cards being kings?

3. Consider another example where a pack contains 4 blue, 2 red and 3 black pens. If a pen is drawn at random from the pack, replaced and the process repeated 2 more times, What is the probability of drawing 2 blue pens and 1 black pen?

4. A box contains 4 chocobars and 4 ice creams. Tom eats 3 of them, by randomly choosing. What is the probability of choosing 2 chocobars and 1 icecream?

5. Two dice are thrown together. What is the probability that the number obtained on one of the dice is multiple of number obtained on the other dice?

Unit-V

1. The population of a town is as follows.

Year(x)	1941	1951	1961	1971	1981	1991
Population in lakhs(y)	20	24	29	36	46	51

Estimate the population increase during the period 1946 to 1976.

2. Find the real positive root of $3x - \cos x - 1 = 0$ by Newton's method correct to 6 decimal places.

3. Find the positive root of $x = \cos x$ using Newton's Method.

4. Solve the following system of equation by Gauss-Seidal method correct to 3 decimal places

$$8x - 3y + 2z = 20$$

$$4x + 11y - z = 33$$

$$6x + 3y + 12z = 35$$

5. Using Newton's method, find the root between 0 and 1 of $x^3 = 6x - 4$ correct to 5 decimal places.