**SAINIK SCHOOL GOAPLGANJ**

**SUMMER VACATION ASSIGNMENT : 2021-22**

**MATHEMATICS**

**TOPIC : MATRICES DETERMINANT AND** **DERIVATIVES**

1. If i = , then is

(a) An integer (b) An irrational number

(c) An imaginary number (d) None of these

2. If is a complex cube root of unity, then the value of is

(a) 0 (b) 1

(c) (d)

3. The value of the determinant is

(a) a3 (1 + ) (b) a3 (1 - )

(c) a3 (1 + ) (d) a3 (1 - )

4. If = k(a-b)(b-c)(c-a), then k = ?

(a) abc (b) a+b+c

(c) ab + bc + ca (d) None of these

5. Assertion (A): does not exist.

Reason (R): The determinant of only a square matrix is defined.

1. A and R are both true and R is the correct explanation of A

(b) A is true, but R is false

(c) A and R are both false

(d) A and R are both true, but R is not the correct explanation of A

6. If A is an invertible matrix and A-1= , then A = ?

(a) (b)

(c) (d)

7. If A is an invertible square matrix and k is a non-negative real number, then

(kA)-1= ?

(a) kA-1 (b) A-1

(c) 2kA (d) None

8. If A and B are two non-zero square matrices of the same order, such that

AB = O, then

(a) At least one of A and B is singular (b) Both A and B are singular

(c) Both A and B are non-singular (d) None of these

9. If A = , then A-1 = ?

(a) (b)

(c) (d) None of these

10. If A = , then (I-A) = ?

(a) (I + A) (b) (I-A)

(c) (I-2A) (d) (I+2A)

11. For what value of k, the system of equations, x + 2 y = 0, kx – y = 0 has non- trivial solution?

(a) k = 2 (b) k = -2

(c) k = (d) k = -

12. Which of the following statements are true for a square matrix A?

I. = 0 = 0

II. AB = O A = O or B = O

II. (AB)T = AT BT

IV. (AT)-1 = (A-1)T

(a) Statements I, II & III are true (b) Statements II and III are true

(c) Statements I and IV are true (d) Only II is true

13. If y = cot -1, then = ?

(a) (b) -

(c) (d) None of these

14. If x3 + y3 = 3axy, then = ?

(a) (b)

(C) (d) None of these

15. If + = a (x-y), then = ?

(a) (b)

(c) (d) None of these

16. If y = , then = ?

(a) (b)

(c) (d) None of these

17. Derivative of tan-1-1) w. r.t. sin-1) is:

(a) (b)

(c) 2 (d) None

18. The derivative of sin2x with respect to (log x)2 is:

(a) (b)

(c) (d) None of these

19. If y = 1 + x + + + .... ∞, then = ?

(a) cos x (b)

(c) (d) None

20. If + = c, then = ?

(a) (b)

(d)

|  |  |
| --- | --- |
| 21. | The ratio in which the point R(5 , 4 , -6) divides the join of the points P(3 , 2 , -4) and Q(9 , 8 , -10) is   1. 2:3 (b)3:4 (c) 1:3 (d) 1:2 |
| 22. | Three vertices of a parallelogram ABCD are A(3,-1,2) , B(1,2,-4) and C(-1,1,2). The co-ordinates of D are:   1. (1,-2,8) (b) (2,-3,5) (c) (-3,4,2) (d) (-3,4,2) | |
| 23. | If the centroid of are A(a,1,3), B(-2,b,-5) and C(4,7,c) lies at the origin , then (a,b,c) =   1. (-2,-8,2) (b) (2,-8,2) (c) (2,8,-2) (d) (2,-8,-2) | |
| 24. | The direction cosines of y- axis are   1. (1,0,1) (b) (0,1,0) (c) ( , 0,) (d) None of these | |
| 25. | The angle between the lines whose direction ratios are (3,4,5) and (4,-3,5) is   1. 30 (b) (c) 60 (d) 90 | |
| 26. | The line with direction ratios 0,1,-1 is inclined with Z-axis at an angle   1. (b) (c) (d) | |

27 If  is equal to

(a)  (b)  (c)  (d) []

28. The domain of the function  is

(a)  (b)  (c) [1, 6] (d) None of thes

29 The period of the function 

(a)  (b)  (c)  (d) 

29. The range of the function 

(a)  (b)  (c)  (d) 

30. If 

(a)  (b)  (c)  (d) 

31. If satisfies the relation  for all real 

(a)  (b) 

(c)  (d) 

**Direction ( NO32 to 34)**Consider denotes the greatest integer function. What is the value of

(a) 1 (b) -1 (c) 0 (d) 2

33. What is the value of

(a) 0 (b) -1 (c)  (d) 

34. If may be of the form

(a)  (b)  (c)  (d) 

Where k is a constant

35. Let P={1, 2, 3} and a relation on set P is given by the set

R={(1,2),(1,3),(2,1) (1,1)(2,2),(3,3),(2,3)}. Then, R is

(a) Reflexive, transitive but not symmetric

(b) Symmetric, transitive but not reflexive

(c) Symmetric, reflexive but not transitive

(d) None of the above

36. If be a function whose inverse is 

Then what is the value of 

(a)  (b) 

(c)  (d) Does not exist

37. If and a function , then which one of the following is correct?

(a) The functions does not have inverse

(b) f is its own inverse

(c) The functions has an inverse but is not its own inverse

(d) None of the above

38. If A={x,y}, B={2,3}, C={3,4}, then what is the number of elements in 

(a) 2 (b) 4 (c) 6 (d) 8 If A is a relation on a set R, then which one of the following is correct?

(a)  (b)  (c)  (d)

39 Let N be the set of natural numbers and be a function given by Which one of the following is correct?

(a) f is one-one and onto (b) f is one-one but not onto

(c) f is only onto (d) f is neither one-one nor onto

40. What is the range of the function

(a) Set of all real numbers (b) Set of all integers

(c) {-1,1} (d) {-1, 0, 1}

41. Let A= {a, b, c, d} and B={x, y, z}. what is the number of elements in 

(a) 6 (b) 7 (c) 12 (d) 64

43. Let A={x, y, z} and B={p, q, r, s}, what is the number of distinct relations from B to A?

(a) 4096 (b) 4094 (c) 128 (d) 126

44. For each non-zero real number The range of f is

(a) A null set (b) A set consisting of only one element

(c) A set consisting of two elements (d) A set consisting of infinitely many elements

46. Consider the following statements

**Statement I** The function such that is one-one.

**Statement II**if the function f is one-one.

Which one of the following is correct in respect of the above statements?

(a) Both the statements are true and statements II is the correct explanation of statement I (b) Both the statements are true and statement II is not the correct explanation of statement I

(c) Statement I is true but statement II is false

(d) Statement I is false but statement II is true.

47. What is the range of the function

Where 

(a) [0,1 ) (b) [0, 1] (c) (0, 1) (d) (0,1]

48. If , then the value of 

(a) 4 (b) 5 (c) 6 (d) -7

49. A square matrix [aij] such that aij=0 for and aij=k, where k is a constant for i=j is called.

(a) Diagonal matrix but not scalar matrix (b) Scalar matrix

(c) Unit matrix (d) None of the above

50. If then what is equal to

(a) 7 (b) -7 (c) 9 (d) -9

51. If is symmetric, then what is  equal to

(a) 2 (b) 3 (c) -1 (d) 5

52. The matrix is

(a) Symmetric (b) Skew-symmetric

(c) Hermitian (d) Skew-Hermitian

53. Consider the following in respect of the matrix 

(I)  (II) 

Which of the above statements (s) is/are correct?

(a) Only I (b) Only II

(c) Both I and II (d) Neither I nor II

54. The roots of the equation 

(a)  (b)  (c)  (d) 

**Consider the determinant**

55 If ,, are the roots of 

(a)  (b)  (c)  (d) 

56. If ,, are the roots of 

(a)  (b)  (c)  (d) 0

57. If then what is the value of x?

(a) 4 (b) 5 (c) 6 (d) 8

58. The value of 

(a)  (b)  (c)  (d) 

59. If a, b and c are real number, then the value of the determinant is

(a) 0 (b)  (c)  (d) 

60. What is the value of sin (19200)?

(a)  (b)  (c)  (d) 

61. What is the maximum value of

(a) 1 (b) 2 (c) 4 (d) 10

62. If then what is the value of

(a) -1 (b) 1 (c) 0 (d) 2

63. What is

(a) 0 (b) 1 (c) 2 (d) 3