KALAIMAGAL MATRIC HIGHER SECONDARY SCHOOL, MOHANUR.

STD : XI | **MATHEMATICS** | **MARKS: 50**

DATE: 15.02.2023 | **ONE MARKS TEST-I (BB FULLY)** | **TIME: 30 min**

Choose the correct answer: **50 x 1 = 50**

1. If A = { (x, y) : $y = e^x$, $x \in R$ } and B = { (x , y) : $y = e^{-x}$, $x \in R$ } then $n(A \cap B)$ is
   1) Infinity 2) 0 3) 1 4) 2
2. If A = {(x, y) : y =sin x, $x \in R$ } and B = { (x, y) : y =cos x, $x \in R$ } then $A \cap B$ contains
   1) no element 2) infinitely many elements 3) only one element 4) cannot be determined
3. The relation R defined on a set A = {0, -1, 1, 2} by xRy if $|x^2 + y^2| \le 2$, then which one of the following is true?
   1) R= { (0,0), (0, −1) , (0,1),(–1, 0),(− 1,1), (1,2) ,(1,0) 2) R^{-1} = {(0,0),(0, − 1), (0,1),(− 1,0),(1,0) }
   3) Domain of R is {0, − 1,1,2} 4) Range of R is {0, − 1, 1}
4. If $f(x) = |x-2| + |x+2|$, $x \in R$, then
   1) $f(x) = \begin{cases} -2x & \text{if } x \in (-\infty,-2] \\ 4 & \text{if } x \in (-2,2] \\ 2x & \text{if } x \in (2,\infty) \end{cases}$ 2) $f(x) = \begin{cases} 2x & \text{if } x \in (-\infty,-2] \\ 4x & \text{if } x \in (-2,2] \\ -2x & \text{if } x \in (2,\infty) \end{cases}$
   3) $f(x) = \begin{cases} -2x & \text{if } x \in (-\infty,-2] \\ -4x & \text{if } x \in (-2,2] \\ 2x & \text{if } x \in (2,\infty) \end{cases}$ 4) $f(x) = \begin{cases} -2x & \text{if } x \in (-\infty,-2] \\ 2x & \text{if } x \in (-2,2] \\ 2x & \text{if } x \in (2,\infty) \end{cases}$
5. If $|x+2| \le 9$, then x belongs to
   1) $(-\infty,-7)$ 2) $[-11,7]$ 3) $(-\infty,-7) \cup [11,\infty)$ 4) $(-11,7)$
6. Given that x, y and b are real numbers $x < y$, $b > 0$, then
   1) $xb < yb$ 2) $xb > yb$ 3) $xb \le yb$ 4) $\frac{x}{b} \ge \frac{y}{b}$
7. If $\frac{|x-2|}{x-2} \ge 0$, then x belongs to
   1) $[2, \infty)$ 2) $(2, \infty)$ 3) $(-\infty,2)$ 4) $(-2,\infty)$
8. $\frac{1}{\cos 80^0} - \frac{\sqrt{3}}{\sin 80^0} =$
   1) $\sqrt{2}$ 2) $\sqrt{3}$ 3) 2 4) 4
9. If cos28° + sin28°= k^3 , then cos 17°is equal to
   1) $\frac{k^3}{\sqrt{2}}$ 2) $-\frac{k^3}{\sqrt{2}}$ 3) $\pm\frac{k^3}{\sqrt{2}}$ 4) $-\frac{k^3}{\sqrt{3}}$
10. The maximum value of $4\sin^2 x + 3\cos^2 x + \sin\frac{x}{2} + \cos\frac{x}{2}$ is
    1) 4+ $\sqrt{2}$ 2) 3+ $\sqrt{2}$ 3) 9 4) 4
11. The sum of the digits at the 10th place of all numbers formed with the help of 2, 4,5,7 taken all at a time is
    1) 432 2) 108 3) 36 4) 18
12. In an examination there are three multiple choice questions and each question has 5 choices. Number of ways in which a student can fail to get all answer correct is
    1) 125 2) 124 3) 64 4) 63
13. The number of ways in which the following prize be given to a class of 30 boys first and second in mathematics, first and second in physics , first in chemistry and first in English is
    1) 30^4 x 29^2 2) 30^3 x 29^3 3) 30^2 x 29^4 4) 30 x 29^5

14. The number of 5 digit numbers all digits of which are odd is
1) 25 2) 5^5 3) 5^6 4) 625

15. The value of 2+ 4+ 6+ …… +2n is
1) $\frac{n(n-1)}{2}$ 2) $\frac{n(n+1)}{2}$ 3) $\frac{2n(2n+1)}{2}$ 4)n(n+1)

16. The coefficient of x^6 in (2+ 2x) ^{10} is
1) $^{10}C_6$ 2) 2^6 3) $^{10}C_6\ 2^6$ 4) $^{10}C_6\ 2^{10}$

17. The coefficient of $x^8 y^{12}$ in the expansion of $(2x + 3y)^{20}$ is
1) 0 2) $2^8\ 3^{12}$ 3) $2^8\ 3^{12} + 2^{12}\ 3^8$ 4) $^{20}C_8\ 2^8 3^{12}$

18. The equation of the locus of the point whose distance from y – axis is half the distance from origin is
1) $x^2 + 3y^2 = 0$ 2) $x^2 - 3y^2 = 0$ 3) $3x^2 + y^2 = 0$ 4) $3x^2 - y^2 = 0$

19. Which of the following equation is the locus of (at^2 , $2at$) ?
1) $\frac{x^2}{a^2} - \frac{y^2}{b^2} = 1$ 2) $\frac{x^2}{a^2} + \frac{y^2}{b^2} = 1$ 3) $x^2 + y^2 = a^2$ 4) $y^2 = 4ax$

20. Which of the following point lie on the locus of $3x^2 + 3y^2 - 8x - 12y + 17 = 0$
1) (0,0) 2) $(-2,3)$ 3) (1,2) 4) (0, -1)

21. If the point (8, -5) lies on the locus $\frac{x^2}{16} - \frac{y^2}{25} = k$, then the value of k is
1) 0 2) 1 3) 2 4) 3

22. If $a_{ij} = \frac{1}{2}(3i - 2j)$ and A= $[a_{ij}]_{2x2}$ is
1) $\begin{bmatrix} \frac{1}{2} & 2 \\ -\frac{1}{2} & 1 \end{bmatrix}$ 2) $\begin{bmatrix} \frac{1}{2} & -\frac{1}{2} \\ 2 & 1 \end{bmatrix}$ 3) $\begin{bmatrix} 2 & 2 \\ \frac{1}{2} & -\frac{1}{2} \end{bmatrix}$ 4) $\begin{bmatrix} -\frac{1}{2} & \frac{1}{2} \\ 1 & 2 \end{bmatrix}$

23. What must be the matrix X, if 2X + $\begin{bmatrix} 1 & 2 \\ 3 & 4 \end{bmatrix} = \begin{bmatrix} 3 & 8 \\ 7 & 2 \end{bmatrix}$?
1) $\begin{bmatrix} 1 & 3 \\ 2 & -1 \end{bmatrix}$ 2) $\begin{bmatrix} 1 & -3 \\ 2 & -1 \end{bmatrix}$ 3) $\begin{bmatrix} 2 & 6 \\ 4 & -2 \end{bmatrix}$ 4) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

24. Which one of the following is not true about the matrix $\begin{bmatrix} 1 & 0 & 0 \\ 0 & 0 & 0 \\ 0 & 0 & 5 \end{bmatrix}$?
1) a scalar matrix 2) a diagonal matrix
3) an upper triangular matrix 4) a lower triangular matrix

25. If A and B are two matrices such that A+B and AB are both defined , then
1) A and B are two matrices not necessarily of same order
2) A and B are square matrices of same order
3) Number of columns of A is equal to the number of rows of B
4) A= B

26. The value of $\overrightarrow{AB} + \overrightarrow{BC} + \overrightarrow{DA} + \overrightarrow{CD}$ is
1) $\overline{AD}$ 2) $\overline{CA}$ 3) $\overline{O}$ 4) $-\overline{AD}$

27. If $\vec{a} + 2\vec{b}$ and $3\vec{a} + m\vec{b}$ are parallel, then the value of m is
1) 3 2) $\frac{1}{3}$ 3) 6 4) $\frac{1}{6}$

28. The unit vector parallel to the resultant of the vectors $\hat{i}+\hat{j}-\hat{k}$ and $\hat{i}-2\hat{j}+\hat{k}$ is

1) $\frac{\hat{i}-\hat{j}+\hat{k}}{\sqrt{5}}$ 2) $\frac{2\hat{i}+\hat{j}}{\sqrt{5}}$ 3) $\frac{2\hat{i}-\hat{j}+\hat{k}}{\sqrt{5}}$ 4) $\frac{2\hat{i}-\hat{j}}{\sqrt{5}}$

29. A vector $\overrightarrow{OP}$ makes 60° and 45°with the positive direction of the x and y axes respectively. Then the angle between $\overrightarrow{OP}$ and the z- axis is

1) 45° 2) 60° 3) 90° 4) 30°

30. $\lim_{x\to\infty}\frac{\sin x}{x}$

1) 1 2) 0 3) ∞ 4) $-\infty$

31. $\lim_{x\to\frac{\pi}{2}}\frac{2x-\pi}{\cos x}=$

1) 2 2) 1 3) -2 4) 0

32. $\lim_{x\to 0}\frac{\sqrt{1-\cos 2x}}{x}$

1) 0 2) 1 3) $\sqrt{2}$ 4) does not exist

33. $\lim_{\theta\to 0}\frac{\sin\sqrt{\theta}}{\sqrt{\sin\theta}}$

1) 1 2) –1 3) 0 4) 2

34. $\frac{d}{dx}\left(\frac{2}{\pi}\sin x^{\circ}\right)$ is

1) $\frac{\pi}{180}\cos x^{\circ}$ 2) $\frac{1}{90}\cos x^{\circ}$ 3) $\frac{\pi}{90}\cos x^{\circ}$ 4) $\frac{2}{\pi}\cos x^{\circ}$

35. If $y=f(x^2+2)$ and $f'(3)=5$, then $\frac{dy}{dx}$ at $x=1$ is

1) 5 2) 25 3) 15 4) 10

36. If $y=\frac{1}{4}u^4, u=\frac{2}{3}x^3+5$, then $\frac{dy}{dx}$ is

1) $\frac{1}{27}x^2(2x^3+15)^3$ 2) $\frac{1}{27}x(2x^3+5)^3$

3) $\frac{2}{27}x^2(2x^3+15)^3$ 4) $-\frac{2}{27}x(2x^3+5)^3$

37. If $f(x)=x^2-3x$, then the points at which $f(x)=f'(x)$ are

1) both positive integers 2) both negative integers

3) both irrational 4) one rational and another irrational

38. If $\int f(x)dx=g(x)+c$, then $\int f(x)g'(x)dx$

1) $\int (f(x))^2 dx$ 2) $\int f(x)g(x)\,dx$ 3) $\int f'(x)\,g(x)\,dx$ 4) $\int (g(x))^2\,dx$

39. If $\int \frac{3^{\frac{1}{x}}}{x^2}dx=k(3^{\frac{1}{x}})+c$, then the value of k is

1) log 3 2) – log 3 3) $-\frac{1}{\log 3}$ 4) $\frac{1}{\log 3}$

40. If $\int f'(x)e^{x^2}dx = (x-1)e^{x^2} + c$, then $f(x)$ is

1) $2x^3 - \frac{x^2}{2} + x + c$ 2) $\frac{x^3}{2} + 3x^2 + 4x + c$ 3) $x^3 + 4x^2 + 6x + c$ 4) $\frac{2x^3}{3} - x^2 + x + c$

41. The gradient (slope) of a curve at any point (x, y) is $\frac{x^2-4}{x^2}$. If the curve passes through the point (2,7) , then the equation of the curve is

1) $y = x + \frac{4}{x} + 3$ 2) $y = x + \frac{4}{x} + 4$ 3) $y = x^2 + 3x + 4$ 4) $y = x^2 - 3x + 6$

42. Four persons are selected at random from a group of 3 men, 2 women and 4 children. The probability that exactly two of them are children is

1) $\frac{3}{4}$ 2) $\frac{10}{23}$ 3) $\frac{1}{2}$ 4) $\frac{10}{21}$

43. A number is selected from the set {1,2,3…,20}. The probability that the selected number is divisible by 3 or 4 is

1) $\frac{2}{5}$ 2) $\frac{1}{8}$ 3) $\frac{1}{2}$ 4) $\frac{2}{3}$

44. A, B and C try to hit a target simultaneously but independently. Their respective probabilities of hitting the target are $\frac{3}{4}, \frac{1}{2}, \frac{5}{8}$. The probability that the target is hit by A or B but not by C is

1) $\frac{21}{64}$ 2) $\frac{7}{32}$ 3) $\frac{9}{64}$ 4) $\frac{7}{8}$

45. If A and B are any two events, then the probability that exactly one of them occur is

1) $P(A \cup \overline{B}) + P(\overline{A} \cup B)$ 2) $P(A \cap \overline{B}) + P(\overline{A} \cap B)$

3) $P(A) + P(B) - P(A \cap B)$ 4) $P(A) + P(B) + 2P(A \cap B)$

46. Let R be the set of all real numbers. Consider the following subsets of the plane
$R \times R : S = \{(x, y) : y = x+1$ and $0 < x < 2\}$ and $T = \{(x, y) : x - y$ is an integer$\}$. Then which of the following is true?

1) T is an equivalence relation but S is not an equivalence relation .

2) Neither S nor T is an equivalence relation

3) Both S and T are equivalence relation

4) S is an equivalence relation but T is not an equivalence relation

47. In 3 fingers, the number of ways four rings can be worn is …. ways.

1) $4^3 - 1$ 2) 3^4 3) 68 4) 64

48. Straight line joining the points (2, 3) and $(-1,4)$ passes through the point (α, β) if

1) $\alpha + 2\beta = 7$ 2) $3\alpha + \beta = 9$ 3) $\alpha + 3\beta = 11$ 4) $3\alpha + \beta = 11$

49. If $A = \begin{bmatrix} \lambda & 1 \\ -1 & -\lambda \end{bmatrix}$, then for what value of λ, $A^2 = O$?

1) 0 2) ± 1 3) -1 4) 1

50. If $\overline{BA} = 3\hat{i} + 2\hat{j} + \hat{k}$ and the position vector of B is $\hat{i} + 3\hat{j} - \hat{k}$, then the position vector A is

1) $4\hat{i} + 2\hat{j} + \hat{k}$ 2) $4\hat{i} + 5\hat{j}$ 3) $4\hat{i}$ 4) $-4\hat{i}$