KALAIMAGAL MATRIC HIGHER SECONDARY SCHOOL, MOHANUR.

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

DATE: 09.03.2023 | **ONE MARK TEST-III (BB FULLY)** | **TIME: 30 min**

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

1. If two sets A and B have 17 elements in common , then the number of elements common to the set A × B and B × A is
   1) 2^{17} 2) 17^2 3) 34 4) insufficient data
2. For non – empty sets A and B , if $A \subset B$ then $(A \times B) \cap (B \times A)$ is equal to
   1) $A \cap B$ 2) $A \times A$ 3) $B \times B$ 4) none of these
3. The number of relations on a set containing 3 elements is
   1) 9 2) 81 3) 512 4) 1024
4. Let R be the universal relation on a set X with more than one element. Then R is
   1) not reflexive 2) not symmetric 3) transitive 4) none of the above
5. If $\log_{\sqrt{x}} 0.25 = 4$, then the value of x is
   1) 0.5 2) 2.5 3) 1.5 4) 1.25
6. The value of $\log_a b \log_b c \log_c a$ is
   1) 2 2) 1 3) 3 4) 4
7. If 3 is the logarithm of 343, then the base is
   1) 5 2) 7 3) 6 4) 9
8. $\cos 1° + \cos 2° + \cos 3° + \ldots\ldots + \cos 179° =$
   1) 0 2) 1 3) –1 4) 89
9. Let $f_k(x) = \frac{1}{k}[\sin^k x + \cos^k x]$ where $x \in R$ and $k \geq 1$. Then $f_4(x) - f_6(x) =$
   1) $\frac{1}{4}$ 2) $\frac{1}{12}$ 3) $\frac{1}{6}$ 4) $\frac{1}{3}$
10. Which of the following is not true?
    1) $\sin\theta = -\frac{3}{4}$ 2) $\cos\theta = -1$ 3) $\tan\theta = 25$ 4) $\sec\theta = \frac{1}{4}$
11. The number of ways in which a host lady invite 8 people for a party of 8 out of 12 people of whom two do not want to attend the party together is
    1) $2 \times {}^{11}C_7 + {}^{10}C_8$ 2)) ${}^{11}C_7 + {}^{10}C_8$ 3) ${}^{12}C_8 - {}^{10}C_6$ 4) ${}^{10}C_6 + 2!$
12. Every body in a room shakes hands with every body else. The total number of shake hands is 66. The number of persons in the room is
    1)11 2) 12 3) 10 4) 6
13. There are 10 points in a plane and 4 of them are collinear . The number of straight lines joining any two points is
    1) 45 2) 40 3) 39 4) 38
14. The number of parallelograms that can be formed from a set of four parallel lines intersecting another set of three parallel lines.
    1) 6 2) 9 3) 12 4) 18
15. If $a, 8, b$ are in AP , $a, 4, b$ are in GP , and if a, x, b are in HP then x is
    1) 2 2) 1 3) 4 4) 16
16. The sequence $\frac{1}{\sqrt{3}}, \frac{1}{\sqrt{3}+\sqrt{2}}, \frac{1}{\sqrt{3}+2\sqrt{2}}, \ldots\ldots$ form an
    1) AP 2) GP 3) HP 4) AGP
17. The HM of two positive numbers whose AM and GM are 16, 8 respectively is
    1) 10 2) 6 3) 5 4) 4

18. The equation of the line with slope 2 and the length of the perpendicular from the origin equal to $\sqrt{5}$ is

1) $x-2y=\sqrt{5}$ 2) $2x-y=\sqrt{5}$ 3) $2x-y=5$ 4) $x-2y-5=0$

19. A line perpendicular to the line $5x-y=0$ forms a triangle with the coordinate axes. If the area of the triangle is 5sq. units, then its equation is

1) $x+5y\pm5\sqrt{2}=0$ 2) $x-5y=0$ 3) $5x+y\pm5\sqrt{2}=0$ 4) $5x-y\pm5\sqrt{2}=0$

20. Equation of the straight line perpendicular to the line $x-y+5=0$, through the point of intersection the y axis and the given line is

1) $x-y-5=0$ 2) $x+y-5=0$ 3) $x+y+5=0$ 4) $x+y+10=0$

21. If the equation of the base opposite to the vertex (2,3) of an equilateral triangle is $x+y=2$, then the length of a side is

1) $\sqrt{\frac{3}{2}}$ 2) 6 3) $\sqrt{6}$ 4) $3\sqrt{2}$

22. If A= $\begin{bmatrix} a & x \\ y & a \end{bmatrix}$ and if $xy=1$, then det (AA^T) is equal to

1) $(a-1)^2$ 2) $(a^2+1)^2$ 3) a^2-1 4) $(a^2-1)^2$

23. The value of x, for which the matrix A= $\begin{bmatrix} e^{x-2} & e^{7+x} \\ e^{2+x} & e^{2x+3} \end{bmatrix}$ is singular is

1) 9 2) 8 3) 7 4) 6

24. If the points $(x,-2)$,(5,2), (8,8) are collinear , then x is equal to

1) –3 2) $\frac{1}{3}$ 3) 1 4) 3

25. If $\begin{vmatrix} 2a & x_1 & y_1 \\ 2b & x_2 & y_2 \\ 2c & x_3 & y_3 \end{vmatrix}=\frac{abc}{2}\neq0$, then the area of the triangle whose vertices are $\left(\frac{x_1}{a},\frac{y_1}{a}\right),\left(\frac{x_2}{b},\frac{y_2}{b}\right),\left(\frac{x_3}{c},\frac{y_3}{c}\right)$ is

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

26. If $\vec{a},\vec{b}$ are the position vectors A and B, then which of the following points whose position vector lies on AB is

1) $\vec{a}+\vec{b}$ 2) $\frac{\vec{a}+\vec{b}}{2}$ 3) $\frac{\overrightarrow{2a}+\vec{b}}{3}$ 4) $\frac{\vec{a}-\vec{b}}{3}$

27. If $\vec{a},\vec{b},\vec{c}$ are the position vectors of three collinear points, then which of the following is true?

1) $\vec{a}=\vec{b}+\vec{c}$ 2) $2\vec{a}=\vec{b}+\vec{c}$ 3) $\vec{b}=\vec{c}+\vec{a}$ 4) $4\vec{a}+\vec{b}+\vec{c}=\vec{0}$

28. If $\vec{r}=\frac{9\vec{a}+7\vec{b}}{16}$, then the point P whose position vector $\vec{r}$ divides the line joining the points with position vectors $\vec{a}$ and $\vec{b}$ in the ratio.

1) 7 : 9 internally 2) 9 : 7 internally

3) 9 : 7 externally 4) 7 : 9 externally

29. If $\lambda\hat{i}+2\lambda\hat{j}+2\lambda\hat{k}$ is a unit vector , then the value of λ is

1) $\frac{1}{3}$ 2) $\frac{1}{4}$ 3) $\frac{1}{9}$ 4) $\frac{1}{2}$

30. $\lim_{x \to 3} \lfloor x \rfloor =$

1) 2 2) 3 3) does not exist 4) 0

31. Let the function f be defined $f(x) = \begin{cases} 3x & 0 \le x \le 1 \\ -3x+5 & 1 < x \le 2 \end{cases}$, then

1) $\lim_{x \to 1} f(x) = 1$ 2) $\lim_{x \to 1} f(x) = 3$

3) $\lim_{x \to 1} f(x) = 2$ 4) $\lim_{x \to 1} f(x)$ does not exist

32. If $f : R \to R$ is defined by $f(x) = \lfloor x-3 \rfloor + \lfloor x-4 \rfloor$ for $x \in R$, then $\lim_{x \to 3} - f(x)$ is equal to

1) –2 2) –1 3) 0 4) 1

33. $\lim_{x \to 0} \frac{xe^x - \sin x}{x}$ is

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

34. If the derivative of $(ax - 5)\, e^{3x}$ at $x = 0$ is –13 , then the value of a is

1) 8 2) –2 3) 5 4) 2

35. $x = \frac{1-t^2}{1+t^2}, y = \frac{2t}{1+t^2}$ then $\frac{dy}{dx}$ is

1) $-\frac{y}{x}$ 2) $\frac{y}{x}$ 3) $-\frac{x}{y}$ 4) $\frac{x}{y}$

36. If $x = a \sin \theta$ and $y = b \cos \theta$, then $\frac{d^2y}{dx^2}$ is

1) $\frac{a}{b^2}\sec^2\theta$ 2) $-\frac{b}{a}\sec^2\theta$ 3) $-\frac{b}{a^2}\sec^3\theta$ 4) $-\frac{b^2}{a^2}\sec^3\theta$

37. The differential coefficient of $\log_{10}x$ with respect to $\log_x 10$ is

1) 1 2) $-(\log_{10} x)^2$ 3) $(\log_x 10)^2$ 4) $\frac{x^2}{100}$

38. $\int \tan^{-1}\left[\sqrt{\frac{1-\cos 2x}{1+\cos 2x}}\right] dx$ is

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

39. $\int 2^{3x+5} dx$ is

1) $\frac{3(2^{3x+5})}{\log 2}+c$ 2) $\frac{2^{3x+5}}{2\log(3x+5)}+c$

3) $\frac{2^{3x+5}}{2\log 3}+c$ 4) $\frac{2^{3x+5}}{3\log 2}+c$

40. $\int \frac{\sin^8 x - \cos^8 x}{1 - 2\sin^2 x \cos^2 x} dx$ is

1) $\frac{1}{2}\sin 2x + c$ 2) $-\frac{1}{2}\sin 2x + c$ 3) $\frac{1}{2}\cos 2x + c$ 4) $-\frac{1}{2}\cos 2x + c$

41. $\int \frac{e^x(x^2 \tan^{-1} x + \tan^{-1} x + 1)}{x^2 + 1} dx$ is

1) $e^x \tan^{-1}(x+1)+c$ 2) $\tan^{-1}(e^x)+c$ 3) $e^x \frac{(\tan^{-1} x)^2}{2} + c$ 4) $e^x \tan^{-1} x + c$

42. A bag contains 5 white and 3 black balls. Five balls are drawn successively without replacement . The probability that they are alternately of different colours is

1) $\frac{3}{14}$ 2) $\frac{5}{14}$ 3) $\frac{1}{14}$ 4) $\frac{9}{14}$

43. If A and B are two events such that $A \subset B$ and $P(B) \neq 0$, then which of the following is correct?

1) $P(A/B) = \frac{P(A)}{P(B)}$ 2) $P(A/B) < P(A)$ 3) $P(A/B) \geq P(A)$ 4) $P(A/B) > P(B)$

44. A bag contains 6 green, 2 white and 7 black balls. If two balls are drawn simultaneously, then the probability that both are different colours is

1) $\frac{68}{105}$ 2) $\frac{71}{105}$ 3) $\frac{64}{105}$ 4) $\frac{73}{105}$

45. If X and Y be two events such that $P(X/Y) = \frac{1}{2}$, $P(Y/X) = \frac{1}{3}$ and $P(X \cap Y) = \frac{1}{6}$, then $P(X \cup Y)$ is

1) $\frac{1}{3}$ 2) $\frac{2}{5}$ 3) $\frac{1}{6}$ 4) $\frac{2}{3}$

46. Let X = { 1,2,3,4} and R = { (1,1),(1,2), (1,3), (2,2) ,(3,3) , (2,1), (3,1), (1,4), (4,1)}. Then R is

1) reflexive 2) symmetric 3) transitive 4) equivalence

47. Number of sides of a polygon having 44 diagonals is…..

1) 4 2) 4 ! 3) 11 4) 22

48. The line $(p+2q)x + (p-3q)y = p-q$ for different values of p and q passes through the point

1) $\left(\frac{3}{5}, \frac{5}{2}\right)$ 2) $\left(\frac{2}{5}, \frac{2}{5}\right)$ 3) $\left(\frac{3}{5}, \frac{3}{5}\right)$ 4) $\left(\frac{2}{5}, \frac{3}{5}\right)$

49. If the square of the matrix $\begin{bmatrix} \alpha & \beta \\ \gamma & -\alpha \end{bmatrix}$ is the unit matrix of order 2, then α, β *and* γ should satisfy the relation .

1) $1 + \alpha^2 + \beta\gamma = 0$ 2) $1 - \alpha^2 - \beta\gamma = 0$ 3) $1 - \alpha^2 + \beta\gamma = 0$ 4) $1 + \alpha^2 - \beta\gamma = 0$

50. Two vertices of a triangle have position vectors $3\hat{i} + 4\hat{j} - 4\hat{k}$ and $2\hat{i} + 3\hat{j} + 4\hat{k}$. If the position vector of the centroid is $\hat{i} + 2\hat{j} + 3\hat{k}$, then the position vector of the third vertex is

1) $-2\hat{i} - \hat{j} + 9\hat{k}$ 2) $-2\hat{i} - \hat{j} - 6\hat{k}$ 3) $2\hat{i} - \hat{j} + 6\hat{k}$ 4) $-2\hat{i} + \hat{j} + 6\hat{k}$