KALAIMAGAL MATRIC HIGHER SECONDARY SCHOOL, MOHANUR.

STD : XII **MATHEMATICS** **MARKS: 50**

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

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

1. If $A=\begin{bmatrix}3 & 5\\ 1 & 2\end{bmatrix}$, B = adj A and $C = 3A$, then $\frac{|adjB|}{|C|}=$

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

2. If $A=\begin{bmatrix}2 & 0\\ 1 & 5\end{bmatrix}$ and $B=\begin{bmatrix}1 & 4\\ 2 & 0\end{bmatrix}$ then $|\text{adj}(AB)| =$

   1) -40 2) -80 3) -60 4) -20

3. If A, B and C are invertible metrics of some order, then which one of the following is not true

   1) $\text{adj } A = |A|\,A^{-1}$ 2) $\text{adj}(AB) = (\text{adj } A)(\text{adj } B)$

   3) $\det A^{-1} = (\det A)^{-1}$ 4) $(ABC)^{-1} = C^{-1}B^{-1}C^{-1}$

4. If A is a non-singular matrix such that $A^{-1}=\begin{bmatrix}5 & 3\\ -2 & -1\end{bmatrix}$, then $(A^{T})^{-1} =$

   1) $\begin{bmatrix}-5 & 3\\ 2 & 1\end{bmatrix}$ 2) $\begin{bmatrix}5 & 3\\ -2 & -1\end{bmatrix}$ 3) $\begin{bmatrix}-1 & -3\\ 2 & 5\end{bmatrix}$ 4) $\begin{bmatrix}5 & -2\\ 3 & -1\end{bmatrix}$

5. If $A=\begin{bmatrix}\cos\theta & \sin\theta\\ -\sin\theta & \cos\theta\end{bmatrix}$ and $A(\text{adj } A)=\begin{bmatrix}k & 0\\ 0 & k\end{bmatrix}$, then $k =$

   1) 0 2) $\sin\theta$ 3) $\cos\theta$ 4) 1

6. The area of the triangle formed by the complex numbers z, iz and $z+iz$ in Argand's diagram is

   1) $\frac{1}{2}|z|^2$ 2) $|z|^2$ 3) $\frac{3}{2}|z|^2$ 4) $2|z|^2$

7. If z is a non zero complex number, such that $2iz^2=\bar{z}$ then $|z|$ is

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

8. If $|z|=1$, then the value of $\frac{1+z}{1+\bar{z}}$ is

   1) z 2) $\bar{z}$ 3) $\frac{1}{z}$ 4) 1

9. If z is a complex number such that $z \in \mathbb{C} \setminus \mathbb{R}$ and $z+\frac{1}{z} \in \mathbb{R}$, then $|z|$ is

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

10. If $z = x + iy$ is a complex number such that $|z+2| = |z-2|$ then the locus of z is

    1) real axis 2) imaginary axis 3) ellipse 4) circle

11. If α, β and γ are the zeros of x^3+px^2+qx+r, then $\sum\frac{1}{\alpha}$ is

    1) $-\frac{q}{r}$ 2) $-\frac{p}{r}$ 3) $\frac{q}{r}$ 4) $-\frac{q}{p}$

12. If $x^3+12x^2+10ax+1999$ definitely has a positive zero, if and only if

    1) $a \geq 0$ 2) $a > 0$ 3) $a < 0$ 4) $a \leq 0$

13. If $\sin^{-1}x+\sin^{-1}y=\frac{2\pi}{3}$; then $\cos^{-1}x+\cos^{-1}y$ is equal to

1) $\frac{2\pi}{3}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{6}$ 4) π

14. If $\sin^{-1}x=2\sin^{-1}\alpha$ has a solution, then

1) $|\alpha|\le\frac{1}{\sqrt{2}}$ 2) $|\alpha|\ge\frac{1}{\sqrt{2}}$ 3) $|\alpha|<\frac{1}{\sqrt{2}}$ 4) $|\alpha|>\frac{1}{\sqrt{2}}$

15. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\frac{3\pi}{2}$, the value of $x^{2017}+y^{2018}+z^{2019}-\frac{9}{x^{101}+y^{101}+z^{101}}$ is

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

16. If $x=\frac{1}{5}$, the value of $\cos(\cos^{-1}x+2\sin^{-1}x)$ is

1) $-\sqrt{\frac{24}{25}}$ 2) $\sqrt{\frac{24}{25}}$ 3) $\frac{1}{5}$ 4) $-\frac{1}{5}$

17. The eccentricity of the hyperbola whose latus rectum is 8 and conjugate axis is equal to half the distance between the foci is

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

18. The length of the diameter of the circle which touches the x -axis at the point $(1,0)$ and passes through the point $(2,3)$.

1) $\frac{6}{5}$ 2) $\frac{5}{3}$ 3) $\frac{10}{3}$ 4) $\frac{3}{5}$

19. The centre of the circle inscribed in a square formed by the lines $x^2-8x-12=0$ and $y^2-14y+45=0$ is

1) $(4,7)$ 2) $(7,4)$ 3) $(9,4)$ 4) $(4,9)$

20. If $P(x,y)$ be any point on $16x^2+25y^2=400$ with foci $F_1(3,0)$ and $F_2(-3,0)$ then PF_1+PF_2 is

1) 8 2) 6 3) 10 4) 12

21. The area of quadrilateral formed with foci of the hyperbolas $\frac{x^2}{a^2}-\frac{y^2}{b^2}=1$ and $\frac{x^2}{a^2}-\frac{y^2}{b^2}=-1$ is

1) $4(a^2+b^2)$ 2) $2(a^2+b^2)$ 3) a^2+b^2 4) $\frac{1}{2}(a^2+b^2)$

22. If a vector $\vec{\alpha}$ lies in the plane of $\vec{\beta}$ and $\vec{\gamma}$, then

1) $[\vec{a},\vec{\beta},\vec{\gamma}]=1$ 2) $[\vec{a},\vec{\beta},\vec{\gamma}]=-1$ 3) $[\vec{a},\vec{\beta},\vec{\gamma}]=1$ 4) $[\vec{a},\vec{\beta},\vec{\gamma}]=2$

23. If $\vec{a},\vec{c},\vec{b}$ are three unit vectors such that $\vec{a}$ is perpendicular to $\vec{b}$, and is parallel to $\vec{c}$ then $\vec{a}\times(\vec{c}\times\vec{b})$ is equal to

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

24. The volume of the parallelepiped with its edges represented by the vectors $\hat{i}+\hat{j}$, $\hat{i}+2\hat{j}$, $\hat{i}+\hat{j}+\pi\hat{k}$ Is

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{3}$ 3) π 4) $\frac{\pi}{4}$

25. If $\vec{a}=\hat{i}+\hat{j}+\hat{k}$, $\vec{b}=\hat{i}+\hat{j}$, $\vec{c}=\hat{i}$ and $(\vec{a}\times\vec{b})\times\vec{c}=\lambda\vec{a}+\mu\vec{b}$, then the value of $\lambda+\mu$ is

1) 0 2) 1 3) 6 4) 3

26. If $\vec{a},\vec{c},\vec{b}$ are non-coplanar vectors such that $\vec{a}\times(\vec{b}\times\vec{c})=\frac{\vec{b}+\vec{c}}{\sqrt{2}}$, then the angle between $\vec{a}$ and $\vec{b}$ is

1) $\frac{\pi}{2}$ 2) $\frac{3\pi}{4}$ 3) $\frac{\pi}{4}$ 4) π

27. A balloon rises straight up at 10 m/s. An observer is 40m away from the spot where the balloon left the ground. Find the rate of change of the balloon's angle of elevation in radian per second when the balloon is 30 metres above the ground.

1) $\frac{3}{25}$ radian/sec 2) $\frac{4}{25}$ radian/sec 3) $\frac{1}{5}$ radian/sec 4) $\frac{1}{3}$ radian/sec

28. A stone is thrown up vertically. The height it reaches at time t seconds is given by $x = 80t - 16t^2$. The stone reaches the maximum height in time t seconds is given by

1) 2 2) 2.5 3)3 4)3.5

29. The abscissa of the point on the curve $f(x) = \sqrt{8-2x}$ at which the slope of the tangent is -0.25 ?

1) -8 2) -4 3) -2 4) 0

30. The tangent to the curve $y^2 - xy + 9 = 0$ is vertical when

1) $y = 0$ 2) $y = \pm\sqrt{3}$ 3) $y = \frac{1}{2}$ 4) $y = \pm 3$

31. What is the value of the limit $\lim_{x\to 0}\left(\cot x - \frac{1}{x}\right)$ is

1) 0 2) 1 3) 2 4) ∞

32. The percentage error of fifth root of 31 is approximately how many times the percentage error in 31?

1) $\frac{1}{31}$ 2) $\frac{1}{5}$ 3) 5 4) 31

33. If $w(x, y) = x^y, x > 0$, then $\frac{\partial w}{\partial x}$ is equal to

1) $x^y \log x$ 2) $y \log x$ 3) yx^{y-1} 4) $x \log y$

34. If we measure the side of a cube to be 4 cm with an error of 0.1 cm, then the error in our calculation of the volume is

1) 0.4 cu.cm 2) 0.45 cu.cm 3) 2 cu.cm 4) 4.8 cu.cm

35. The value of $\int_{-1}^{2} |x|\,dx$ is

1) $\frac{1}{2}$ 2) $\frac{3}{2}$ 3) $\frac{5}{2}$ 4) $\frac{7}{2}$

36. The value of $\int_{-\frac{\pi}{2}}^{\frac{\pi}{2}} \sin^2 x \cos x\,dx$ is

1) $\frac{3}{2}$ 2) $\frac{1}{2}$ 3) 0 4) $\frac{2}{3}$

37. The value of $\int_{-\frac{\pi}{4}}^{\frac{\pi}{4}} \left(\frac{2x^7 - 3x^5 + 7x^3 - x + 1}{\cos^2 x}\right) dx$ is

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

38. The area between $y^2 = 4x$ and its latus rectum is

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

39. The differential equation representing the family of curves $y = A\cos(x + B)$, where A and B are parameters, is

1) $\frac{d^2y}{dx^2} - y = 0$ 2) $\frac{d^2y}{dx^2} + y = 0$ 3) $\frac{d^2y}{dx^2} = 0$ 4) $\frac{d^2x}{dy^2} = 0$

40. The order of the differential equation of all circles with centre at (h,k) and radius 'a' is
1) 2 2) 3 3) 4 4) 1

41. The general solution of the differential equation $\frac{dy}{dx}=\frac{y}{x}$ is
1) $xy=k$ 2) $y=k\log x$ 3) $y=kx$ 4) $\log y=kx$

42. The solution of $\frac{dy}{dx}+p(x)y=0$ is
1) $y=ce^{\int pdx}$ 2) $y=ce^{-\int pdx}$ 3) $x=ce^{-\int pdy}$ 4) $x=ce^{\int pdy}$

43. The integrating factor of the differential equation $\frac{dy}{dx}+P(x)y=Q(x)$ is x, then $P(x)$
1) x 2) $\frac{x^2}{2}$ 3) $\frac{1}{x}$ 4) $\frac{1}{x^2}$

44. A rod of length $2l$ is broken into two pieces at random. The probability density function of the shorter of the two pieces is $f(x)=\begin{cases}\frac{1}{l} & 0<x<l\\ 0 & l\le x<2l\end{cases}$ The mean and variance of the shorter of the two pieces are respectively
1) $\frac{l}{2},\frac{l^2}{3}$ 2) $\frac{l}{2},\frac{l^2}{6}$ 3) $l,\frac{l^2}{12}$ 4) $\frac{l}{2},\frac{l^2}{12}$

45. A pair of dice numbered 1, 2, 3, 4, 5, 6 of a six-sided die and 1, 2, 3, 4 of a four-sided die is rolled and the sum is determined. Let the random variable X denote this sum. Then the number of elements in the inverse image of 7 is
1) 1 2) 2 3) 3 4) 4

46. Let X represent the difference between the number of heads and the number of tails obtained when a coin is tossed n times. Then the possible values of X are
1) $i+2n,\ i=0,1,2,.....n$ 2) $2i-n,\ i=0,1,2,.....n$
3) $n-i,\ \ i=0,1,2,.....n$ 4) $2i+2n, i=0,1,2,.....n$

47. In the set $\mathbb{R}$ of real numbers '$*$' is defined as follows. Which one of the following is not a binary operation on $\mathbb{R}$?
1) $a*b$=min $(a\,.\,b)$ 2) $a*b$= max (a,b) 3) $a*b=a$ 4) $a*b=a^b$

48. In the set $\mathbb{Q}$ define $a\odot b=a+b+ab$. For what value of y, $3\odot(y\odot 5)=7$?
1) $y=\frac{2}{3}$ 2) $y=-\frac{2}{3}$ 3) $y=-\frac{3}{2}$ 4) $y=4$

49. Which one of the following statements has the truth value T ?
1) sin x is an even function.
2) Every square matrix is non-singular
3) The product of complex number and its conjugate is purely imaginary
4) $\sqrt{5}$ is an irrational number

50. Determine the truth value of each of the following statements:
(a) 4+2=5 and 6+3=9 (b) 3+2=5 and 6+1=7
(c) 4+5=9 and 1+2= 4 (d) 3+2=5 and 4+7=11

	(a)	(b)	(c)	(d)
1)	F	T	F	T
2)	T	F	T	F
3)	T	T	F	F
4)	F	F	T	T