

KALAIMAGAL MATRIC HIGHER SECONDARY SCHOOL, MOHANUR.

STD : XI

MATHEMATICS

MARKS: 50

DATE:

ONE MARK TEST-VI (BB FULLY)

TIME: 30 min

Choose the correct answer:

50 x 1 = 50

1. Let $X=\{1,2,3,4\}$, $Y= \{a,b,c,d\}$ and $f=\{(1,a),(4,b),(2,c),(3,d),(2,d)\}$. Then f is
 - 1) an one –to –one function
 - 2) an onto function
 - 3) a function which is not one – to – one
 - 4) not a function
2. Let $f: R \rightarrow R$ be defined by $f(x) = 1 - |x|$. Then the range of f is
 - 1) R
 - 2) $(1, \infty)$
 - 3) $(-1, \infty)$
 - 4) $(-\infty, 1]$
3. The equation whose roots are numerically equal but opposite in sign to the roots of $3x^2 - 5x - 7 = 0$ is
 - 1) $3x^2 - 5x - 7 = 0$
 - 2) $3x^2 + 5x - 7 = 0$
 - 3) $3x^2 - 5x + 7 = 0$
 - 4) $3x^2 + x - 7$
4. If a and b are the real roots of the equation $x^2 - kx + c = 0$, then the distance between the points $(a, 0)$ and $(b, 0)$ is
 - 1) $\sqrt{k^2 - 4c}$
 - 2) $\sqrt{4k^2 - c}$
 - 3) $\sqrt{4c - k^2}$
 - 4) $\sqrt{k - 8c}$
5. If $\frac{1-2x}{3+2x-x^2} = \frac{A}{3-x} + \frac{B}{x+1}$, then the value of $A+B$ is
 - 1) $\frac{-1}{2}$
 - 2) $\frac{-2}{3}$
 - 3) $\frac{1}{2}$
 - 4) $\frac{2}{3}$
6. The value of $\log_3 11 \cdot \log_{11} 13 \cdot \log_{13} 15 \cdot \log_{15} 27 \cdot \log_{27} 81$ is
 - 1) 1
 - 2) 2
 - 3) 3
 - 4) 4
7. In a triangle ABC, $\sin^2 A + \sin^2 B + \sin^2 C = 2$, then the triangle is
 - 1) equilateral triangle
 - 2) isosceles triangle
 - 3) right triangle
 - 4) scalene triangle
8. $\frac{\cos 6x + 6\cos 4x + 15\cos 2x + 10}{\cos 5x + 5\cos 3x + 10\cos x}$ is equal to
 - 1) $\cos 2x$
 - 2) $\cos x$
 - 3) $\cos 3x$
 - 4) $2\cos x$
9. A wheel is spinning at 2 radians/ second . How many seconds will it take to make 10 complete revolutions?
 - 1) 10π seconds
 - 2) 20π seconds
 - 3) 5π seconds
 - 4) 15π seconds
10. In a ΔABC , if i) $\sin \frac{A}{2} \sin \frac{B}{2} \sin \frac{C}{2} > 0$ ii) $\sin A \sin B \sin C > 0$ then
 - 1) Both (i) and (ii) are true
 - 2) Only (i) is true
 - 3) Only (ii) is true
 - 4) Neither (i) nor (ii) is true
11. The number of 10 digit number that can be written by using the digits 2 and 3 is
 - 1) ${}^{10}C_2 + {}^9C_2$
 - 2) 2^{10}
 - 3) $2^{10} - 2$
 - 4) $10!$
12. The product of first n odd natural numbers equals
 - 1) ${}^{2n}C_n \times {}^n P_n$
 - 2) $\left(\frac{1}{2}\right)^n \times {}^{2n}C_n \times {}^nP_n$
 - 3) $\left(\frac{1}{4}\right)^n \times {}^{2n}C_n \times {}^{2n}P_n$
 - 4) ${}^nC_n \times {}^nP_n$
13. $1+3+5+7+\dots+17$ is equal to
 - 1) 101
 - 2) 81
 - 3) 71
 - 4) 61

14. The sum up to n terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \sqrt{32} + \dots$ is
- 1) $\frac{n(n+1)}{2}$
 - 2) $2n(n+1)$
 - 3) $\frac{n(n+1)}{\sqrt{2}}$
 - 4) 1
15. The sum of an infinite GP is 18. If the first term is 6, the common ratio is
- 1) $\frac{1}{3}$
 - 2) $\frac{2}{3}$
 - 3) $\frac{1}{6}$
 - 4) $\frac{3}{4}$
16. The value of $\frac{1}{2!} + \frac{1}{4!} + \frac{1}{6!} + \dots$ is
- 1) $\frac{e^2 + 1}{2e}$
 - 2) $\frac{(e+1)^2}{2e}$
 - 3) $\frac{(e-1)^2}{2e}$
 - 4) $\frac{e^2 - 1}{2e}$
17. The value of $1 - \frac{1}{2}\left(\frac{2}{3}\right) + \frac{1}{3}\left(\frac{2}{3}\right)^2 - \frac{1}{4}\left(\frac{2}{3}\right)^3 + \dots$ is
- 1) $\log\left(\frac{5}{3}\right)$
 - 2) $\frac{3}{2}\log\left(\frac{5}{3}\right)$
 - 3) $\frac{5}{3}\log\left(\frac{5}{3}\right)$
 - 4) $\frac{2}{3}\log\left(\frac{2}{3}\right)$
18. If one of the lines given by $6x^2 - xy + 4cy^2 = 0$ is $3x + 4y = 0$ then c equals to
- 1) -3
 - 2) -1
 - 3) $\frac{5}{9}$
 - 4) $\frac{1}{9}$
19. The equation of one the line represented by the equation $x^2 + 2xy \cot\theta - y^2 = 0$ is
- 1) $x - y \cot\theta = 0$
 - 2) $x + y \tan\theta = 0$
 - 3) $x \cos\theta + y (\sin\theta + 1) = 0$
 - 4) $x \sin\theta + y (\cos\theta + 1) = 0$
20. If A is skew symmetric of order n and C is a column matrix of order $n \times 1$, then $C^T AC$ is
- 1) an identity matrix of order n
 - 2) an identity matrix of order 1
 - 3) a zero matrix of order 1
 - 4) an identity matrix of order 2
21. If $A+I = \begin{bmatrix} 3 & -2 \\ 4 & 1 \end{bmatrix}$, then $(A+I)(A-I)$ is equal to
- 1) $\begin{bmatrix} -5 & -4 \\ 8 & -9 \end{bmatrix}$
 - 2) $\begin{bmatrix} -5 & 4 \\ -8 & 9 \end{bmatrix}$
 - 3) $\begin{bmatrix} 5 & 4 \\ 8 & 9 \end{bmatrix}$
 - 4) $\begin{bmatrix} -5 & -4 \\ -8 & -9 \end{bmatrix}$
22. If $(1, 2, 4)$ and $(2, -3\lambda, -3)$ are the initial and terminal points of the vector $\hat{i} + 5\hat{j} - 7\hat{k}$, then the value of λ is equal to
- 1) $\frac{7}{3}$
 - 2) $-\frac{7}{3}$
 - 3) $-\frac{5}{3}$
 - 4) $\frac{5}{3}$
23. If $\vec{a} = \hat{i} + \hat{j} + \hat{k}$, $\vec{b} = 2\hat{i} + x\hat{j} + \hat{k}$, $\vec{c} = \hat{i} - \hat{j} + 4\hat{k}$ and $\vec{a} \cdot (\vec{b} \times \vec{c}) = 70$, then x is equal to
- 1) 5
 - 2) 7
 - 3) 26
 - 4) 10
24. The value of $\lim_{x \rightarrow k^-} x - \lfloor x \rfloor$, where k is an integer is
- 1) -1
 - 2) 1
 - 3) 0
 - 4) 2
25. Let $f: \mathbb{R} \rightarrow \mathbb{R}$ be defined by $f(x) = \begin{cases} x, & x \text{ is irrational} \\ 1-x, & x \text{ is rational} \end{cases}$ then f is
- 1) discontinuous at $x = \frac{1}{2}$
 - 2) continuous at $x = \frac{1}{2}$
 - 3) continuous every where
 - 4) discontinuous every where
26. Let f be a continuous function on $[2, 5]$. If f takes only rational for all x and $f(3) = 12$, then $f(4.5)$ is equal to
- 1) $\frac{f(3) + f(4.5)}{7.5}$
 - 2) 12
 - 3) 17.5
 - 4) $\frac{f(4.5) - f(3)}{1.5}$

27. If $f(x) = \begin{cases} x+1 & \text{when } x < 2 \\ 2x-1 & \text{when } x \geq 2 \end{cases}$, the $f'(2)$ is

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

28. If $f(x) = \begin{cases} x+2 & -1 < x < 3 \\ 5 & x=3 \\ 8-x & x > 3 \end{cases}$, then at $x=3, f'(x)$ is

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

29. If $f(x) = \begin{cases} 2a-x & \text{for } -a < x < a \\ 3x-2a & \text{for } x \geq a \end{cases}$, then which one of the following is true?

 - 1) $f(x)$ is not differentiable at $x=a$
 - 2) $f(x)$ is discontinuous at $x=a$
 - 3) $f(x)$ is continuous for all x in \mathbb{R}
 - 4) $f(x)$ is differentiable for all $x \geq a$

30. $\int e^{-7x} \sin 5x \, dx$ is

 - 1) $\frac{e^{-7x}}{74} [-7\sin 5x - 5\cos 5x] + c$
 - 2) $\frac{e^{-7x}}{74} [7\sin 5x + 5\cos 5x] + c$
 - 3) $\frac{e^{-7x}}{74} [7\sin 5x - 5\cos 5x] + c$
 - 4) $\frac{e^{-7x}}{74} [-7\sin 5x + 5\cos 5x] + c$

31. $\int \frac{x+2}{\sqrt{x^2-1}} \, dx$ is

 - 1) $\sqrt{x^2-1} - 2\log|x+\sqrt{x^2-1}| + c$
 - 2) $\sin^{-1} x - 2\log|x+\sqrt{x^2-1}| + c$
 - 3) $2\log|x+\sqrt{x^2-1}| - \sin^{-1} x + c$
 - 4) $\sqrt{x^2-1} + 2\log|x+\sqrt{x^2-1}| + c$

32. $\int \sin \sqrt{x} \, dx$ is

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

33. There are three events A, B and C of which one and only one can happen. If the odds are 7 to 4 against A and 5 to 3 against B, then odds against C is

 - 1) 23: 65
 - 2) 65: 23
 - 3) 23: 88
 - 4) 88: 23

34. It is given that the events A and B are such that $P(A) = \frac{1}{4}$, $P(A/B) = \frac{1}{2}$ and $P(B/A) = \frac{2}{3}$. Then $P(B)$ is

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

35. Ten coins are tossed. The probability of getting at least 8 heads is

 - 1) $\frac{7}{64}$
 - 2) $\frac{7}{32}$
 - 3) $\frac{7}{16}$
 - 4) $\frac{7}{128}$

36. The relation R defined on a set $A = \{0, -1, 1, 2\}$ by xRy if $|x^2 + y^2| \leq 2$, 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 $\{0, -1, 1\}$

37. If $\frac{|x-2|}{x-2} \geq 0$, then x belongs to

 - 1) $[2, \infty)$
 - 2) $(2, \infty)$
 - 3) $(-\infty, 2)$
 - 4) $(-2, \infty)$

38. 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

39. The number of 5 digit numbers all digits of which are odd is

- 1) 25 2) 5^5 3) 5^6 4) 625

40. 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) ${}^{20}C_8 2^8 3^{12}$

41. 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

42. 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) $\begin{bmatrix} 2 & -6 \\ 4 & -2 \end{bmatrix}$

43. 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) $\frac{2\hat{i} - \hat{j}}{\sqrt{5}}$

44. $\lim_{\theta \rightarrow 0} \frac{\sin \sqrt{\theta}}{\sqrt{\sin \theta}}$

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

45. 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

46. 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) $\int (g(x))^2 dx$

47. 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) $y = x^2 - 3x + 6$

48. 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) $\frac{7}{8}$

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

- 1) $P(A \cup \bar{B}) + P(\bar{A} \cup B)$ 2) $P(A \cap \bar{B}) + P(\bar{A} \cap B)$
3) $P(A) + P(B) - P(A \cap B)$ 4) $P(A) + P(B) + 2P(A \cap B)$

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) $-4\hat{i}$