Padasalai's

Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

- Padasalai's NEWS - Group
https://t.me/joinchat/NIfCqVRBNj9hhV4wu6_NqA

- Padasalai's Channel - Group
https://t.me/padasalaichannel

- Lesson Plan - Group
https://t.me/joinchat/NIfCqVWwo5iL-21gpzrXLw

- 12th Standard - Group
https://t.me/Padasalai_12th

- 11th Standard - Group
https://t.me/Padasalai_11th

- 10th Standard - Group
https://t.me/Padasalai_10th

- 9th Standard - Group
https://t.me/Padasalai_9th

- 6th to 8th Standard - Group
https://t.me/Padasalai_6to8

- 1st to 5th Standard - Group
https://t.me/Padasalai_1to5

- TET - Group
https://t.me/Padasalai_TET

- PGTRB - Group
https://t.me/Padasalai_PGTRB

- TNPSC - Group
https://t.me/Padasalai_TNPSC

MODEL PAPER 1

STD XI

MAX MARKS 75

ANSWER ALL THE QUESTIONS

1.

The rule $f(x) = x^2$ is a bijection if the domain and the co-domain are given by

(1) $\mathbb{R}, \mathbb{R}$ (2) $\mathbb{R}, (0, \infty)$ (3) $(0, \infty), \mathbb{R}$ (4) $[0, \infty), [0, \infty)$

2.

If two sets A and B have 17 elements in common, then the number of elements common to the set $A \times B$ and $B \times A$ is

(1) 2^{17} (2) 17^2 (3) 34 (4) insufficient data

3.

The number of students who take both the subjects Mathematics and Chemistry is 70. This represents 10% of the enrollment in Mathematics and 14% of the enrollment in Chemistry. The number of students take at least one of these two subjects, is

(1) 1120 (2) 1130 (3) 1100 (4) insufficient data

4.

If two sets A and B have 17 elements in common, then the number of elements common to the set $A \times B$ and $B \times A$ is

(1) 2^{17} (2) 17^2 (3) 34 (4) insufficient data

5.

Which one of the following is a function which is 'onto' ?

(1) $f : R \to R$; $f(x) = x^2$ (2) $f : R \to [1, \infty)$; $f(x) = x^2 + 1$

6.

Which of the following has only one subset?

A) {2} B) { } C) { ϕ } D) None of these

7.

If a and b are the roots of the equation $x^2 - kx + 16 = 0$ and satisfy $a^2 + b^2 = 32$, then the value of k is

(1) 10 (2) -8 (3) -8.8 (4) 6

8.

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) $\frac{2}{3}$

9.

The value of $\log_{\sqrt{2}} 512$ is

(1) 16 (2) 18 (3) 9 (4) 12

10.

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

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

11.

The solution set of the following inequality $|x-1| \geq |x-3|$ is

(1) $[0, 2]$ (2) $(2, \infty)$ (3) $(0, 2)$ (4) $(-\infty, 2)$

12.

If $-3x + 17 < -13$, then

(A) $x \in (10, \infty)$ (B) $x \in [10, \infty)$

(C) $x \in (-\infty, 10]$ (D) $x \in [-10, 10)$

13.

(A) $x \in (-\infty, 5)$ (B) $x \in (-\infty, 5]$

(C) $x \in [5, \infty)$ (D) $x \in (5, \infty)$

14.

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.

15.

Let $f_k(x) = \frac{1}{k}\left[\sin^k x + \cos^k x\right]$ 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) $\frac{1}{3}$

16.

If $\sin\alpha + \cos\alpha = b$, then $\sin 2\alpha$ is equal to

(1) $b^2 - 1$, if $b \leq \sqrt{2}$ (2) $b^2 - 1$, if $b > \sqrt{2}$ (3) $b^2 - 1$, if $b \geq 1$ (4) $b^2 - 1$, if $b \geq \sqrt{2}$

17.

Which of the following is not true?

(1) $\sin\theta = -\frac{3}{4}$ (2) $\cos\theta = -1$ (3) $\tan\theta = 25$ (4) $\sec\theta = \frac{1}{4}$

18.

$\cos B$ is equal to

(1) $\frac{c^2+a^2-b^2}{2ca}$ (2) $\frac{c^2+b^2-a^2}{2bc}$ (3) $\frac{a^2+b^2-c^2}{2ab}$ (4) $\frac{a^2+b^2+c^2}{2ab}$

19.

$(\text{Sin } 60° + \text{Cos} 60°)^2 + (\text{Sin } 60° - \cos 60°)^2$ = ______________

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

20.

If $\sin\theta + \cos\theta = 1$, then the value of $\sin 2\theta$ is equal to

(A) 1 (B) 0 (C) $\frac{1}{2}$ (D) 2

21.

If $\cos A = \frac{1}{7}$ and $\cos B = \frac{13}{14}$, $0 < A, B < \frac{\pi}{2}$, then A - B = _________

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{\pi}{6}$

22.

$1 + 3 + 5 + 7 + \cdots + 17$ is equal to

(1) 101 (2) 81 (3) 71 (4) 61

23.

Number of sides of a polygon having 44 diagonals is $\cdots\cdots$

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

24.

The number of rectangles that a chessboard has $\cdots$

(1) 81 (2) 9^9 (3) 1296 (4) 6561

25.

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

(1) 25 (2) 5^5 (3) 5^6 (4) 625.

26.

If $10^n + 3.4^{n+2} + k$ is divisible by 9 for all $n \in$ N, then the least positive integral value of k is

(A) 5 (B) 3 (C) 7 (D) 1

27.

How many different arrangements can be made out of letters of words ENGINEERING

(1) 11! (2) $\frac{11!}{(3!)^2 (2!)^2}$ (3) $\frac{11!}{3! \cdot 2!}$ (4) $\frac{11!}{3!}$

28.

The value of $2 + 4 + 6 + \cdots + 2n$ is

(1) $\frac{n(n-1)}{2}$ (2) $\frac{n(n+1)}{2}$ (3) $\frac{2n(2n+1)}{2}$ (4) $n(n+1)$

29.

The coefficient of x^6 in $(2+2x)^{10}$ is

(1) ${}^{10}C_6$ (2) 2^6 (3) ${}^{10}C_6$ (4) ${}^{10}C_6 2^{10}$.

30.

The last term in the expansion of $(2+\sqrt{3})^8$ is

(1) 81 (2) 27 (3) $\sqrt{3}$ (4) 3

31.

If ${}^nC_{12} = {}^nC_8$, then n is equal to

(A) 20 (B) 12 (C) 6 (D) 30

32.

The number of possible outcomes when a coin is tossed 6 times is

(A) 36 (B) 64 (C) 12 (D) 32

33.

If the lines represented by the equation $6x^2 + 41xy - 7y^2 = 0$ make angles α and β with x- axis, then $\tan\alpha \tan\beta =$

(1) $-\frac{6}{7}$ (2) $-\frac{6}{7}$ (3) $-\frac{7}{6}$ (4) $\frac{7}{6}$

34.

Equation of two parallel straight lines differ by

(1) x term (2) y term (3) constant term (4) xy term

35.

The area of the triangle formed by the lines $x^2 - 4y^2 = 0$ and $x = a$ is

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

36.

The y-intercept of the straight line passing through (1,3) and perpendicular to $2x - 3y + 1 = 0$ is

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

37.

Let A and B be two symmetric matrices of same order. Then which one of the following statement is not true?

(1) $A + B$ is a symmetric matrix (2) AB is a symmetric matrix

(3) $AB = (BA)^T$ (4) $A^T B = AB^T$

38.

A root of the equation $\begin{vmatrix} 3-x & -6 & 3 \\ -6 & 3-x & 3 \\ 3 & 3 & -6-x \end{vmatrix} = 0$ is

(1) 6 (2) 3 (3) 0 (4) – 6

39.

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) $\begin{bmatrix} -5 & -4 \\ -8 & -9 \end{bmatrix}$

40.

The matrix $\begin{bmatrix} 8 & 5 & 7 \\ 0 & 6 & 4 \\ 0 & 0 & 2 \end{bmatrix}$ is

(1) the upper triangular (2) lower triangular
(3) square matrix (4) null matrix

41.

Given that the value of a third order determinant is 11 then the value of the determinant formed by the respective co-factors as its elements will be
(1) 11 (2) 121 (3) 1331 (4) 0

42.

The matrix $\begin{bmatrix} a-b-c & 2a & 2a \\ 2b & b-c-a & 2b \\ 2c & 2c & c-a-b \end{bmatrix}$ is singular if...

(a) $a - b = 0$ (b) $a + b = 0$
(c) $a + b + c = 0$ (d) $a = 0$

43.

$\begin{vmatrix} x+1 & x+3 & x+4 \\ x+4 & x+6 & x+8 \\ x+8 & x+10 & x+14 \end{vmatrix} = \ldots$

(a) 2 (b) -2 (c) 4 (d) -4

44.

$$\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0, \text{ then } x = \ldots$$

(a) $\frac{3}{2}, \frac{3}{11}$ (b) $\frac{3}{2}, \frac{11}{3}$ (c) $\frac{2}{3}, \frac{11}{3}$ (d) $\frac{2}{3}, \frac{3}{11}$

45.

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

46.

If the projection of $5\hat{i} - \hat{j} - 3\hat{k}$ on the vector $\hat{i} + 3\hat{j} + \lambda\hat{k}$ is same as the projection of $\hat{i} + 3\hat{j} + \lambda\hat{k}$ on $5\hat{i} - \hat{j} - 3\hat{k}$, then λ is equal to

(1) ± 4 (2) ± 3 (3) ± 5 (4) ± 1

47.

If the points whose position vectors $10\hat{i} + 3\hat{j},\ 12\hat{i} - 5\hat{j}$ and $a\hat{i} + 11\hat{j}$ are collinear then a is equal to

(1) 6 (2) 3 (3) 5 (4) 8

48.

If $|\vec{a}| = 13, |\vec{b}| = 5$ and $\vec{a} \cdot \vec{b} = 60°$ then $|\vec{a} \times \vec{b}|$ is

(1) 15 (2) 35 (3) 45 (4) 25

49.

If G is the centriod of a triangle ABC and G' is the centroid of triangle $A'B'C'$ then $\overrightarrow{AA'} + \overrightarrow{BB'} + \overrightarrow{CC'} =$

(1) $\overrightarrow{GG'}$ (2) $3\overrightarrow{GG'}$ (3) $2\overrightarrow{GG'}$ (4) $3\overrightarrow{GG'}$

50.

$$\lim_{x \to \infty} \frac{a^x - b^x}{x} =$$

(1) $\log ab$ (2) $\log\left(\frac{a}{b}\right)$ (3) $\log\left(\frac{b}{a}\right)$ (4) $\frac{a}{b}$

51.

If $\lim_{x \to 0} \frac{\sin px}{\tan 3x} = 4$, then the value of p is

(1) 6 (2) 9 (3) 12 (4) 4

52.

$$\lim_{n \to \infty}\left(\frac{1}{n^2} + \frac{2}{n^2} + \frac{3}{n^2} + \ldots + \frac{n}{n^2}\right) \text{ is}$$

(1) $\frac{1}{2}$ (2) 0 (3) 1 (4) ∞

53.

At $x = \frac{3}{2}$ the function $f(x) = \frac{|2x-3|}{2x-3}$ is

(1) continuous (2) discontinuous (3) differentiable (4) non-zero

54.

The function $f(x)=|x|$ is

(1) continuous at $x=0$

(2) discontinuous at $x=0$

(3) not continuous from the right at $x=0$

(4) not continuous from the left at $x=0$

55.

The function $f(x)=\frac{x^2+1}{x^2-3x+2}$ is continuous at all points of R except at

(1) $x=1$ (2) $x=2$ (3) $x=1, 2$ (4) $x=-1, -2$

56.

If $y=\frac{1}{a-z}$, then $\frac{dz}{dy}$ is

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

57.

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

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

58.

If $f(x)=\begin{cases} ax^2-b, & -1<x<1 \\ \frac{1}{|x|}, & \text{elsewhere} \end{cases}$ is differentiable at $x=1$, then

(1) $a=\frac{1}{2}, b=\frac{-3}{2}$ (2) $a=\frac{-1}{2}, b=\frac{3}{2}$ (3) $a=-\frac{1}{2}, b=-\frac{3}{2}$ (4) $a=\frac{1}{2}, b=\frac{3}{2}$

59.

If $f(x)=x+2$, then $f'(f(x))$ at $x=4$ is

(1) 8 (2) 1 (3) 4 (4) 5

60.

The derivative of $f(x)=x^2|x|$ at $x=0$ is

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

61.

$\int e^{\sqrt{x}}dx$ is

(1) $2\sqrt{x}(1-e^{\sqrt{x}})+c$ (2) $2\sqrt{x}(e^{\sqrt{x}}-1)+c$

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

62.

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

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

63.

$\int x^2 \cos x \, dx$ is

(1) $x^2 \sin x + 2x\cos x - 2\sin x + c$ (2) $x^2 \sin x - 2x\cos x - 2\sin x + c$

(3) $-x^2 \sin x + 2x\cos x + 2\sin x + c$ (4) $-x^2 \sin x - 2x\cos x + 2\sin x + c$

64.

$\int \frac{dx}{e^x - 1}$ is

(1) $\log|e^x| - \log|e^x - 1| + c$ (2) $\log|e^x| + \log|e^x - 1| + c$

(3) $\log|e^x - 1| - \log|e^x| + c$ (4) $\log|e^x + 1| - \log|e^x| + c$

65.

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

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

66.

$\int \frac{1}{\sqrt{3+4x}} dx =$

(1) $\frac{1}{2}\sqrt{3+4x} + c$ (2) $\frac{1}{4}\log\sqrt{3+4x} + c$ (3) $2\sqrt{3+4x} + c$ (4) $-\frac{1}{2}\sqrt{3+4x} + c$

67.

$\int \left(\frac{x-1}{x+1}\right) dx =$

(1) $\frac{1}{2}\left(\frac{x-1}{x+1}\right)^2 + c$ (2) $x - 2\log(x+1) + c$ (3) $\frac{(x-1)^2}{2}\log(x+1) + c$ (4) $x + 2\log(x+1) + c$

68.

If $P(A) = 0.35$, $P(B) = 0.73$ and $P(A \cap B) = 0.14$. Then $P(\overline{A} \cap \overline{B}) =$

(1) 0.94 (2) 0.06 (3) 0.86 (4) 0.14

69.

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) $\frac{1}{2}$

70.

Given $P(A) = 0.50$, $P(B) = 0.40$ and $P(A \cap B) = 0.20$ then $P(A/\overline{B}) =$

(1) 0.50 (2) 0.40 (3) 0.70 (4) 0.10

An urn contains 10 white and 10 black balls. While another urn contains 5 white and 10 black balls. One urn is chosen at random and a ball is drawn from it. The probability that it is white, is

(1) $\frac{5}{11}$ (2) $\frac{5}{12}$ (3) $\frac{3}{7}$ (4) $\frac{4}{7}$

71.

In a certain college 4% of the boys and 1% of the girls are taller than 1.8 meter. Further 60% of the students are girls. If a student is selected at random and is taller than 1.8 meters, then the probability that the student is a girl is

(1) $\frac{2}{11}$ (2) $\frac{3}{11}$ (3) $\frac{5}{11}$ (4) $\frac{7}{11}$

72.

If two events A and B are independent such that $P(A)=0.35$ and $P(A\cup B)=0.6$, then $P(B)$ is

(1) $\frac{5}{13}$ (2) $\frac{1}{13}$ (3) $\frac{4}{13}$ (4) $\frac{7}{13}$

73.

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) $\frac{73}{105}$

74.

A letter is taken at random from the letters of the word 'ASSISTANT' and another letter is taken at random from the letters of the word 'STATISTICS'. The probability that the selected letters are the same is

(1) $\frac{7}{45}$ (2) $\frac{17}{90}$ (3) $\frac{29}{90}$ (4) $\frac{19}{90}$

75.

If $\tan\alpha=\frac{m}{m+1}$ and $\tan\beta=\frac{1}{2m+1}$ then $\alpha + \beta =$ ________

(a) $\frac{\pi}{4}$ (b) $-\frac{\pi}{4}$ (c) $\frac{3\pi}{4}$ (d) $-\frac{3\pi}{4}$

PREPARED BY G NARASIMHAN

RETIRED HEAD MASTER

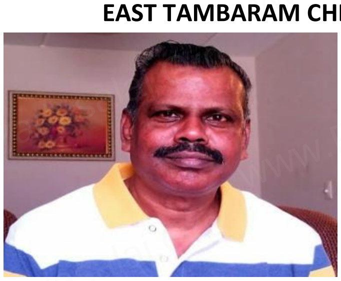
J G NATIONAL HIGHER SECONDARY SCHOOL EAST TAMBARAM

CHENNAI 59 PHONE 9884588989

RESIDENTIAL ADDRESS

NO 40/28 BUDDHAR STREET

EAST TAMBARAM CHENNAI 59



MODEL PAPER 2

STD XI **MAX MARKS 75**

ANSWER ALL THE QUESTIONS

1. Let $f : \mathbb{R} \to \mathbb{R}$ be defined by $f(x) = 1 - |x|$. Then the range of f is

(1) $\mathbb{R}$ (2) $(1, \infty)$ (3) $(-1, \infty)$ (4) $(-\infty, 1]$

2. 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

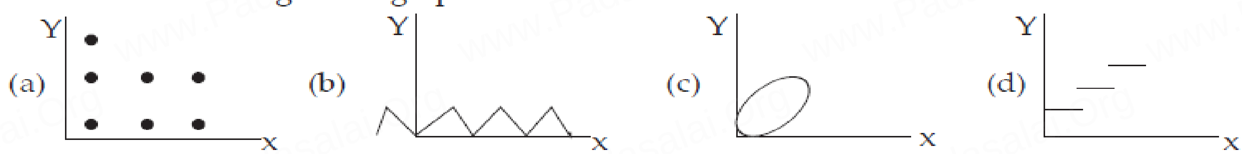
3. The function $f : [0, 2\pi] \to [-1, 1]$ defined by $f(x) = \sin x$ is

(1) one-to-one (2) onto (3) bijection (4) cannot be defined

4. Out of 2000 employees in an office 48% preferred Coffee (c), 54% liked (T), 64% used to smoke (S). Out of the total 28% used C and T, 32% used T and S and 30% preferred C and S, only 6% did none of these. The number having all the three is

(a) 360 (b) 300 (c) 380 (d) none of these

5. Which of the diagram is graph of a function



6. Given that x, y and b are real numbers $x < y, b \geq 0$, then

(1) $xb < yb$ (2) $xb > yb$ (3) $xb \leq yb$ (4) $\frac{x}{b} \geq \frac{y}{b}$

7. The function $f : \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = \dfrac{(x^2 + \cos x)(1 + x^4)}{(x - \sin x)(2x - x^3)} + e^{-|x|}$ is

(1) an odd function (2) neither an odd function nor an even function
(3) an even function (4) both odd function and even function.

8. The solution of $5x - 1 < 24$ and $5x + 1 > -24$ is

(1) $(4, 5)$ (2) $(-5, -4)$ (3) $(-5, 5)$ (4) $(-5, 4)$

9. If a and b are the roots of the equation $x^2 - kx + 16 = 0$ and satisfy $a^2 + b^2 = 32$, then the value of k is

(1) 10 (2) -8 (3) -8.8 (4) 6

10. 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) $\frac{2}{3}$

11. If $\sin\alpha + \cos\alpha = b$, then $\sin 2\alpha$ is equal to

(1) $b^2 - 1$, if $b \leq \sqrt{2}$ (2) $b^2 - 1$, if $b > \sqrt{2}$ (3) $b^2 - 1$, if $b \geq 1$ (4) $b^2 - 1$, if $b \geq \sqrt{2}$

12.

If $f(\theta) = |\sin\theta| + |\cos\theta|$, $\theta \in R$, then $f(\theta)$ is in the interval

(1) $[0, 2]$ (2) $\left[1, \sqrt{2}\right]$ (3) $[1, 2]$ (4) $[0, 1]$

13.

If α and β are the roots of $\tan^2 x + a\tan x + b = 0$, then $\dfrac{\sin(\alpha+\beta)}{\sin\alpha\sin\beta}$ is equal to

(1) $\dfrac{b}{a}$ (2) $\dfrac{a}{b}$ (3) $-\dfrac{a}{b}$ (4) $-\dfrac{b}{a}$

14.

$\dfrac{1}{\cos 80^\circ} - \dfrac{\sqrt{3}}{\sin 80^\circ} =$

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

15.

The product of $s\,(s-a)\,(s-b)\,(s-c)$ is equal to

(1) Δ (2) Δ^2 (3) 2Δ (4) $\dfrac{\Delta}{s}$

16.

$\dfrac{1}{360}$ of a complete rotation in clockwise is

(1) -1° (2) -360° (3) -90° (4) 1°

17.

The sum of the digits at the 10^{th} 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

18.

In 3 fingers, the number of ways four rings can be worn is $\cdots\cdots\cdots$ ways.

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

19.

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.

20.

If 10 lines are drawn in a plane such that no two of them are parallel and no three are concurrent, then the total number of point of intersection are

(1) 45 (2) 40 (3) 10! (4) 2^{10}

21.

If ${}_nP_r = 720\,{}_nC_r$, then the value of r is

(1) 6 (2) 5 (3) 4 (4) 7

22.

The number of diagonals that can be drawn by joining the vertices of an octagon is

(1) 28 (2) 48 (3) 20 (4) 24

23.

The value of $1 - \frac{1}{2}\left(\frac{2}{3}\right) + \frac{1}{3}\left(\frac{2}{3}\right)^2 - \frac{1}{4}\left(\frac{2}{3}\right)^3 + \cdots$ 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) $\frac{2}{3}\log\left(\frac{2}{3}\right)$.

24.

The sum up to n terms of the series $\sqrt{2} + \sqrt{8} + \sqrt{18} + \sqrt{32} + \cdots$ is

(1) $\frac{n(n+1)}{2}$ (2) $2n(n+1)$ (3) $\frac{n(n+1)}{2}$ (4) 1.

25.

If S_n denotes the sum of n terms of an AP whose common difference is d, the value of $S_n - 2S_{n-1} + S_{n-2}$ is

(1) d (2) 2d (3) 4d (4) d^2.

26.

If a is the arithmetic mean and g is the geometric mean of two numbers, then

(1) $a \leq g$ (2) $a \geq g$ (3) $a = g$ (4) $a > g$.

27.

The total number of terms in the expansion of $\left[(a+b)^2\right]^{18}$ is

(1) 11 (2) 36 (3) 37 (4) 35

28.

Sum of the binomial coefficients is

(1) $2n$ (2) n^2 (3) 2^n (4) $n+17$

29.

The equation of the locus of the point whose distance from y-axis is half the distance from origin is

(1) $x^2 + 3y^2 = 0$ C (2) $x^2 - 3y^2 = 0$ (3) $3x^2 + y^2 = 0$ (4) $3x^2 - y^2 = 0$

30.

The slope of the line which makes an angle 45° with the line $3x - y = -5$ are

(1) $1, -1$ (2) $\frac{1}{2}, -2$ (3) $1, \frac{1}{2}$ (4) $2, -\frac{1}{2}$

31.

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

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

32.

The image of the point (2, 3) in the line $y = -x$ is

(1) $(-3, -2)$ (2) $(-3, 2)$ (3) $(-2, -3)$ (4) $(3, 2)$

33.

The condition for $ax^2 + 2hxy + by^2 + 2gx + 2fy + c = 0$ to represent a pair of straight lines is

(1) $abc + 2fgh - bf^2 - ag^2 - ch^2 = 0$ (2) $abc - 2fgh - ag^2 - bf^2 - ch^2 = 0$

(3) $abc + 2fgh - ah^2 - bg^2 - cf^2 = 0$ (4) $abc + 2fgh - af^2 - bg^2 - ch^2 = 0$

34.

The graph of $xy = 0$ is

(1) a point (2) a line

(3) a pair of intersecting lines (4) a pair of parallel lines

35.

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

36.

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

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

37.

If $\Delta = \begin{vmatrix} a & b & c \\ x & y & z \\ p & q & r \end{vmatrix}$, then $\begin{vmatrix} ka & kb & kc \\ kx & ky & kz \\ kp & kq & kr \end{vmatrix}$ is

(1) Δ (2) $k\Delta$ (3) $3k\Delta$ (4) $k^3\Delta$

38.

If $a \neq b, b, c$ satisfy $\begin{vmatrix} a & 2b & 2c \\ 3 & b & c \\ 4 & a & b \end{vmatrix} = 0$, then $abc =$

(1) $a+b+c$ (2) 0 (3) b^3 (4) $ab+bc$

39.

The factor of the determinant $\begin{vmatrix} x+a & b & c \\ a & x+b & c \\ a & b & x+c \end{vmatrix}$ is

(1) x (2) $x+b$ (3) $x+c$ (4) $x-a+b+c$

40.

If all the three rows are identical in a determinant Δ on putting $x = a$ then the factor of Δ is

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

41.

Given that the value of a third order determinant is 11 then the value of the determinant formed by the respective co-factors as its elements will be

(1) 11 (2) 121 (3) 1331 (4) 0

42.

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) $\frac{1}{6}$

43.

The vectors $\vec{a} - \vec{b}$, $\vec{b} - \vec{c}$, $\vec{c} - \vec{a}$ are

(1) parallel to each other (2) unit vectors

(3) mutually perpendicular vectors (4) coplanar vectors.

44.

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

45.

The value of $\theta \in \left(0, \frac{\pi}{2}\right)$ for which the vectors $\vec{a} = (\sin\theta)\hat{i} + (\cos\theta)\hat{j}$ and $\vec{b} = \hat{i} - \sqrt{3}\hat{j} + 2\hat{k}$ are perpendicular, is equal to

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

46.

Which of the following vectors has the same direction as the vector $\vec{i} - 2\vec{j}$

(1) $-\vec{i} + 2\vec{j}$ (2) $2\vec{i} + 4\vec{j}$ (3) $-3\vec{i} + 6\vec{j}$ (4) $3\vec{i} - 6\vec{j}$

47.

Let $\vec{a}$, $\vec{b}$ be the vectors $\overrightarrow{AB}$, $\overrightarrow{BC}$ determined by two adjacent sides of regular hexagon ABCDEF. The vector represented by $\overrightarrow{EF}$ is

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

48.

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

(1) 1 (2) 0 (3) ∞ (4) $-\infty$

49.

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

50.

$\lim_{n \to \infty} \left(\frac{1}{n^2} + \frac{2}{n^2} + \frac{3}{n^2} + \ldots + \frac{n}{n^2} \right)$ is

(1) $\frac{1}{2}$ (2) 0 (3) 1 (4) ∞

51.

At $x = \frac{3}{2}$ the function $f(x) = \frac{|2x-3|}{2x-3}$ is

(1) continuous (2) discontinuous (3) differentiable (4) non-zero

52.

The function $f(x) = \begin{cases} \frac{\sin(x-2)}{x-2} & x \ne 2 \\ 0 & x = 2 \end{cases}$ is discontinuous at

(1) $x = 0$ (2) $x = -1$ (3) $x = -2$ (4) $x = 2$

53.

The function $f(x) = |x|$ is

(1) continuous at $x = 0$

(2) discontinuous at $x = 0$

(3) not continuous from the right at $x = 0$

(4) not continuous from the left at $x = 0$

54.

The function $y = \tan x$ is continous at

(1) $x = 0$ (2) $x = \frac{\pi}{2}$ (3) $x = \frac{3\pi}{2}$ (4) $x = -\frac{\pi}{2}$

55.

If $y = \frac{1}{a-z}$, then $\frac{dz}{dy}$ is

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

56.

If $y=\frac{(1-x)^2}{x^2}$, then $\frac{dy}{dx}$ is

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

57.

If $g(x)=(x^2+2x+3)f(x)$ and $f(0)=5$ and $\lim_{x\to 0}\frac{f(x)-5}{x}=4$, then $g'(0)$ is

(1) 20 (2) 14 (3) 18 (4) 12

58.

The number of points in $\mathbb{R}$ in which the function $f(x)=|x-1|+|x-3|+\sin x$ is not differentiable, is

(1) 3 (2) 2 (3) 1 (4) 4

59.

The function $f(x)=\begin{cases}2 & x\le 1\\ x & x>1\end{cases}$ is not differentiable at

(1) $x=0$ (2) $x=-1$ (3) $x=1$ (4) $x=-2$

60.

The derivative of $f(x)=x^2|x|$ at $x=0$ is

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

61.

$Rf'(0)$ for the function $f(x)=\begin{cases}0 & if\ x\le 0\\ x & if\ x>0\end{cases}$ is

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

62.

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

63.

$\int\frac{x^2+\cos^2 x}{x^2+1}\operatorname{cosec}^2 x\,dx$ is

(1) $\cot x+\sin^{-1}x+c$ (2) $-\cot x+\tan^{-1}x+c$

(3) $-\tan x+\cot^{-1}x+c$ (4) $-\cot x-\tan^{-1}x+c$

64.

$\int\frac{\sec^2 x}{\tan^2 x-1}dx$

(1) $2\log\left|\frac{1-\tan x}{1+\tan x}\right|+c$ (2) $\log\left|\frac{1+\tan x}{1-\tan x}\right|+c$

(3) $\frac{1}{2}\log\left|\frac{\tan x+1}{\tan x-1}\right|+c$ (4) $\frac{1}{2}\log\left|\frac{\tan x-1}{\tan x+1}\right|+c$

65.

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

(1) $2\left(-\sqrt{x}\cos\sqrt{x}+\sin\sqrt{x}\right)+c$ (2) $2\left(-\sqrt{x}\cos\sqrt{x}-\sin\sqrt{x}\right)+c$

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

66.

$\int \sin^2 x\,dx =$

(1) $\frac{\sin^3 x}{3}+c$ (2) $-\frac{\cos^2 x}{2}+c$ (3) $\frac{1}{2}\left[x-\frac{\sin 2x}{2}\right]+c$ (4) $\frac{1}{2}[x+\sin 2x]+c$

67.

$\int \sin 7x\cos 5x\ \ dx =$

(1) $\frac{1}{35}\cos 7x\sin 5x+c$ (2) $-\frac{1}{2}\left[\frac{\cos 12x}{12}+\frac{\cos 2x}{2}\right]+c$

(3) $-\frac{1}{2}\left[\frac{\cos 6x}{6}+\cos x\right]+c$ (4) $\frac{1}{2}\left[\frac{\cos 12x}{12}+\frac{\cos 2x}{2}\right]+c$

68.

$\int \frac{e^x}{e^x+1}dx =$

(1) $\frac{1}{2}x+c$ (2) $\frac{1}{2}\left(\frac{e^x}{1+e^x}\right)^2+c$ (3) $\log\left(e^x+1\right)+c$ (4) $x+e^x+c$

69.

Let A and B be two events such that $P\left(\overline{A\cup B}\right)=\frac{1}{6}$, $P\left(A\cap B\right)=\frac{1}{4}$ and $P\left(\overline{A}\right)=\frac{1}{4}$. Then the events A and B are

(1) Equally likely but not independent (2) Independent but not equally likely

(3) Independent and equally likely (4) Mutually inclusive and dependent

70.

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) $\frac{9}{14}$

71.

A number x is chosen at random from the first 100 natural numbers. Let A be the event of numbers which satisfies $\frac{(x-10)(x-50)}{x-30}\geq 0$, then $P(A)$ is

(1) 0.20 (2) 0.51 (3) 0.71 (4) 0.70

72.

If a and b are chosen randomly from the set $\{1,2,3,4\}$ with replacement, then the probability of the real roots of the equation $x^2+ax+b=0$ is

(1) $\frac{3}{16}$ (2) $\frac{5}{16}$ (3) $\frac{7}{16}$ (4) $\frac{11}{16}$

73.

If A and B are two events such that $P(A)=0.16$, $P(B)=0.24$ and $P(A\cap B)=0.11$, then the probability of obtaining only one of the two events is

(1) 0.29 (2) 0.71 (3) 0.82 (4) 0.18

74.

Three coins are tossed. The probability of getting atleast two heads is

(1) $\frac{3}{8}$ (2) $\frac{7}{8}$ (3) $\frac{1}{8}$ (4) $\frac{1}{2}$

75.

An urn contains 10 white and 10 black balls. While another urn contains 5 white and 10 black balls. One urn is chosen at random and a ball is drawn from it. The probability that it is white, is

(1) $\frac{5}{11}$ (2) $\frac{5}{12}$ (3) $\frac{3}{7}$ (4) $\frac{4}{7}$

PREPARED BY G NARASIMHAN

RETIRED HEAD MASTER

J G NATIONAL HIGHER SECONDARY SCHOOL EAST TAMBARAM

CHENNAI 59 PHONE 9884588989

RESIDENTIAL ADDRESS

NO 40/28 BUDDHAR STREET

EAST TAMBARAM CHENNAI 59

MODEL PAPER 3

STD XI MAX MARKS 75

ANSWER ALL THE QUESTIONS

1. 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

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. If $n(A) = 2$ and $n(B \cup C) = 3$, then $n[(A \times B) \cup (A \times C)]$ is

(1) 2^3 (2) 3^2 (3) 6 (4) 5

4. The number of students who take both the subjects Mathematics and Chemistry is 70. This represents 10% of the enrollment in Mathematics and 14% of the enrollment in Chemistry. The number of students take at least one of these two subjects, is

(1) 1120 (2) 1130 (3) 1100 (4) insufficient data

5. Identify the correct statement

(1) The set of real numbers is a closed set

(2) The set of all non-negative real numbers is represented by $(0, \infty)$

(3) The set [3, 7] indicates the set of all natural numbers between 3 and 7

(4) (2, 3) is a subset of [2, 3].

6. Identify the correct statements of the following

(i) a relation is a function

(ii) a function is a relation

(iii) 'a function which is not a relation' is not possible

(iv) 'a relation which is not a function' is possible

(1) (ii), (iii) and (iv) (2) (ii) and (iii) (3) (iii) and (iv) (4) all

7. If $\dfrac{kx}{(x+2)(x-1)} = \dfrac{2}{x+2} + \dfrac{1}{x-1}$, then the value of k is

(1) 1 (2) 2 (3) 3 (4) 4

8. The value of $\log_3 11 \log_{11} 13 \log_{13} 15 \log_{15} 27 \log_{27} 81$ is

(1) 1 (2) 2 (3) 3 (4) 4

9. The number of real roots of $(x+3)^4 + (x+5)^4 = 16$ is

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

10. If $|x+2| \le 9$, then x belongs to

(1) $(-\infty, -7)$ (2) $[-11, 7]$ (3) $(-\infty, -7) \cup [11, \infty)$ (4) $(-11, 7)$

11. If $\dfrac{|x-2|}{x-2} \ge 0$, then x belongs to

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

12.

$\frac{\cos 6x + 6\cos 4x + 15\cos 2x + 10}{\cos 5x + 5\cos 3x + 10\cos x}$ is equal to

(1) $cos^2 x$ (2) $1+\cos x$ (3) $\cos 3x$ (4) $\cos 2x$

13.

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

14. The value of $\frac{1-Cos15^0}{1+Cos15^0}$ = ______

(1) Sec 30° **(2) tan** $^2\left(\frac{15}{2}\right)$ **3) tan 30°** **(4) tan** $^2 7\frac{1}{2}^0$

15. In a triangle ABC if Cot (A+B) = 1 then tan C is __________

(1) 0 **(2) 1** **(3) ∞** **(4) -1**

16. If Sin A = 1 then Sin 2A is equal to _________

(1) 2 **(2) 1** **(3) 0** **(4) -1**

17. The value of Sin 54° is ___________

(1) $\frac{1-\sqrt{5}}{4}$ **(2)** $\frac{\sqrt{5}-1}{4}$ **(3)** $\frac{\sqrt{5}+1}{4}$ **(4)** $\frac{-\sqrt{5}-1}{4}$

18.

$1+3+5+7+\cdots+17$ is equal to

(1) 101 (2) 81 (3) 71 (4) 61

19.

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

20.

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

21.

If $^{(n+5)}P_{(n+1)} = (\frac{11(n-1)}{2})^{(n+3)}P_n$, then the value of n are

(1) 7 and 11 (2) 6 and 7 (3) 2 and 11 (4) 2 and 6.

22.

The number of ways in which a host lady invite 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) $^{10}C_6 + 2!$.

23.

In a plane there are 10 points are there out of which 4 points are collinear, then the number of triangles formed is

(1) 110 (2) $^{10}C_3$ (3) 120 (4) 116

24.

The value of $\frac{1}{2!}+\frac{1}{4!}+\frac{1}{6!}+\cdots$ is

(1) $\frac{e^2+1}{2e}$ (2) $\frac{(e+1)^2}{2e}$ (3) $\frac{(e-1)^2}{2e}$ (4) $\frac{e^2+1}{2e}$.

25.

The value of the series $\frac{1}{2}+\frac{7}{4}+\frac{13}{8}+\frac{19}{16}+\cdots$ is

(1) 14 (2) 7 (3) 4 (4) 6.

26.

The remainder when 38^{15} is divided by 13 is

(1) 12 (2) 1 (3) 11 (4) 5.

27.

If $(1+x^2)^2(1+x)^n = a_0 + a_1x + a_2x^2 + \cdots + x^{n+4}$ and if a_0, a_1, a_2 are in AP, then n is

(1) 1 (2) 2 (3) 3 (4) 4.

28.

The coefficient of x^6 in $(2+2x)^{10}$ is

(1) ${}^{10}C_6$ (2) 2^6 (3) ${}^{10}C_6$ (4) ${}^{10}C_6\, 2^{10}$.

29.

If a, b, c are in A.P. as well as in G.P. then

(1) $a=b\neq c$ (2) $a\neq b=c$ (3) $a\neq b\neq c$ (4) $a=b=c$

30.

The A.M., G.M. and H.M. between two positive numbers a and b are equal then

(1) $a=b$ (2) $ab=1$ (3) $a>b$ (4) $a<b$

31.

The area of the triangle formed by the lines $x^2-4y^2=0$ and $x=a$ is

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

32.

The length of $\perp$ from the origin to the line $\frac{x}{3}-\frac{y}{4}=1$, is

(1) $\frac{11}{5}$ (2) $\frac{5}{12}$ (3) $\frac{12}{5}$ (4) $-\frac{5}{12}$

33.

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

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

34.

Equation of the straight line that forms an isosceles triangle with coordinate axes in the I-quadrant with perimeter $4+2\sqrt{2}$ is

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

35.

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) $y^2=4ax$

36. If the equation of the straight line is $y=\sqrt{3}x+4$, then the angle made by the Straight line with the positive direction of x axis is

1) 45º 2) 30º 3) 60º 4) 90º

37. **If the straight line $a_1x+b_1y+c=0$ and $a_2x+b_2y+c_2 = 0$ are perpendicular , then**

1) $\frac{a_1}{a_2} = -\frac{b_1}{b_2}$ **2)** $\frac{a_1}{a_2} = \frac{b_1}{b_2}$ **3)** $a_1a_2 = -b_1b_2$ **4)** $\frac{a_1}{a_2} = \frac{b_1}{b_2} = \frac{c_1}{c_2}$

38. **Which of the following is a parallel line to 3x+4y+5=0 ?**

1) 4x+3y+6=0 2) 3x-4y+6=0 3) 4x-3y+9=0 4) 3x +4y+6=0

39.

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

40.

If $A = \begin{bmatrix} 1 & -1 \\ 2 & -1 \end{bmatrix}$, $B = \begin{bmatrix} a & 1 \\ b & -1 \end{bmatrix}$ and $(A+B)^2 = A^2 + B^2$, then the values of a and b are

(1) $a = 4, b = 1$ (2) $a = 1, b = 4$ (3) $a = 0, b = 4$ (4) $a = 2, b = 4$

41.

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

42.

A root of the equation $\begin{vmatrix} 3-x & -6 & 3 \\ -6 & 3-x & 3 \\ 3 & 3 & -6-x \end{vmatrix} = 0$ is

(1) 6 (2) 3 (3) 0 (4) – 6

43.

If $A = \begin{vmatrix} -1 & 2 & 4 \\ 3 & 1 & 0 \\ -2 & 4 & 2 \end{vmatrix}$ and $B = \begin{vmatrix} -2 & 4 & 2 \\ 6 & 2 & 0 \\ -2 & 4 & 8 \end{vmatrix}$, then B is given by

(1) $B = 4A$ (2) $B = -4A$ (3) $B = -A$ (4) $B = 6A$

44. **The value of the determinant** $\begin{vmatrix} a & 0 & 0 \\ 0 & b & 0 \\ 0 & 0 & c \end{vmatrix}^2$ *is*

(i) abc (ii) 0 (iii) $a^2b^2c^2$ (iv) -abc

45. **If** $\Delta = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$ **and A_1, B_1, C_1 ……. Are the cofactors of a_1, b_1, c_1…….**

Then $a_1A_2+b_1B_2+c_1C_2$ is equal to

(i) Δ (ii) 0 (iii) -Δ (iv) Δ^2

46.

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°

47.

One of the diagonals of parallelogram $ABCD$ with $\vec{a}$ and $\vec{b}$ as adjacent sides is $\vec{a}+\vec{b}$. The other diagonal $\overrightarrow{BD}$ is

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

48.

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) $-2\hat{i}+\hat{j}+6\hat{k}$

49.

Vectors $\vec{a}$ and $\vec{b}$ are inclined at an angle $\theta=120^\circ$. If $|\vec{a}|=1, |b|=2$, then $[(\vec{a}+3\vec{b})\times(3\vec{a}-\vec{b})]^2$ is equal to

(1) 225 (2) 275 (3) 325 (4) 300

50.

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

51.

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

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

52.

$\lim_{x\to 0}\frac{8^x-4^x-2^x+1^x}{x^2}=$

(1) 2 log 2 (2) $2(\log 2)^2$ (3) log 2 (4) 3 log 2

53.

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

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

54.

$\lim_{x\to 0}\frac{5^x-6^x}{x}$ = ________

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

55.

$\lim_{x\to 0}(1+x)^{\frac{1}{x}}=?$

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

56.

$\lim_{x\to 0}\dfrac{e^{\tan x}-e^{x}}{\tan x - x}=$

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

57.

The function $f(x)=\begin{cases}\dfrac{x^2-1}{x^3+1} & x\neq -1\\ P & x=-1\end{cases}$ is not defined for $x=-1$. The value of $f(-1)$ so that the function extended by this value is continuous is

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

58.

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

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

59.

If $f(x)=x\tan^{-1}x$, then $f'(1)$ is

(1) $1+\frac{\pi}{4}$ (2) $\frac{1}{2}+\frac{\pi}{4}$ (3) $\frac{1}{2}-\frac{\pi}{4}$ (4) 2

60.

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) $\frac{x^2}{100}$

61.

It is given that $f'(a)$ exists, then $\lim_{x\to a}\dfrac{xf(a)-af(x)}{x-a}$ is

(1) $f(a)-af'(a)$ (2) $f'(a)$ (3) $-f'(a)$ (4) $f(a)+af'(a)$

62.

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 $x\geq a$

63.

) 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) $\frac{1}{\log 3}$

64.

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

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

65.

$\int \frac{dx}{e^x - 1}$ is

(1) $\log|e^x| - \log|e^x - 1| + c$ (2) $\log|e^x| + \log|e^x - 1| + c$

(3) $\log|e^x - 1| - \log|e^x| + c$ (4) $\log|e^x + 1| - \log|e^x| + c$

66.

$\int \frac{x+2}{\sqrt{x^2-1}}\, dx$ 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) $\sqrt{x^2-1} + 2\log|x+\sqrt{x^2-1}| + c$

67.

$\int \frac{x}{1+x^2}\, dx =$

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

68.

$\int \frac{e^x}{e^x+1}\, dx =$

(1) $\frac{1}{2}x + c$ (2) $\frac{1}{2}\left(\frac{e^x}{1+e^x}\right)^2 + c$ (3) $\log\left(e^x+1\right) + c$ (4) $x + e^x + c$

69.

$\int \sin 7x \cos 5x \; dx =$

(1) $\frac{1}{35}\cos 7x \sin 5x + c$ (2) $-\frac{1}{2}\left[\frac{\cos 12x}{12} + \frac{\cos 2x}{2}\right] + c$

(3) $-\frac{1}{2}\left[\frac{\cos 6x}{6} + \cos x\right] + c$ (4) $\frac{1}{2}\left[\frac{\cos 12x}{12} + \frac{\cos 2x}{2}\right] + c$

70.

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) $\frac{7}{8}$

71.

A matrix is chosen at random from a set of all matrices of order 2, with elements 0 or 1 only. The probability that the determinant of the matrix chosen is non zero will be

(1) $\frac{3}{16}$ (2) $\frac{3}{8}$ (3) $\frac{1}{4}$ (4) $\frac{5}{8}$

72.

An urn contains 5 red and 5 black balls. A ball is drawn at random, its colour is noted and is returned to the urn. Moreover, 2 additional balls of the colour drawn are put in the urn and then a ball is drawn at random. The probability that the second ball drawn is red will be

(1) $\frac{5}{12}$ (2) $\frac{1}{2}$ (3) $\frac{7}{12}$ (4) $\frac{1}{4}$

73.

The probability of two events A and B are 0.3 and 0.6 respectively. The probability that both A and B occur simultaneously is 0.18. The probability that neither A nor B occurs is

(1) 0.1 (2) 0.72 (3) 0.42 (4) 0.28

74.

X speaks truth in 95 percent of cases and Y in 80 percent of cases. The percentage of cases they likely to contradict each other in stating same fact is

(1) 14% (2) 86% (3) 23% (4) 85.5%

75.

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) $\frac{5}{3}$

PREPARED BY G NARASIMHAN

RETIRED HEAD MASTER

J G NATIONAL HIGHER SECONDARY SCHOOL EAST TAMBARAM

CHENNAI 59 PHONE 9884588989

RESIDENTIAL ADDRESS

NO 40/28 BUDDHAR STREET

EAST TAMBARAM CHENNAI 59

MODEL PAPER 4

STD XI **MAX MARKS 75**

ANSWER ALL THE QUESTIONS

1.

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

2.

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 $\{0, -1, 1\}$

3.

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

4.

The function $f : \mathbb{R} \to \mathbb{R}$ is defined by $f(x) = \sin x + \cos x$ is

(1) an odd function
(2) neither an odd function nor an even function
(3) an even function
(4) both odd function and even function.

5.

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

6.

Let A and B be subsets of the universal set $\mathbb{N}$, the set of natural numbers. Then $A' \cup [(A \cap B) \cup B']$ is

(1) A (2) A' (3) B (4) $\mathbb{N}$

7.

Which of the following is a function which is not one-to-one?

(1) $f : R \to R$; $f(x) = x + 1$ (2) $f : R \to R$; $f(x) = x^2 + 1$
(3) $f : R \to \{1, -1\}$; $f(x) = x - 1$ (4) $f : R \to R$; $f(x) = -x$

8.

The inverse of $f : R \to R^+$; $f(x) = x^2$ is
(1) not onto (2) not one-to-one
(3) not onto and not one-to-one (4) not at all a function

9.

Identify the correct statements

(i) a constant function is a polynomial function.
(ii) a polynomial function is a quadratic function.
(iii) for linear function, inverse always exists.
(iv) A constant function is one-to-one only if the domain is a singleton set.

(1) (i) and (iii) (2) (i), (iii) and (iv) (3) (ii) and (iii) (4) (i) and (iii)

10.

The solution of $5x - 1 < 24$ and $5x + 1 > -24$ is

(1) $(4, 5)$ (2) $(-5, -4)$ (3) $(-5, 5)$ (4) $(-5, 4)$

11.

The value of $\log_{\sqrt{2}} 512$ is

(1) 16 (2) 18 (3) 9 (4) 12

12.

The value of $\log_a b \ \log_b c \ \log_c a$ is

(1) 2 (2) 1 (3) 3 (4) 4

13.

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) $3x^2 + x - 7$

14.

The number of real roots of $(x + 3)^4 + (x + 5)^4 = 16$ is

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

15.

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

16.

If $\pi < 2\theta < \frac{3\pi}{2}$, then $\sqrt{2 + \sqrt{2 + 2\cos 4\theta}}$ equals to

(1) $-2\cos\theta$ (2) $-2\sin\theta$ (3) $2\cos\theta$ (4) $2\sin\theta$

17.

$\cos 1^\circ + \cos 2^\circ + \cos 3^\circ + \ldots + \cos 179^\circ =$

(1) 0 (2) 1 (3) -1 (4) 89

18.

Which of the following is not true?

(1) $\sin\theta = -\frac{3}{4}$ (2) $\cos\theta = -1$ (3) $\tan\theta = 25$ (4) $\sec\theta = \frac{1}{4}$

19.

$\frac{\sin(A-B)}{\cos A \cos B} + \frac{\sin(B-C)}{\cos B \cos C} + \frac{\sin(C-A)}{\cos C \cos A}$ is

(1) $\sin A + \sin B + \sin C$ (2) 1 (3) 0 (4) $\cos A + \cos B + \cos C$

20. $\frac{1}{Sec 60^0 - \tan 60^0} =$ ________

(1) $\frac{\sqrt{3}+2}{2\sqrt{3}}$ (2) $\frac{\sqrt{3}-2}{2\sqrt{3}}$ 3) $\frac{1+\sqrt{3}}{2}$ (4) $\frac{1-\sqrt{3}}{2}$

21.

$\frac{\tan 15^0 - \tan 75^0}{1+\tan 15^0 \tan 75^0}$ **is equal to ___________**

(1) $\frac{1+\sqrt{3}}{1-\sqrt{3}}$ (2) $\frac{1+2\sqrt{3}}{1-2\sqrt{3}}$ 3) $\frac{\sqrt{3}-1}{1-\sqrt{3}}$ (4) 1

22.

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) $30^4 \times 29^2$ (2) $30^3 \times 29^3$ (3) $30^2 \times 29^4$ (4) 30×29^5.

23.

The number of five digit telephone numbers having at least one of their digits repeated is

(1) 90000 (2) 10000 (3) 30240 (4) 69760.

24.

If 10 lines are drawn in a plane such that no two of them are parallel and no three are concurrent, then the total number of point of intersection are

(1) 45 (2) 40 (3) 10! (4) 2^{10}

25.

${}^{(n-1)}C_r + {}^{(n-1)}C_{(r-1)}$ is

(1) ${}^{(n+1)}C_r$ (2) ${}^{(n-1)}C_r$ (3) ${}^nC_r$ (4) ${}^nC_{r-1}$.

26.

The product of first n odd natural numbers equals

(1) ${}^{2n}C_n \times {}^n P_n$ (2) $(\frac{1}{2})^n \times {}^{2n}C_n \times {}^n P_n$ (3) $(\frac{1}{4})^n \times {}^{2n}C_n \times {}^{2n} P_n$ (4) ${}^nC_n \times {}^n P_n$

27.

The number of diagonals that can be drawn by joining the vertices of an octagon is

(1) 28 (2) 48 (3) 20 (4) 24

28.

If ${}^n\text{C}_{10} > {}^n\text{C}_r$ for all possible r, then a value of n is

(1) 10 (2) 21 (3) 19 (4) 20.

29.

The HM of two positive numbers whose AM and GM are 16, 8 respectively is

(1) 10 (2) 6 (3) 5 (4) 4.

30.

The n^{th} term of the sequence $1, 2, 4, 7, 11, \cdots$ is

(1) $n^3 + 3n^2 + 2n$ (2) $n^3 - 3n^2 + 3n$ (3) $\frac{n(n+1)(n+2)}{3}$ (4) $\frac{n^2-n+2}{2}$.

31.

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.

32.

If $(1+x^2)^2(1+x)^n = a_0 + a_1x + a_2x^2 + \cdots + x^{n+4}$ and if a_0, a_1, a_2 are in AP, then n is

(1) 1 (2) 2 (3) 3 (4) 4.

33.

The first term of a G.P. is 1. The sum of third and fifth terms is 90. Find the common ratio of the G.P.

(1) ± 2 (2) 10 (3) ± 3 (4) – 3

34.

The third term of a G.P. is 5, the product of its first five terms is

(1) 25 (2) 625 (3) 3125 (4) 625 × 25

35.

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) 3 (4) 1

36.

The y-intercept of the straight line passing through (1,3) and perpendicular to $2x - 3y + 1 = 0$ is

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

37.

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) $3\sqrt{2}$

38.

The coordinates of the four vertices of a quadrilateral are (–2,4), (–1,2), (1,2) and (2,4) taken in order.The equation of the line passing through the vertex (–1,2) and dividing the quadrilateral in the equal areas is

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

39. The Value of "m" for which the point (2,3) lies on the line 2x-my+11 = 0 is
1) –5 2) O 3) 3 4) 5

40. The slope of a line is –1, then the angle of inclination is ________
1) 135º 2) 120º 3) 180º 4) 150º

41. The point of intersection of x + y = 3 and x – y =1 is __________
1) (1,1) 2) (1,0) 3) (2,1) 4) (1,-1)

42.

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) $A = B$.

43.

If A and B are symmetric matrices of order n, where $(A \neq B)$, then

(1) $A + B$ is skew-symmetric (2) $A + B$ is symmetric
(3) $A + B$ is a diagonal matrix (4) $A + B$ is a zero matrix

44.

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

45.

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) $\begin{bmatrix} -5 & -4 \\ -8 & -9 \end{bmatrix}$

46. The factor of the determinant $\begin{vmatrix} x & -6 & -1 \\ 2 & -3x & x-3 \\ -3 & 2x & x+2 \end{vmatrix}$ *is*

(i) x+2 **(ii) x-3** **(iii) x-2** **(iv) x+3**

47.

If the projection of $5\hat{i}-\hat{j}-3\hat{k}$ on the vector $\hat{i}+3\hat{j}+\lambda\hat{k}$ is same as the projection of $\hat{i}+3\hat{j}+\lambda\hat{k}$ on $5\hat{i}-\hat{j}-3\hat{k}$, then λ is equal to

(1) ± 4 (2) ± 3 (3) ± 5 (4) ± 1

48.

If $\vec{a}$ and $\vec{b}$ having same magnitude and angle between them is $60°$ and their scalar product is $\frac{1}{2}$ then $|\vec{a}|$ is

(1) 2 (2) 3 (3) 7 (4) 1

49.

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

50.

The value of $\overrightarrow{AB}+\overrightarrow{BC}+\overrightarrow{DA}+\overrightarrow{CD}$ is

(1) $\overrightarrow{AD}$ (2) $\overrightarrow{CA}$ (3) $\vec{0}$ (4) $-\overrightarrow{AD}$

51.

A vector makes equal angle with the positive direction of the coordinate axes. Then each angle is equal to

(1) $\cos^{-1}\left(\frac{1}{3}\right)$ (2) $\cos^{-1}\left(\frac{2}{3}\right)$ (3) $\cos^{-1}\left(\frac{1}{\sqrt{3}}\right)$ (4) $\cos^{-1}\left(\frac{2}{\sqrt{3}}\right)$

52.

If $\vec{a}=\hat{i}+2\hat{j}+2\hat{k}, |\vec{b}|=5$ and the angle between $\vec{a}$ and $\vec{b}$ is $\frac{\pi}{6}$, then the area of the triangle formed by these two vectors as two sides, is

(1) $\frac{7}{4}$ (2) $\frac{15}{4}$ (3) $\frac{3}{4}$ (4) $\frac{17}{4}$

53.

$\lim_{x\to\infty}\left(\frac{x^2+5x+3}{x^2+x+3}\right)^x$ is

(1) e^4 (2) e^2 (3) e^3 (4) 1

54.

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

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

55.

$\lim_{\alpha\to\pi/4}\frac{\sin\alpha-\cos\alpha}{\alpha-\frac{\pi}{4}}$ is

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

56. The value of $\lim_{x\to 1}\frac{x^3-1}{x-1}$ *is*

1) 3 2) 1 3) 0 4) ∞

57. The positive integer n so that $\lim_{x\to 2}\frac{x^n-2^n}{x-2}=32$ **is**

1) 4 2) 5 3) 2 4) 2

58.

At $x=\frac{3}{2}$ the function $f(x)=\frac{|2x-3|}{2x-3}$ is

(1) continuous (2) discontinuous (3) differentiable (4) non-zero

59.

Let a function f be defined by $f(x)=\frac{x-|x|}{x}$ for $x\neq 0$ and $f(0)=2$. Then f is

(1) continuous nowhere (2) continuous everywhere

(3) continuous for all x except $x=1$ (4) continuous for all x except $x=0$

60. The inequality $x^2-7x+6>0$ **the value of x lies**

1) out side of (1,6) 2) inside of (1,6) 3) out side of [1,6] 4) out side of [1,6]

61. The left limit of f(x) = $\begin{cases}\frac{|x-4|}{x-4}, & for\ \ x\neq 4\\ 0 & , for\ \ x=4\end{cases}$

1) 0 2) 1 3) -1 4) None

62.

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

63.

If $y = mx + c$ and $f(0) = f'(0) = 1$, then $f(2)$ is

(1) 1 (2) 2 (3) 3 (4) -3

64.

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

65.

If $f(x) = \begin{cases} x-5 & \text{if } x \le 1 \\ 4x^2-9 & \text{if } 1 < x < 2 \\ 3x+4 & \text{if } x \ge 2 \end{cases}$, then the right hand derivative of $f(x)$ at $x = 2$ is

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

66.

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

67.

$\int \frac{\sqrt{\tan x}}{\sin 2x} dx$ is

(1) $\sqrt{\tan x} + c$ (2) $2\sqrt{\tan x} + c$ (3) $\frac{1}{2}\sqrt{\tan x} + c$ (4) $\frac{1}{4}\sqrt{\tan x} + c$

68.

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

69.

$\int \sqrt{\frac{1-x}{1+x}} dx$ is

(1) $\sqrt{1-x^2} + \sin^{-1} x + c$ (2) $\sin^{-1} x - \sqrt{1-x^2} + c$

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

70.

$\int x^2 e^{\frac{x}{2}} dx$ is

(1) $x^2 e^{\frac{x}{2}} - 4xe^{\frac{x}{2}} - 8e^{\frac{x}{2}} + c$ (2) $2x^2 e^{\frac{x}{2}} - 8xe^{\frac{x}{2}} - 16e^{\frac{x}{2}} + c$

(3) $2x^2 e^{\frac{x}{2}} - 8xe^{\frac{x}{2}} + 16e^{\frac{x}{2}} + c$ (4) $x^2 \frac{e^{\frac{x}{2}}}{2} - \frac{xe^{\frac{x}{2}}}{4} + \frac{e^{\frac{x}{2}}}{8} + c$

71.

$\int \sin^2 x\,dx =$

(1) $\frac{\sin^3 x}{3}+c$ (2) $-\frac{\cos^2 x}{2}+c$ (3) $\frac{1}{2}\left[x-\frac{\sin 2x}{2}\right]+c$ (4) $\frac{1}{2}[x+\sin 2x]+c$

72.

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) $\frac{7}{8}$

73.

A letter is taken at random from the letters of the word 'ASSISTANT' and another letter is taken at random from the letters of the word 'STATISTICS'. The probability that the selected letters are the same is

(1) $\frac{7}{45}$ (2) $\frac{17}{90}$ (3) $\frac{29}{90}$ (4) $\frac{19}{90}$

74.

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) $\frac{2}{3}$

75.

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

PREPARED BY G NARASIMHAN

RETIRED HEAD MASTER

J G NATIONAL HIGHER SECONDARY SCHOOL EAST TAMBARAM

CHENNAI 59 PHONE 9884588989

RESIDENTIAL ADDRESS

NO 40/28 BUDDHAR STREET

EAST TAMBARAM CHENNAI 59

MODEL PAPER 5

STD XI **MAX MARKS 75**

ANSWER ALL THE QUESTIONS

1.

If the function $f : [-3, 3] \to S$ defined by $f(x) = x^2$ is onto, then S is

(1) $[-9, 9]$ (2) $\mathbb{R}$ (3) $[-3, 3]$ (4) $[0, 9]$

2.

The number of constant functions from a set containing m elements to a set containing n elements is

(1) mn (2) m (3) n (4) $m+n$

3.

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

4.

Identify the correct statements

(i) the domain of circular functions are always R.
(ii) The range of tangent function is R.
(iii) The range of cosine function is same as the range of sine function.
(iv) The domain of cotangent function is $R - \{k\pi\}$

(1) all (2) (i) and (iii) (3) (ii), (iii) and (iv) (4) (iii) and (iv)

5.

The true statements of the following are

(i) The composition of function $f \circ g$ and the product of functions fg are same.

(ii) For the composition of functions $f \circ g$, the co-domain of g must be the domain of f.

(iii) If $f \circ g$, $g \circ f$ exist then $f \circ g = g \circ f$.

(iv) If the function f and g are having same domain and co-domain then $fg = gf$.

(1) all (2) (ii), (iii) and (iv) (3) (iii) and (iv) (4) (ii) and (iv)

6.

A survey shows that 70% of the Indian like mango wheres 82% like apple. If x% of Indian like both mango and apples then

(a) $x = 52$ (b) $52 \leq x \leq 70$ (c) $x = 70$ (d) $70 \leq x \leq 82$

7.

Let R be a reflexive relation of a finite set A having n elements and let there be m ordered pairs in R. Then

(a) $m \geq n$ (b) $m \leq n$ (c) $m = n$ (d) None of these

8.

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) $\sqrt{k - 8c}$

9.

If 8 and 2 are the roots of $x^2 + ax + c = 0$ and 3, 3 are the roots of $x^2 + dx + b = 0$, then the roots of the equation $x^2 + ax + b = 0$ are

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

10.

The number of solutions of $x^2 + |x-1| = 1$ is

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

11.

If 3 is the logarithm of 343, then the base is

(1) 5 (2) 7 (3) 6 (4) 9

12.

The solution set of the following inequality $|x-1| \geq |x-3|$ is

(1) $[0, 2]$ (2) $(2, \infty)$ (3) $(0, 2)$ (4) $(-\infty, 2)$

13.

If $\cos 28^\circ + \sin 28^\circ = k^3$, then $\cos 17^\circ$ is equal to

(1) $\frac{k^3}{\sqrt{2}}$ (2) $-\frac{k^3}{\sqrt{2}}$ (3) $\pm\frac{k^3}{\sqrt{2}}$ (4) $-\frac{k^3}{\sqrt{3}}$

14.

$\left(1+\cos\frac{\pi}{8}\right)\left(1+\cos\frac{3\pi}{8}\right)\left(1+\cos\frac{5\pi}{8}\right)\left(1+\cos\frac{7\pi}{8}\right) =$

(1) $\frac{1}{8}$ (2) $\frac{1}{2}$ (3) $\frac{1}{\sqrt{3}}$ (4) $\frac{1}{\sqrt{2}}$

15.

If $\tan 40^\circ = \lambda$, then $\frac{\tan 140^\circ - \tan 130^\circ}{1 + \tan 140^\circ \tan 130^\circ} =$

(1) $\frac{1-\lambda^2}{\lambda}$ (2) $\frac{1+\lambda^2}{\lambda}$ (3) $\frac{1+\lambda^2}{2\lambda}$ (4) $\frac{1-\lambda^2}{2\lambda}$

16.

The number of solutions of

$\cos x + \cos 2x + \cos 3x = 0,\ x \in [0, 2\pi]$ *is*

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

17.

If K $[\sin 18^0 + \cos 36^0) = 5$ then K = ___________

(a) $2\sqrt{5}$ (b) $\frac{\sqrt{5}}{2}$ (c) 4 (d) 5

18.

If $\sin^{-1} x - \cos^{-1} x < 0$ then ________

(a) $-1 \le x < \frac{1}{\sqrt{2}}$ (b) $-1 < x < 0$ (c) $-1 \le x < \frac{1}{2}$ (d) $-1 \le x < \sqrt{3}/2$

19.

If $\cos p\theta + \cos q\theta = 0$ and if $p \neq q$, then θ is equal to (n is any integer)

(1) $\frac{\pi(3n+1)}{p-q}$ (2) $\frac{\pi(2n+1)}{p \pm q}$ (3) $\frac{\pi(n \pm 1)}{p \pm q}$ (4) $\frac{\pi(n+2)}{p+q}$

20.

If p Cosecθ = Cot 45° then p is ___________

(1) Cos45° (2) tan 45° (3) sin 45° (4) sin θ

21.

The value of Sin 54° is ____________

(1) $\frac{1-\sqrt{5}}{4}$ **(2)** $\frac{\sqrt{5}-1}{4}$ **(3)** $\frac{\sqrt{5}+1}{4}$ **(4)** $\frac{-\sqrt{5}-1}{4}$

22.

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

(1) 25 (2) 5^5 (3) 5^6 (4) 625.

23.

Number of sides of a polygon having 44 diagonals is $\cdots\cdots$

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

24.

The number of ways of choosing 5 cards out of a deck of 52 cards which include at least one king is

(1) ${}^{52}C_5$ (2) ${}^{48}C_5$ (3) ${}^{52}C_5 + {}^{48}C_5$ (4) ${}^{52}C_5 - {}^{48}C_5$.

25.

If ${}^nC_4$, ${}^nC_5$, ${}^nC_6$ are in AP the value of n can be

(1)14 (2)11 (3)9 (4)5

26.

The number of 4 digit numbers, that can be formed by the digits 3, 4, 5, 6, 7, 8, 0 and no digit is being repeated, is

(1) 720 (2) 840 (3) 280 (4) 560

27.

20 persons are invited for a party. The number of ways in which they and the host can be seated at a circular table if two particular persons be seated on either side of the host is equal to

(1) 18! 2! (2) 18! 3! (3) 19! 2! (4) 20! 2!

28.

The remainder when 2^{3n} -7n+4 is divided by 49 is ....

(a) 0 (b) 1 (c) 4 (d) 5

29.

The HM of two positive numbers whose AM and GM are 16, 8 respectively is

(1) 10 (2) 6 (3) 5 (4) 4.

30.

If a, 4, b are in A. P. and a, 2, b are in G. P. then $\frac{1}{a}$, 1, $\frac{1}{b}$ are in ______

(A) G. P. (B) A. P. (C) H. P. (D) A. G. P.

31.

The coefficient of x^8y^{12} in the expansion of $(2x+3y)^{20}$ is

(1) 0 (2) 2^83^{12} (3) $2^83^{12} + 2^{12}3^8$ (4) ${}^{20}C_8\, 2^83^{12}$.

32.

The A.M. between two numbers is 5 and the G.M. is 4. Then H.M. between them is

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

33.

If A, G, H are respectively arithmetic mean, geometric mean and harmonic mean then

(1) A > G > H (2) A < G > H (3) A < G < H (4) A > G < H

34.

The intercepts of the perpendicular bisector of the line segment joining (1, 2) and (3,4) with coordinate axes are

(1) 5, −5 (2) 5, 5 (3) 5, 3 (4) 5, −4

35.

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

36.

The point on the line $2x-3y=5$ is equidistance from $(1,2)$ and $(3,4)$ is

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

37.

If the two straight lines $x+(2k-7)y+3=0$ and $3kx+9y-5=0$ are perpendicular then the value of k is

(1) $k=3$ (2) $k=\frac{1}{3}$ (3) $k=\frac{2}{3}$ (4) $k=\frac{3}{2}$

38.

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

39.

Let $A=\begin{bmatrix}4&4k&k\\0&k&4k\\0&0&4\end{bmatrix}$. If $\det(A^2)=16$ then $|k|$ is ...

(a) 1 (b) $\frac{1}{4}$ (c) 4 (d) 4^2

40.

If A is a square matrix, then which of the following is not symmetric?

(1) $A+A^T$ (2) AA^T (3) A^TA (4) $A-A^T$

41.

If $\begin{vmatrix}2a&x_1&y_1\\2b&x_2&y_2\\2c&x_3&y_3\end{vmatrix}=\frac{abc}{2}\neq 0$, 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) $\frac{1}{8}abc$

42.

If x_1, x_2, x_3 as well as y_1, y_2, y_3 are in geometric progression with the same common ratio, then the points (x_1,y_1), (x_2,y_2), (x_3,y_3) are

(1) vertices of an equilateral triangle
(2) vertices of a right angled triangle
(3) vertices of a right angled isosceles triangle
(4) collinear

43.

The matrix A satisfying the equation $\begin{bmatrix}1&3\\0&1\end{bmatrix}A=\begin{bmatrix}1&1\\0&-1\end{bmatrix}$ is

(1) $\begin{bmatrix}1&4\\-1&0\end{bmatrix}$ (2) $\begin{bmatrix}1&-4\\1&0\end{bmatrix}$ (3) $\begin{bmatrix}1&4\\0&-1\end{bmatrix}$ (4) $\begin{bmatrix}1&-4\\1&1\end{bmatrix}$

44.

$$\begin{vmatrix}(b+c)^2&a^2&a^2\\b^2&(c+a)^2&b^2\\c^2&c^2&(a+b)^2\end{vmatrix}=k(abc)(a+b+c)^3,\text{ then } k=\ldots$$

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

45.

$\begin{vmatrix} 3x-8 & 3 & 3 \\ 3 & 3x-8 & 3 \\ 3 & 3 & 3x-8 \end{vmatrix} = 0$, then $x = \ldots$

(a) $\frac{3}{2}, \frac{3}{11}$ (b) $\frac{3}{2}, \frac{11}{3}$ (c) $\frac{2}{3}, \frac{11}{3}$ (d) $\frac{2}{3}, \frac{3}{11}$

46.

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

47.

If $ABCD$ is a parallelogram, then $\overrightarrow{AB}+\overrightarrow{AD}+\overrightarrow{CB}+\overrightarrow{CD}$ is equal to

(1) $2(\overrightarrow{AB}+\overrightarrow{AD})$ (2) $4\overrightarrow{AC}$ (3) $4\overrightarrow{BD}$ (4) $\vec{0}$

48.

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) $\frac{1}{2}$

49.

If $|\vec{a}|=13, |\vec{b}|=5$ and $\vec{a}\cdot\vec{b}=60°$ then $|\vec{a}\times\vec{b}|$ is

(1) 15 (2) 35 (3) 45 (4) 25

50.

if $2\bar{\imath}+4\bar{\jmath}-5\bar{k}$ and $\bar{\imath}+2\bar{\jmath}+3\bar{k}$ is two different sides of rhombus, find the lengh of diagonal = ...

1. $7, \sqrt{69}$ 2. $6, \sqrt{59}$ 3. $5, \sqrt{65}$ 4. $8, \sqrt{45}$

51.

$\bar{a}$, $\bar{b}$ and $\bar{c}$ are unit vectors, $\bar{a}+\bar{b}+\bar{c}=\bar{0}$ then $\bar{a}\cdot\bar{b}+\bar{b}\cdot\bar{c}+\bar{c}\cdot\bar{a}=$ ....

(a) 1 (b) 3 (c) $-\frac{3}{2}$ (d) non of these .

57.

if the difference of two unit vectors is unit then angle between two vectors = ...

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{4}$ (d) $\frac{2\pi}{3}$

58.

a force $\bar{F}=(2,1,-1)$ act on a partical and displaces it from the point $A(2,-1,0)$ to the point $B(2,1,0)$ then work done by force is equal to ....

(a) 2 (b) 4 (c) 6

59.

if $|\bar{a}|=3.5$ then $|\bar{a}\times\bar{\imath}|^2+|\bar{a}\times\bar{\jmath}|^2+|\bar{a}\times\bar{k}|^2=$................

(a) 7 (b) 13.5 (c) 18.5 (d) 24.5

52.

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

(1) 1 (2) – 1 (3) 0 (4) 2

53.

If $f(x) = x(-1)^{\left\lfloor \frac{1}{x} \right\rfloor}$, $x \le 0$, then the value of $\lim_{x\to 0} f(x)$ is equal to

(1) – 1 (2) 0 (3) 2 (4) 4

54.

If $\lim_{x\to 0} \frac{\sin px}{\tan 3x} = 4$, then the value of p is

(1) 6 (2) 9 (3) 12 (4) 4

55.

The value of $\lim_{x\to 0} \frac{\sin x}{\sqrt{x^2}}$ is

(1) 1 (2) – 1 (3) 0 (4) ∞

56.

Let f be a continuous function on [2, 5]. If f takes only rational values 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) $\frac{f(4.5)-f(3)}{1.5}$

57.

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

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

58.

If $y = \cos(\sin x^2)$, then $\frac{dy}{dx}$ at $x = \sqrt{\frac{\pi}{2}}$ is

(1) – 2 (2) 2 (3) $-2\sqrt{\frac{\pi}{2}}$ (4) 0

59.

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

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

60.

If $pv = 81$, then $\frac{dp}{dv}$ at $v = 9$ is

(1) 1 (2) – 1 (3) 2 (4) -2

61.

$\int \frac{x^2+\cos^2 x}{x^2+1}\operatorname{cosec}^2 x\,dx$ is

(1) $\cot x + \sin^{-1} x + c$ (2) $-\cot x + \tan^{-1} x + c$

(3) $-\tan x + \cot^{-1} x + c$ (4) $-\cot x - \tan^{-1} x + c$

62.

$$\int \frac{\sec^2 x}{\tan^2 x - 1} dx$$

(1) $2\log\left|\frac{1-\tan x}{1+\tan x}\right| + c$ (2) $\log\left|\frac{1+\tan x}{1-\tan x}\right| + c$

(3) $\frac{1}{2}\log\left|\frac{\tan x+1}{\tan x-1}\right| + c$ (4) $\frac{1}{2}\log\left|\frac{\tan x-1}{\tan x+1}\right| + c$

63.

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

(1) $2\left(-\sqrt{x}\cos\sqrt{x}+\sin\sqrt{x}\right)+c$ (2) $2\left(-\sqrt{x}\cos\sqrt{x}-\sin\sqrt{x}\right)+c$

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

64.

$$\int \left(\frac{x-1}{x+1}\right) dx =$$

(1) $\frac{1}{2}\left(\frac{x-1}{x+1}\right)^2 + c$ (2) $x - 2\log(x+1) + c$ (3) $\frac{(x-1)^2}{2}\log(x+1) + c$ (4) $x + 2\log(x+1) + c$

65.

$$\int \frac{dx}{(x+3)\sqrt{x+2}} = \_\_\_\_\_\_\_\_ + c$$

(a) $2\tan^{-1}\sqrt{x+2}$ (b) $2\tan^{-1}\sqrt{x^2+3}$ (c) $2\tan^{-1}x$ (d) $2\tan^{-1}\sqrt{x^2+2}$

66.

$$\int \frac{2^{\sqrt{x}}}{\sqrt{x}} dx = \_\_\_\_\_\_\_\_ + c$$

(a) $2^{\sqrt{x}}\log_2^e$ (b) $2^{\sqrt{x}}\log_e^2$ (c) $2^{\sqrt{x}+1}\log_2^e$ (d) $2^{\sqrt{x}+1}\log_e^2$

67.

$$\int \operatorname{cosec} x \; dx =$$

(1) $\log\tan\frac{x}{2} + c$ (2) $-\log(\operatorname{cosec} x + \cot x) + c$

(3) $\log(\operatorname{cosec} x - \cot x) + c$ (4) all of them

68.

$$\int \frac{1}{\sqrt{3+4x}} dx =$$

(1) $\frac{1}{2}\sqrt{3+4x} + c$ (2) $\frac{1}{4}\log\sqrt{3+4x} + c$ (3) $2\sqrt{3+4x} + c$ (4) $-\frac{1}{2}\sqrt{3+4x} + c$

69.

$$\int \tan x \; dx =$$

(1) $\log\cos x + c$ (2) $\log\sec x + c$ (3) $\sec^2 x + c$ (4) $\frac{\tan^2 x}{2} + c$

70.

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) $\frac{10}{21}$

71.

Two items are chosen from a lot containing twelve items of which four are defective, then the probability that at least one of the item is defective

(1) $\frac{19}{33}$ (2) $\frac{17}{33}$ (3) $\frac{23}{33}$ (4) $\frac{13}{33}$

72.

If two events A and B are independent such that $P(A) = 0.35$ and $P(A \cup B) = 0.6$, then $P(B)$ is

(1) $\frac{5}{13}$ (2) $\frac{1}{13}$ (3) $\frac{4}{13}$ (4) $\frac{7}{13}$

73.

When three dice are rolled, number of elementary events are

(1) 2^3 (2) 3^6 (3) 6^3 (4) 3^2

74.

Three coins are tossed. The probability of getting atleast two heads is

(1) $\frac{3}{8}$ (2) $\frac{7}{8}$ (3) $\frac{1}{8}$ (4) $\frac{1}{2}$

75.

Two events A and B are independent, then $P(A/B) =$

(1) $P(A)$ (2) $P(A \cap B)$ (3) $P(A) = P(B)$ (4) $\frac{P(A)}{P(B)}$

PREPARED BY G NARASIMHAN RETIRED HEAD MASTER

J G NATIONAL HIGHER SECONDARY SCHOOL EAST TAMBARAM

CHENNAI 59 PHONE 9884588989

RESIDENTIAL ADDRESS

NO 40/28 BUDDHAR STREET

EAST TAMBARAM CHENNAI 59