



Padalsalai's Telegram Groups!

(தலைப்பிற்கு கீழே உள்ள லிங்கை கிளிக் செய்து குழுவில் இணையவும்!)

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KANCHANA DEVI MATRIC.HR.SEC SCHOOL**SUB :Maths****CLASS:XI****Ln-7-12****MARKS:90****TIME:3.00hrs****I. Answer the following questions:****20x1=20**

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

1) $A+A^T$

2) AA^T

3) $A^T A$

4) $A-A^T$

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

1) -3

2) $1/3$

3) 1

4) 3

3. A square matrix A is said to be singular if

1) $|A|=0$

2) $A \neq 0$

3) $AB=0$

4) $A=0$

4. A square matrix a is said to be skew-symmetric if

1) $A=A^T$

2) $-A=A^T$

3) $A^T=|A|$

4) $A=-A^T$

5. If $\vec{a} \times \vec{a} =$

1) $-\vec{a}$

2) ∞

3) 0

4) 1

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

1) 3

2) $1/3$

3) 6

4) $1/6$

7. The sum of the square of the direction cosines of $\vec{r}$ is

1) 3

2) 0

3) 1

4) 4

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

1) $1/3$

2) $1/4$

3) $1/9$

4) $1/2$

9. $\lim_{x \rightarrow \infty} \frac{\sin x}{x}$

1) 1

2) 0

3) ∞

4) $-\infty$

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

1) 1

2) -1

3) 0

4) 2

11. $\lim_{x \rightarrow 0} \frac{xe^x - \sin x}{x}$ is

1) 1

2) 2

3) 3

4) 0

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

1) 1

2) -1

3) 0

4) limit does not exist.

13. 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

14. Find y' if $y = x^3 - 6x^2 - 5x + 3$

- 1) 1 2) -6 3) 6 4) -5

15. Differentiate 2^x

- 1) $(\log 2)2^x$ 2) $\log 2/2^x$ 3) 2^x 4) $\log 2$

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

- 1) $x^2 + c$ 2) $2x^2 + c$ 3) $x^2/2 + c$ 4) $-x^2/2 + c$

17. $\int e^{-4x} \cos x dx$ is

- 1) $\frac{e^{-4x}}{17} [4\cos x - \sin x] + c$ 2) $\frac{e^{-4x}}{17} [-4\cos x + \sin x] + c$
 3) $\frac{e^{-4x}}{17} [4\cos x + \sin x] + c$ 4) $\frac{e^{-4x}}{17} [-4\cos x - \sin x] + c$

18. If $\frac{d}{dx}(kx)$ is

- 1) k 2) 0 3) x 4) kx

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

- 1) $7/64$ 2) $7/32$ 3) $7/16$ 4) $7/128$

20. If $P(S) =$

- 1) 1 2) -1 3) 0 4) $\emptyset$

II. Answer the following questions: [Q. No 30 is compulsory]

7x2=14

21. If $\vec{a}, \vec{b}, \vec{c}$ are the side of a triangle taken in order then $\vec{a} + \vec{b} + \vec{c} = \vec{0}$

22. Can a vector have direction angles $30^\circ, 45^\circ, 60^\circ$?

23. Calculate $\lim_{x \rightarrow -1} (x^2 - 3)^{10}$.

24. Evaluate: $\lim_{x \rightarrow 0} \frac{\sin \alpha x}{\sin \beta x}$.

25. Find $f'(x)$ if $f(x) = \frac{1}{\sqrt[3]{x^2 + x + 1}}$.

26. Differentiate $y = x^{\sqrt{x}}$.

27. Evaluate : $\int e^{3x} \cos 2x dx$.

28. Evaluate : $\int e^{x \log 2} e^x dx$.

29. Suppose a fair die is rolled. Find the probability of getting an even number.

30. The probability of the impossible event is zero. That is $P(\emptyset) = 0$.

III. Answer the following questions: [Q. No 40 is compulsory]

7x3=21

31. State section formula – External Division.

32. Find the area of a triangle having the points $A(1,0,0)$, $B(0,1,0)$, $C(0,0,1)$ as its vertices.

33. Check if $\lim_{x \rightarrow -5} f(x)$ exists or not, where $f(x) = \begin{cases} \frac{|x+5|}{x+5}, & \text{for } x \neq -5 \\ 0, & \text{for } x = -5 \end{cases}$

34. If f and g are continuous functions with $f(3) = 5$ and $\lim_{x \rightarrow 3} [2f(x) - g(x)] = 4$, find $g(3)$.

35. Find y if $x^4 + y^4 = 16$.

36. Find $\frac{dy}{dx}$ if $x = a(t - \sin t)$, $y = a(1 - \cos t)$.

37. Integrate the following with respect to x : $\cos 5x \sin 3x$

38. Integrate the following with respect to x : $\beta x^{\alpha-1} e^{-\beta x^\alpha}$.

39. If A and B are any two events, then $P(A \cup B) = P(A) + P(B) - P(A \cap B)$.

40. Evaluate : $\int x^3 e^{-x} dx$.

IV. Answer the following questions:

7x5=35

41. a) Three coins are tossed simultaneously, What is the probability of getting

i) exactly one head

ii) at least one head

iii) at most one head ?

(OR)

b) Evaluate : $\int \frac{2x+3}{\sqrt{x^2+x+1}} dx$

42. a) A tree is growing so that, after t - years its height is increasing at a rate of $\frac{18}{\sqrt{t}}$ cm per year. Assume that when $t = 0$ the height is 5 cm.

i) Find the height of the tree after 4 years.

ii) After how many years will the height be 149 cm? **(OR)**

b) Evaluate : $\int \frac{3x+1}{\sqrt{2x^2-2x+3}} dx$.

43. a) If $x = a(\theta + \sin \theta)$, $y = a(1 - \cos \theta)$ then prove that at $\theta = \frac{\pi}{2}$ $y = \frac{1}{a}$. **(OR)**

b) Find i) $\lim_{t \rightarrow 0} \frac{\sqrt{x^2+9}-3}{t^2}$ ii) $\lim_{x \rightarrow a} \frac{x^n - a^n}{x - a} = na^{n-1}$

44. a) For what value of α is this function $f(x) = \begin{cases} \frac{x^4-1}{x-1}, & \text{for } x \neq 1 \\ \alpha, & \text{for } x = 1 \end{cases}$ continuous at $x=1$? **(OR)**

b) Differentiate : $(2x+1)^5 (x^3-x+1)^4$.

45. a) The medians of a triangle are concurrent. **(OR)**

b) If A, B, C are cofactor of a, b, c respectively $i=1$ to 3 $|A| = \begin{vmatrix} a_1 & b_1 & c_1 \\ a_2 & b_2 & c_2 \\ a_3 & b_3 & c_3 \end{vmatrix}$,

show that $\begin{vmatrix} A_1 & B_1 & C_1 \\ A_2 & B_2 & C_2 \\ A_3 & B_3 & C_3 \end{vmatrix} = |A|^2$

46. a) Show that the vectors $5\hat{i} + 6\hat{j} + 7\hat{k}$, $7\hat{i} - 8\hat{j} + 9\hat{k}$, $3\hat{i} + 20\hat{j} + 5\hat{k}$.

(OR)

b) Prove that $\begin{vmatrix} b+c & a & a^2 \\ c+a & b & b^2 \\ a+b & c & c^2 \end{vmatrix} = (a-b)(b-c)(c-a)(a+b+c)$.

47. a) Find the slope of tangent line to the graph of $f(x) = -5x^2 + 7x$ at $(5, f(5))$.

(OR)

b) If $\sin y = x \sin(a+y)$, then prove that $\frac{dy}{dx} = \frac{\sin^2(a+y)}{\sin a}$, $a \neq n\pi$.