

## Mathematics

## Directions

You are given following questions from the topic, with four choices A through D. Select the choice that will answer the question best.

- The range of the function  $f(x) = \frac{x}{x^2-9}$  is

  - $x = \pm 3$
  - $x \neq \pm 3$
  - $\mathcal{R}$
  - $R - \{0\}$
- The  $f: x \rightarrow ax + b$  is an even function if

  - $a = 0$
  - $a \neq 0$
  - $a = 1, b = 1$
  - None
- $x = a \text{ Sec } t$  and  $y = b \text{ Tan } t$  are parametric equations of

  - Circle
  - Hyperbola
  - Parabola
  - $x^2 - y^2 = r^2$
- $\lim_{x \rightarrow \infty} \frac{7}{x^7} = ?$

  - 0

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B.  $\frac{1}{2}$

C.  $\frac{1}{4}$

D.  $\frac{1}{8}$

5.  $\frac{d}{dx} 5 \ln x = ?$

A.  $5 \ln x$

B.  $\frac{1}{5}$

C.  $e^{5x}$

D.  $5x^4$

6.  $\frac{d}{dx} (\cos^{-1}x + \sin^{-1}xx) =$

A.  $\bar{\Lambda}/2$

B.  $\frac{2}{\sqrt{1-x^2}}$

C. 0

D. None

7.  $f(x) = e^x$  is increasing in the interval

A.  $[0, \infty]$

B.  $[-\infty, 0]$

C.  $(0, \infty)$

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D.  $(-\infty, \infty)$

8. Direction cosine of the vector  $3\hat{i} - \hat{j} + 2\hat{k}$  are

A.  $\frac{3}{14}$

B.  $\frac{-1}{\sqrt{14}}$

C.  $\frac{3}{\sqrt{14}}, \frac{1}{\sqrt{14}}, \frac{-2}{\sqrt{14}}$

D.  $\frac{-5}{\sqrt{12}}, \frac{-1}{\sqrt{12}}, \frac{3}{\sqrt{12}}$

9. A function which is to be maximized or minimized is called

A. Optimal solution

B. Maximized or minimized

C. Objective function

D. Subjective function

10. The volume of tetra hydron with vertices  $(2,1,8), (3,2,9), (2,1,4), (3,2,6)$  is

A.  $3/6$

B.  $3/4$

C.  $2/3$

D.  $4/2$

11.  $\int e^x \left( \frac{1}{x} + \ln x \right) dx =$

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- A.  $e^x 1/x$
- B.  $e^x \ln x$
- C.  $e^x$
- D. None

12. The area bounded by sin curve and x-axis from  $-\bar{\Lambda}$  to  $\bar{\Lambda}$  is

- A. 0
- B. 2
- C. 4
- D. None

13. If A.M between  $a$  and  $b = \frac{a^{n+1} + b^{n+1}}{a^n + b^n}$  then  $n =$

- A. -1
- B. 1
- C. 0
- D. 2

14. The distance of the point  $(x,y)$  from x-axis is

- A.  $x$
- B.  $y$
- C.  $|x|$
- D.  $|y|$

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15. The equation of straight line passing through (1, 2) and perpendicular to  $x + y + 1 = 0$  is
- A.  $y - x + 1 = 0$
- B.  $y - x - 1 = 0$
- C.  $y - x + 2 = 0$
- D.  $y - x - 2 = 0$
16. Intercept form is
- A.  $\frac{x}{b} + \frac{y}{a} = 1$
- B.  $\frac{a}{x} + \frac{b}{y} = 1$
- C.  $\frac{x}{a} + \frac{y}{b} = 1$
- D.  $\frac{x}{a} - \frac{y}{b} = 1$
17. The points (5, -2), (1,2), (-2,5) are
- A. Co-planar
- B. Collinear
- C. Vertices of
- D. None
18. The product of fourth roots of 16 is
- A. 1
- B. -1
- C. 16

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D. -16

19. Sum of all four fourth roots of 625 is

A. 625

B. 1

C.  $5i$

D. Zero

20. The roots of equation  $x^2 + 2x + 3 = 0$  is

A. Real

B. Rational

C. Complex

D. Irrational

21. Value of  $(1 - w - w^2)^5 =$

A. 0

B. 32

C. -32

D. 1

22. The sum of a +ve no and its reciprocal is  $26/5$ , then number is

A. 4

B. 6

C. 5

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D. 2

23. If  $A \cup B = A$ , then  $n(A \cup B) =$ A.  $n(A)$ B.  $n(B)$ C.  $n(A \cap B)$ D.  $n(A) n(B)$ 

24. Which of the following is not a function?

A.  $y = \sqrt{x}$ B.  $y = -\sqrt{x}$ C.  $y^2 = x$ D.  $y = \sqrt{3 - x^2}$ 25.  $(\mathbb{N}, +)$  is a groupoid

A. Monoid

B. Group

C. Semi group

D. None

## ANSWERS

1.	B	2.	D	3.	B	4.	A	5.	D
6.	C	7.	A	8.	A	9.	C	10.	B
11.	B	12.	D	13.	C	14.	D	15.	B
16.	C	17.	B	18.	C	19.	D	20.	C
21.	B	22.	C	23.	A	24.	C	25.	C