TRIGONOMETRIC EQUATION - EXERCISE

1. The number of solutions of the equation $\tan^2x - \sec^6x + 1 = 0$ in (0, 13) is :-
(1) 0 (2) 4
(3) 13 (4) 6

2. The general solution of the equation

$$\frac{1-\sin x+\sin^2 x-....}{1+\sin x+\sin^2 x+....} = \frac{1-\cos 2x}{1+\cos 2x}$$ is :-

(1) $n\pi + (-1)^n \pi/6,\ 2n\pi - \pi/2$
(2) $n\pi - (-1)^n \pi/6,\ 2n\pi + \pi/2$
(3) $n\pi + (-1)^n \pi/6$
(4) $2n\pi - \pi/2$

3. If $0 < A < \pi/2$ and
$\sin A + \cos A + \tan A + \cot A + \sec A + \operatorname{cosec} A = 7$
and sinA and cosA are roots of equation
$4x^2 - 3x + a = 0$. Then value of 25a is :-
(1) 28 (2) 30 (3) 26 (4) 32

4. The set of values of 'λ' for which equation $\sin^4x + \cos^4x = \lambda$ has a solution, is:-

(1) (0, 1) (2) $\left[\frac{1}{2}, 1\right]$

(3) [–1, 1] (4) $\left[1, \frac{3}{2}\right]$

5. No. of sol^n of eq^n $\cos^{48}x - \sin^{49}x = 1$ is, if $x \in (-\pi, \pi)$:-
(1) 2 (2) 3 (3) 1 (4) 4

6. The total number of solution of
$\sin^4x + \cos^4x = \sin x \cos x$ in $[0, 2\pi]$ is equal to:-
(1) 2 (2) 4
(3) 6 (4) none of these

7. The number of solutions of $\sin x = \frac{x}{10}$ are :-

(1) 3 (2) 5 (3) 7 (4) none

8. The sum of the solutions in $x \in (0, 4\pi)$ of the equation $4\sin\frac{x}{3}\left(\sin\left(\frac{\pi+x}{3}\right)\right)\sin\left(\frac{2\pi+x}{3}\right) = 1$

is-
(1) 6π (2) 4π
(3) 3π (4) None of these

9. Let $f(x) = \max\{\tan x, \cot x\}$. Then number of roots of the equation $f(x) = \frac{1}{\sqrt{3}}$ in $(0, 2\pi)$ is :-

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

10. The number of solutions of the equation $|\cos x - \sin x| = 2\cos x$ in $[0, 2\pi]$ is :-
(1) 1 (2) 2 (3) 3 (4) 4

11. The number of real solutions of the equation $\cos^5x + \sin^3x = 1$ in the interval $[0, 2\pi]$ is
(1) 2 (2) 1
(3) 3 (4) infinite

12. Number of real roots of the equation
$\sec\theta + \operatorname{cosec}\theta = \sqrt{15}$ lying between 0 and π is
(1) 0 (2) 2 (3) 4 (4) 8

13. The number of values of θ in the interval $\left(-\frac{\pi}{2}, \frac{\pi}{2}\right)$ satisfying the equation $\left(\sqrt{3}\right)^{\sec^2\theta} = \tan^4\theta + 2\tan^2\theta$ is :-
(1) 4 (2) 2
(3) 1 (4) none of these

14. If $\tan\theta - \cot\theta + 2\tan 2\theta + 4\tan 4\theta + 8\cot 8\theta = \sin\theta$, then θ =

(1) $n\pi$ (2) $(2n+1)\frac{\pi}{2}$

(3) $n\pi + (-1)^n.\frac{\pi}{6}$ (4) none of these

15. For $n \in Z$, the general solution of the equation $(\sqrt{3}-1)\sin\theta + (\sqrt{3}+1)\cos\theta = 2$ is :-

(1) $\theta = 2n\pi \pm \frac{\pi}{4} + \frac{\pi}{12}$

(2) $\theta = n\pi + (-1)^n\frac{\pi}{4} + \frac{\pi}{12}$

(3) $\theta = 2n\pi \pm \frac{\pi}{4} - \frac{\pi}{12}$

(4) $\theta = n\pi + (-1)^n\frac{\pi}{4} - \frac{\pi}{12}$

16. The number of values of x in the interval $[0, 5\pi]$ satisfying the equation $3\sin^2x - 7\sin x + 2 = 0$ is
(1) 0 (2) 5
(3) 6 (4) 10

17. The solution of the equation $\cos^2\theta + \sin\theta + 1 = 0$ lies in the interval

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

(3) $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$ (4) $\left(\frac{5\pi}{4}, \frac{7\pi}{4}\right)$

18. The solution set of the equation $\tan(\pi \tan x) = \cot(\pi \cot x)$ is

(1) ϕ (2) $\{0\}$

(3) $\left\{\frac{\pi}{4}\right\}$ (4) none of these

19. If $81^{\sin^2 x} + 81^{\cos^2 x} = 30$, Then No. of solution is equal to where $x \in \left[0, \frac{\pi}{2}\right]$

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

20. One root of the equation $\cos x - x + \frac{1}{2} = 0$ lies in the interval :-

(1) $\left(0, \frac{\pi}{2}\right)$ (2) $\left(-\frac{\pi}{2}, 0\right)$ (3) $\left(\frac{\pi}{2}, \pi\right)$ (4) $\left(\pi, \frac{3\pi}{2}\right)$

21. The number of roots of the equation $x + 2\tan x = \frac{\pi}{2}$ in the interval $[0, 2\pi]$ is –

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

22. If $x \neq \frac{n\pi}{2}$ and $(\cos x)^{\sin^2 x - 3\sin x + 2} = 1$, then all solutions of x is/are given by –

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

(3) $2n\pi + (-1)^n \frac{\pi}{2}$ (4) None of these

23. Find the number of solutions for $\sin 5\theta \cos 3\theta = \sin 9\theta . \cos 7\theta$ in $\left[0, \frac{\pi}{2}\right]$

(1) 3 (2) 5 (3) 9 (4) 10

24. Solution set of 'θ' for which $\sin\theta + \sqrt{3}\cos\theta \geq 1$, $-\pi < \theta \leq \pi$

(1) $\left(-\frac{\pi}{6}, \frac{\pi}{6}\right)$ (2) $\left[-\frac{\pi}{6}, \frac{\pi}{2}\right]$

(3) $\left[-\frac{\pi}{3}, \frac{\pi}{3}\right]$ (4) $\left(-\frac{\pi}{6}, \frac{\pi}{2}\right)$

25. General solution of the equation $3\sqrt{3}\sin^3 x + \cos^3 x + 3\sqrt{3}\sin x \cos x = 1$ is-

(1) $n\pi + (-1)^n \frac{\pi}{6}$; $n \in I$ (2) $n\pi + (-1)^n \frac{\pi}{3} - \frac{\pi}{6}$

(3) $n\pi + (-1)^n \frac{\pi}{6} - \frac{\pi}{6}$ (4) None of these

26. The most general values of x for which $\sin x + \cos x = \min_{a \in R} \{1, a^2 - 4a + 6\}$ are given by-

(1) $2n\pi$ (2) $2n\pi + \frac{\pi}{2}$

(3) $n\pi + (-1)^n . \frac{\pi}{4} - \frac{\pi}{4}$ (4) All of above

27. If $0 \leq x \leq 3\pi$, $0 \leq y \leq 3\pi$ and $\cos x . \sin y = 1$ then the possible number of values of the ordered pair (x,y) is-

(1) 6 (2) 12 (3) 8 (4) 15

28. Let $\theta \in [0, 4\pi]$ satisfy the equation $(\sin\theta + 2)(\sin\theta + 3)(\sin\theta + 4) = 6$. If the sum of all the values of θ is of the form $k\pi$, then the value of k is :

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

29. The variable x satisfying the equation $|\sin x \cos x| + \sqrt{2 + \tan^2 x + \cot^2 x} = \sqrt{3}$ belongs to the interval:-

(1) $\left[0, \frac{\pi}{3}\right]$ (2) $\left(\frac{\pi}{3}, \frac{\pi}{2}\right)$

(3) $\left[\frac{3\pi}{4}, \pi\right)$ (4) non existent

30. The general solution of the equation $\sin^{100} x - \cos^{100} = 1$ is:-

(1) $2n\pi + \frac{\pi}{3}$, $n \in I$ (2) $n\pi + \frac{\pi}{2}$, $n \in I$

(3) $n\pi + \frac{\pi}{4}$, $n \in I$ (4) $2n\pi - \frac{\pi}{3}$, $n \in I$

ANSWER KEY Exercise-I

Que.	1	2	3	4	5	6	7	8	9	10
Ans.	**2**	**3**	**1**	**2**	**1**	**1**	**3**	**3**	**3**	**2**
Que.	11	12	13	14	15	16	17	18	19	20
Ans.	**3**	**3**	**2**	**1**	**1**	**3**	**4**	**1**	**1**	**1**
Que.	21	22	23	24	25	26	27	28	29	30
Ans.	**3**	**4**	**3**	**2**	**3**	**4**	**1**	**2**	**4**	**2**