Assignment

General Solution of a Trigonometric Equations

Basic Level

1. If $\cos p\theta = \cos q\theta,\ p \neq q$, then **[MP PET 1995]**

(a) $\theta = 2n\pi$ (b) $\theta = \frac{2n\pi}{p \pm q}$ (c) $\theta = \frac{n\pi}{p+q}$ (d) None of these

2. General solution of $\tan 5\theta = \cot 2\theta$ is **[Karnataka CET 2000]**

(a) $\theta = \frac{n\pi}{7} + \frac{\pi}{14}$ (b) $\theta = \frac{n\pi}{7} + \frac{\pi}{5}$ (c) $\theta = \frac{n\pi}{7} + \frac{\pi}{2}$ (d) $\theta = \frac{n\pi}{7} + \frac{\pi}{3}, n \in Z$

3. If $\tan 2\theta \tan\theta = 1$, then θ =

(a) $\frac{\pi}{3}$ (b) $(6n \pm 1)\frac{\pi}{6}$ (c) $(4n \pm 1)\frac{\pi}{6}$ (d) None of these

4. If $\tan\theta + \cot\theta = 2$, then $\theta =$

(a) $n\pi$ (b) $n\pi + \frac{\pi}{4}$ (c) $n\pi \pm \frac{\pi}{4}$ (d) $n\pi \pm \frac{\pi}{3}$

5. If $\cot\theta + \tan\theta = 2\text{cosec}\,\theta$, then general value of θ is **[Roorkee 1971]**

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

6. If $1 + \cot\theta = \text{cosec}\theta$, then the general value of θ is **[Roorkee 1981]**

(a) $n\pi + \frac{\pi}{2}$ (b) $2n\pi - \frac{\pi}{2}$ (c) $2n\pi + \frac{\pi}{2}$ (d) None of these

7. The value of $\cos y \cos\left(\frac{\pi}{2} - x\right) - \cos\left(\frac{\pi}{2} - y\right)\cos x + \sin y \cos\left(\frac{\pi}{2} - x\right) + \cos x \sin\left(\frac{\pi}{2} - y\right)$ is zero if **[Kerala (Engg.) 1993]**

(a) x = o (b) y = o (c) $x = y$ (d) $x = n\pi - \frac{\pi}{4} + y (n \in I)$

8. If $\sin^2\theta - 2\cos\theta + \frac{1}{4} = 0$, then the general value of θ is **[MP PET 1984]**

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

9. The general value of θ satisfying $\sin^2\theta + \sin\theta = 2$ is **[AMU 1996, 99]**

(a) $n\pi + (-1)^n \frac{\pi}{6}$ (b) $2n\pi + \frac{\pi}{4}$ (c) $n\pi + (-1)^n \frac{\pi}{2}$ (d) $n\pi + (-1)^n \frac{\pi}{3}$

Advance Level

10. If $\sec 4\theta - \sec 2\theta = 2$, then the general value of θ is **[IIT 1963]**

(a) $(2n+1)\frac{\pi}{4}$ (b) $(2n+1)\frac{\pi}{10}$ (c) $n\pi + \frac{\pi}{2}$ *or* $\frac{n\pi}{5} + \frac{\pi}{10}$ (d) None of these

11. If $\sin\left(\frac{\pi}{4}\cot\theta\right) = \cos\left(\frac{\pi}{4}\tan\theta\right)$, then θ = **[Karnataka CET 1988]**

(a) $n\pi + \frac{\pi}{4}$ (b) $2n\pi \pm \frac{\pi}{4}$ (c) $n\pi - \frac{\pi}{4}$ (d) $2n\pi \pm \frac{\pi}{6}$

12. The general solution of $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 2x + \cos 3x$ is **[IIT 1989]**

(a) $n\pi + \frac{\pi}{8}$ (b) $\frac{n\pi}{2} + \frac{\pi}{8}$ (c) $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$ (d) $2n\pi + \cos^{-1}\frac{3}{2}$

13. The solution of the equation $\sec\theta - \text{cosec}\,\theta = \frac{4}{3}$ is **[Roorkee 1994]**

(a) $\frac{1}{2}\left[n\pi + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)\right]$ (b) $n\pi + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)$ (c) $\frac{n\pi}{2} + (-1)^n \sin^{-1}\left(\frac{3}{4}\right)$ (d) None of these

14. If $4\sin^4 x + \cos^4 x = 1$, then x equal to **[Roorkee 1989]**

(a) $n\pi$ (b) $n\pi \pm \sin^{-1}\frac{2}{5}$ (c) $n\pi + \frac{\pi}{6}$ (d) None of these

15. If $2(\sin x - \cos 2x) + \sin 2x(1 + 2\sin x) - 2\cos x = 0$, then x = **[Karnataka CET 2002]**

(a) $(2n \pm 1)\pi$ (b) $(2n \pm 1)\frac{\pi}{6}$ (c) $(n \pm 1)\frac{\pi}{4}$ (d) $(n \pm 1)\frac{\pi}{6}$

16. Expression $2^{\sin\theta} + 2^{-\cos\theta}$ is minimum when $\theta =$ .... and its minimum value is .....

(a) $2n\pi + \frac{\pi}{4}, n \in I$; 2 (b) $2n\pi + \frac{7\pi}{4}, n \in I$; $2^{1-\left(\frac{1}{\sqrt{2}}\right)}$ (c) $n\pi \pm \frac{\pi}{4}, n \in I$; $2^{1-\left(\frac{1}{\sqrt{2}}\right)}$ (d) None of these

17. The general solution of the equation $2^{\cos 2x} + 1 = 3.2^{-\sin^2 x}$ is

(a) $n\pi$ (b) $n\pi + \pi$ (c) $n\pi - \pi$ (d) None of these

18. If $\theta = \tan^{-1}(2\tan^2\theta) - \frac{1}{2}\sin^{-1}\left(\frac{3\sin 2\theta}{5 + 4\cos 2\theta}\right)$ then the general value of θ **[Roorkee 1997; WBJEE 2000]**

(a) $n\pi$ (b) $n\pi + \frac{\pi}{4}$ (c) $n\pi + \tan^{-1}(-2)$ (d) All of these

19. If the expression $\frac{\sin\frac{x}{2} + \cos\frac{x}{2} - i\tan x}{1 + 2i\sin\frac{x}{2}}$ is real, then x is equal to

(a) $2n\pi + \tan^{-1} K, K \in R, n \in Z$ (b) $2n\pi + 2\tan^{-1} K$, where $K \in (0,1), n \in Z$

(b) $2n\pi + 2\tan^{-1} K$, where $K \in (1,2), n \in Z$ (d) $2n\pi + 2\tan^{-1} K, K \in (2,3), n \in Z$

20. If $\frac{1}{6}\sin x, \cos x, \tan x$ are in G.P., then x is equal to

(a) $n\pi \pm \frac{\pi}{3}, n \in Z$ (b) $2n\pi \pm \frac{\pi}{3}, n \in Z$ (c) $n\pi + (-1)^n \frac{\pi}{3}, n \in Z$ (d) None of these

21. If $32\tan^8\theta = 2\cos^2\alpha - 3\cos\alpha$ and $3\cos 2\theta = 1$, then the general value of α is **[Roorkee 1996]**

(a) $2n\pi \pm \frac{\pi}{3}$ (b) $2n\pi \pm \cos^{-1} 2$ (c) $2n\pi \pm \frac{2\pi}{3}$ (d) None of these

22. If $\max_{\theta \in R}\{5\sin\theta + 3\sin(\theta - \alpha)\} = 7$, then the set of possible values of α is

(a) $\left\{x \mid x = 2n\pi \pm \frac{\pi}{3}, n \in Z\right\}$ (b) $\left\{x \mid x = 2n\pi \pm \frac{2\pi}{3}, n \in Z\right\}$ (c) $\left[\frac{\pi}{3}, \frac{2\pi}{3}\right]$ (d) None of these

23. If $|\cos x|^{\sin^2 x - \frac{3}{2}\sin x + \frac{1}{2}} = 1$, then possible values of x are

(a) $n\pi$ or $n\pi + (-1)^n \frac{\pi}{6}$, $n \in I$ (b) $n\pi$ or $2n\pi + \frac{\pi}{2}$ or $n\pi + (-1)^n \frac{\pi}{6}$, $n \in I$

(c) $n\pi + (-1)^n \frac{\pi}{6}$, $n \in I$ (d) None of these

24. The general solution of $\cos^{50} x - \sin^{50} x = 1$ is

(a) $n\pi$ (b) $2n\pi$ (c) $n\pi + \frac{\pi}{2}$ (d) $2n\pi + \frac{\pi}{2}$

25. Let [x] = the greatest integer less than or equal to x and let $f(x) = \sin x + \cos x$. Then the most general solution of $f(x) = \left[f\left(\frac{\pi}{10}\right)\right]$ are

(a) $2n\pi + \frac{\pi}{2}, n \in Z$ (b) $n\pi, n \in Z$ (c) $2n\pi, n \in Z$ (d) 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

(a) $2n\pi$ (b) $2n\pi + \frac{\pi}{2}$ (c) $n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{4}$ (d) None of these

Number of Solutions and Solutions in the Interval of a Trigonometric Equation

Basic Level

27. The number of values of θ in $[0, 2\pi]$ satisfying the equation $2\sin^2\theta = 4 + 3\cos\theta$ are **[MP PET 1989]**

(a) 0 (b) 1 (c) 2 (d) 3

28. The equation $3\cos x + 4\sin x = 6$ has....solution **[Orissa JEE 2002]**

(a) Finite (b) Infinite (c) One (d) No

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

(a) $\left(-\frac{\pi}{4}, \frac{\pi}{4}\right)$ (b) $\left(\frac{\pi}{4}, \frac{3\pi}{4}\right)$ (c) $\left(\frac{3\pi}{4}, \frac{5\pi}{4}\right)$ (d) $\left(\frac{5\pi}{4}, \frac{7\pi}{4}\right)$

30. The solution set of the system of equations $x + y = \frac{2\pi}{3}, \cos x + \cos y = \frac{3}{2}$, where x and y are real in

(a) A finite non-empty set (b) Null set (c) Infinite (d)

31. The equation $2\cos^2\left(\frac{x}{2}\right)\sin^2 x = x^2 + \frac{1}{x^2}, 0 \le x \le \frac{\pi}{2}$ has **[Kurukshetra CEE 1995]**

(a) No solution (b) One real solution (c) More than one real solution (d) None of these

32. The smallest positive root of the equation $\tan x - x = 0$ lies on

(a) $\left(0,\frac{\pi}{2}\right)$ (b) $\left(\frac{\pi}{2},\pi\right)$ (c) $\left(\pi,\frac{3\pi}{2}\right)$ (d) $\left(\frac{3\pi}{2},2\pi\right)$

Advance Level

33. If a is any real number, then the number of roots of $\cot x - \tan x = a$ in the first quadrant are

(a) 2 (b) 0 (c) 1 (d) None of these

34. The number of solutions of the equation $\sin\left(\frac{\pi x}{2\sqrt{3}}\right) = x^2 - 2\sqrt{3}x + 4$

(a) Form an empty set (b) 1 (c) 2 (d) >2

35. The number of all possible triplets (a_1, a_2, a_3) such that $a_1 + a_2\cos 2x + a_3\sin^2 x = 0$ for all x is

(a) Zero (b) 1 (c) 2 (d) Infinite

36. The equation $(\cos p - 1)x^2 - (\cos p)x + \sin p = 0$, where x is a variable, has real roots. Then the interval of p may be any one of the followings **[IIT 1990]**

(a) $(0, 2\pi)$ (b) $(-\pi, 0)$ (c) $\left(-\frac{\pi}{2},\frac{\pi}{2}\right)$ (d) $(0,\pi)$

37. Let n be an odd integer if $\sin n\theta = \sum_{r=0}^{n} b_r \sin^r\theta$, for every value of θ, then **[IIT 1998]**

(a) $b_0 = 1, b_1 = 3$ (b) $b_0 = 0, b_1 = 4$ (c) $b_0 = 0, b_1 = n$ (d) $b_0 = 0, b_1 = n^2 - n + 3$

Solution of Simultaneously Solving Equation

Basic Level

38. The most general value of θ which will satisfy both the equations $\sin\theta = -\frac{1}{2}$ and $\tan\theta = \frac{1}{\sqrt{3}}$ is **[UPSEAT 1980; MP PET 19**

(a) $n\pi + (-1)^n\frac{\pi}{6}$ (b) $n\pi + \frac{\pi}{6}$ (c) $2n\pi \pm \frac{\pi}{6}$ (d) None of these

39. The most general value of θ satisfying the equations $\sin\theta = \sin\alpha$ and $\cos\theta = \cos\alpha$ is **[DCE 1999; IIT 1971; Karnataka CET 19**

(a) $2n\pi + \alpha$ (b) $2n\pi - \alpha$ (c) $n\pi + \alpha$ (d) $n\pi - \alpha$

40. If $\sin A = \sin B, \cos A = \cos B$, then the value of A in terms of B is

(a) $n\pi + B$ (b) $n\pi + (-1)^n B$ (c) $2n\pi + B$ (d) $2n\pi - B$

41. If $\cos\theta = -\frac{1}{\sqrt{2}}$ and $\tan\theta = 1$, then the general value of θ is

(a) $2n\pi + \frac{\pi}{4}$ (b) $(2n+1)\pi + \frac{\pi}{4}$ (c) $n\pi + \frac{\pi}{4}$ (d) $n\pi \pm \frac{\pi}{4}$

42. If $\sin 2x + \sin 4x = 2\sin 3x$, then $x =$ **[EAMCET 1989]**

(a) $\frac{n\pi}{3}$ (b) $n\pi + \frac{\pi}{3}$ (c) $2n\pi \pm \frac{\pi}{3}$ (d) None of these

43. If $\tan\theta = \sqrt{3}$ and $\operatorname{cosec}\theta = \frac{-2}{\sqrt{3}}$, then the most general value of θ satisfying both the equations is

(a) $2n\pi+\frac{\pi}{3}$ (b) $2n\pi+\frac{2\pi}{3}$ (c) $2n\pi+\frac{4\pi}{3}$ (d) None of these

44. If $\sin\theta=\frac{1}{2}$ and $\cos\theta=\frac{\sqrt{3}}{2}$, then the general value of θ which satisfies both the equations is

(a) $2n\pi+\frac{\pi}{3}$ (b) $2n\pi+\frac{\pi}{4}$ (c) $2n\pi+\frac{\pi}{6}$ (d) None of these

45. General solution of $(1+2\sin\theta)^2+(\sqrt{3}\tan\theta-1)^2=0$ is

(a) $n\pi+\frac{\pi}{6}$ (b) $2n\pi+\frac{11\pi}{6}$ (c) $2n\pi+\frac{7\pi}{6}$ (d) None of these

46. If $3\sin^2\theta+2\sin^2\phi=1$ and $3\sin 2\theta=2\sin 2\phi,\ 0<\theta<\frac{\pi}{2}$ and $0<\phi<\frac{\pi}{2}$, then the value of $\theta+2\phi$ is

(a) $\frac{\pi}{2}$ (b) $\frac{\pi}{4}$ (c) o (d) None of these

Principal Value and Particular Values of a Trigonometrical Equations

Basic Level

47. The smallest value of θ satisfying $\sqrt{3}(\cot\theta+\tan\theta)=4$ is **[EAMCET 1996]**

(a) $\frac{2\pi}{3}$ (b) $\frac{\pi}{3}$ (c) $\frac{\pi}{6}$ (d) $\frac{\pi}{12}$

48. If $\sin\theta=\sqrt{3}\cos\theta,-\pi<\theta<0$, then θ = **[MP PET 1992]**

(a) $-\frac{5\pi}{6}$ (b) $-\frac{4\pi}{6}$ (c) $\frac{4\pi}{6}$ (d) $\frac{5\pi}{6}$

49. If $\tan\theta=-\frac{1}{\sqrt{3}}$, $\sin\theta=\frac{1}{2}$ and $\cos\theta=-\frac{\sqrt{3}}{2}$, then the principal value of θ will be **[MP PET 1984]**

(a) $\frac{\pi}{6}$ (b) $\frac{5\pi}{6}$ (c) $\frac{7\pi}{6}$ (d) $-\frac{\pi}{6}$

50. The smallest positive angle satisfying the equation $\sin^2\theta-2\cos\theta+\frac{1}{4}=0$ is

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

51. If $\sin 5x+\sin 3x+\sin x=0$, then the value of x other than o lying between $0\le x\le\frac{\pi}{2}$ is **[MNR 1985]**

(a) $\frac{\pi}{6}$ (b) $\frac{\pi}{12}$ (c) $\frac{\pi}{3}$ (d) $\frac{\pi}{4}$

52. The value of x satisfying the equation $\sin x+\frac{1}{\sin x}=\frac{7}{2\sqrt{3}}$ is given by

(a) 10^o (b) 30^o (c) 45^o (d) 60^o

53. If $\sin 2\theta=\cos 3\theta$ and θ is an acute angle, then $\sin\theta$ is equal to

(a) $\frac{\sqrt{5}-1}{4}$ (b) $\frac{-\sqrt{5}-1}{4}$ (c) o (d) None of these

54. The values of θ satisfying $\sin 7\theta=\sin 4\theta-\sin\theta$ and $0<\theta<\frac{\pi}{2}$ are

(a) $\frac{\pi}{9},\frac{\pi}{4}$ (b) $\frac{\pi}{3},\frac{\pi}{9}$ (c) $\frac{\pi}{6},\frac{\pi}{9}$ (d) $\frac{\pi}{3},\frac{\pi}{4}$

55. If $(2\cos x-1)(3+2\cos x)=0,\ 0\le x\le 2\pi$, then x = **[UPSEAT 1988, 2000]**

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{3},\frac{5\pi}{3}$ (c) $\frac{\pi}{2},\frac{5\pi}{3},\cos^{-1}\left(-\frac{3}{2}\right)$ (d) $\frac{5\pi}{3}$

56. If $2\cos^2 x+3\sin x-3=0,\ 0\le x\le 180^o$, then $x=$ **[MP PET 1986]**

(a) $30^o,90^o,150^o$ (b) $60^o,120^o,180^o$ (c) $0^o,30^o,150^o$ (d) $45^o,90^o,135^o$

57. If $r\ \sin\theta=3,\ r=4(1+\sin\theta),\ 0\le\theta\le 2\pi$, then $\theta=$ **[Roorkee 1974]**

(a) $\frac{\pi}{6},\frac{\pi}{3}$ (b) $\frac{\pi}{6},\frac{5\pi}{6}$ (c) $\frac{\pi}{3},\frac{\pi}{4}$ (d) $\frac{\pi}{2},\pi$

58. If $\tan(\theta+x)\tan(\theta-x)=1$ for all x, then value of θ must be

(a) 0° (b) 30° (c) 45° (d) 60°

59. If $2\sin^2\theta=3\cos\theta$, where $0\le\theta\le 2\pi$, then $\theta=$ **[IIT 1963]**

(a) $\frac{\pi}{6},\frac{7\pi}{6}$ (b) $\frac{\pi}{3},\frac{5\pi}{3}$ (c) $\frac{\pi}{3},\frac{7\pi}{3}$ (d) None of these

60. $\cot\theta=\sin 2\theta$ ($\theta\ne n\pi$, n is integer), if θ = **[Karnataka CET 1993;BIT Ranchi 1991]**

(a) 45^o and 60^o (b) 45^o and 90^o (c) 45^o only (d) 90^o only

61. If $\cos\theta=\frac{-1}{2}$ and $0<\theta<360^o$, then the values of θ are **[Karnataka CET 2001]**

(a) 120^o and 300^o (b) 60^o and 120^o (c) 120^o and 240^o (d) 60^o and 240^o

62. If $\tan(\pi\cos\theta)=\cot(\pi\sin\theta)$, then $\sin\left(\theta+\frac{\pi}{4}\right)$ equals **[AMU 1999]**

(a) $\frac{1}{\sqrt{2}}$ (b) $\frac{1}{2}$ (c) $\frac{1}{2\sqrt{2}}$ (d) $\frac{\sqrt{3}}{2}$

63. If $2\sec(2\alpha)=\tan\beta+\cot\beta$, then one of the values of $(\alpha+\beta)$ is

(a) π (b) $n\pi-\frac{\pi}{4}$ (c) $\frac{\pi}{4}$ (d) None of these

Advance Level

64. If $3\sin 2\theta=2\sin 3\theta$ and $0<\theta<\pi$, then value of $\sin\theta$ is **[T.S. Rajendra 1992]**

(a) $\frac{\sqrt{2}}{3}$ (b) $\frac{\sqrt{3}}{\sqrt{5}}$ (c) $\frac{\sqrt{15}}{4}$ (d) $\frac{\sqrt{2}}{\sqrt{5}}$

65. $2\sin^2 x+\sin^2 2x=2,-\pi<x<\pi$, then x = **[ISM Dhanbad 1989]**

(a) $\pm\frac{\pi}{6}$ (b) $\pm\frac{\pi}{4}$ (c) $\frac{3\pi}{2}$ (d) None of these

66. If $5\cos 2\theta+2\cos^2\frac{\theta}{2}+1=0,-\pi<\theta<\pi$, then $\theta=$ **[Roorkee 1984]**

(a) $\frac{\pi}{3}$ (b) $\frac{\pi}{3}, \cos^{-1}\frac{3}{5}$ (c) $\cos^{-1}\frac{3}{5}$ (d) None of these

67. If $\sec x \cos 5x + 1 = 0$, where $0 < x < 2\pi$, then x = **[Roorkee 1978; IIT 1963]**

(a) $\frac{\pi}{5}, \frac{\pi}{4}$ (b) $\frac{\pi}{5}$ (c) $\frac{\pi}{4}$ (d) None of these

68. The equation $3^{\sin 2x + 2\cos^2 x} + 3^{1-\sin 2x + 2\sin^2 x} = 28$ is satisfied for the values of x given by

(a) cos x = 0 (b) tan x = –1 (c) tan x = 1 (d) Both (a) and (b)

69. If $e^{\{(\sin^2 x + \sin^4 x + \sin^6 x + \ldots\ldots \infty)\log_e 2\}}$ satisfies the equation $x^2 - 9x + 8 = 0$, then the value of $\frac{\cos x}{\cos x + \sin x}$, $0 < x < \frac{\pi}{2}$ is **[IIT 1991]**

(a) $\frac{1}{2}(\sqrt{3}+1)$ (b) $\frac{1}{2}(\sqrt{3}-1)$ (c) $\frac{1}{2}$ (d) 0

70. The value of θ lying between $\theta = 0$ and $\theta = \frac{\pi}{2}$ and satisfying the equation $\begin{vmatrix} 1+\cos^2\theta & \sin^2\theta & 4\sin 4\theta \\ \cos^2\theta & 1+\sin^2\theta & 4\sin 4\theta \\ \cos^2\theta & \sin^2\theta & 1+4\sin 4\theta \end{vmatrix} = 0$ is **[MNR 1**

(a) $\frac{11\pi}{24}$ (b) $\frac{7\pi}{24}$ (c) $\frac{5\pi}{24}$ (d) $\frac{\pi}{24}$

71. The smallest positive value of x and y, satisfying $x - y = \frac{\pi}{4}$ and $\cot x + \cot y = 2$ are **[Roorkee 2000]**

(a) $x = \frac{\pi}{6}, y = \frac{5\pi}{2}$ (b) $x = \frac{5\pi}{12}, y = \frac{\pi}{6}$ (c) $x = \frac{\pi}{3}, y = \frac{7\pi}{12}$ (d) None of these

72. If $(1-\tan\theta)(1+\tan\theta)\sec^2\theta + 2^{\tan^2\theta} = 0$ then in the interval $\left(\frac{-\pi}{2}, \frac{\pi}{2}\right)$, the value of θ is **[IIT 1996]**

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

Periodic Functions

Basic Level

73. Period of $\sin\theta\cos\theta$ is

(a) $\frac{\pi}{2}$ (b) π (c) 2π (d) None of these

74. Period of $\tan 3\theta$ is

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

75. Period of $\frac{\sin\theta + \sin 2\theta}{\cos\theta + \cos 2\theta}$ is

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

76. Period of $\cos(7x - 5)$ is

(a) $\frac{2\pi - 5}{7}$ (b) $2\pi - 5$ (c) $\frac{2\pi}{7}$ (d) $\frac{\pi}{7}$

77. Period of $\sin\theta + \cos\theta$ is

(a) π (b) 2π (c) $\frac{\pi}{4}$ (d) None of these

78. Period of $\sin\frac{x}{2}-\cos\frac{x}{3}$ is

(a) 2π (b) 4π (c) 8π (d) 12π

79. Period of $\cot 3x-\cos(4x+3)$ is

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

80. Period of $|2\sin 3\theta+4\cos 3\theta|$ is

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

81. The period of the function $\sin\left(\frac{\pi x}{2}\right)+\cos\left(\frac{\pi x}{2}\right)$ is **[EAMCET 1990]**

(a) 4 (b) 6 (c) 12 (d) 24

82. The period of the function $|\sin\pi x|$ is **[AMU 1999]**

(a) π^2 (b) 2π (c) 2 (d) 1

83. The period of $f(x)=\sin\left(\frac{\pi x}{n-1}\right)+\cos\left(\frac{\pi x}{n}\right), n\in Z,\ n>2$ is

(a) $2\pi m(n-1)$ (b) $4n(n-1)$ (c) $2n(n-1)$ (d) None of these

84. The period of $a\sin x+b\cos x$ is

(a) $\frac{\pi}{2}$ (b) π (c) 2π (d) None of these

85. The period of $\sin 8x-\sqrt{3}\cos 8x$ is

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

86. The period of $118\sin 2x-143\cot 4x$ is

(a) 2π (b) π (c) 4π (d) None of these

Advance Level

87. The period of $\sin x.\cos\left(\frac{\pi}{4}-x\right)$ is

(a) π (b) 2π (c) $\frac{\pi}{2}$ (d) None of these

88. The period of $\frac{7\sin x+5\cos x}{7\sin 2x+11\cos x}$ is

(a) 2π (b) π (c) $\frac{\pi}{2}$ (d) None of these

89. The period of the function $f(x)=3\sin(2x+1)$ in radians is

(a) 2π (b) π (c) $\frac{\pi}{2}$ (d) $-\pi$

90. The function f given by $f(x)=\sin\left(\frac{\pi x}{2}\right)+2\cos\left(\frac{\pi x}{3}\right)-\tan\left(\frac{\pi x}{4}\right)$ is periodic with period **[EAMCET 1992]**

(a) 6 (b) 3 (c) 4 (d) 12

Trigonometrical Inequations

Basic Level

91. The solution set of inequality $\cos^2\theta<\frac{1}{2}$ is

(a) $\left\{\theta:(8n+1)\frac{\pi}{4}<\theta<(8n+3)\frac{\pi}{4},n\in Z\right\}$ (b) $\left\{\theta:(8n-3)\frac{\pi}{4}<\theta<(8n-1)\frac{\pi}{4},n\in Z\right\}$

(c) $\left\{\theta:(4n+1)\frac{\pi}{4}<\theta<(4n+3)\frac{\pi}{4},n\in Z\right\}$ (d) None of these

92. Let $2\sin^2 x+3\sin x-2>0$ and $x^2-x-2<0$ (x measured in radians) then x lies in the interval

(a) $\left(\frac{\pi}{6},\frac{5\pi}{6}\right)$ (b) $\left(-1,\frac{5\pi}{6}\right)$ (c) $(-1,2)$ (d) $\left(\frac{\pi}{6},2\right)$

93. The number of values of $x\in[0,4\pi]$ satisfying $|\sqrt{3}\cos x-\sin x|\geq 2$ is

(a) 2 (b) 0 (c) 4 (d) 8

94. If $4\sin^2 x-8\sin x+3\leq 0,\ 0\leq x\leq 2\pi,$ then the solution set for x is

(a) $\left[0,\frac{\pi}{6}\right]$ (b) $\left[0,\frac{5\pi}{6}\right]$ (c) $\left[\frac{5\pi}{6},2\pi\right]$ (d) $\left[\frac{\pi}{6},\frac{5\pi}{6}\right]$

95. The number of solutions of $|\cos x|=\sin x,\ 0\leq x\leq 4\pi,$ is

(a) 8 (b) 4 (c) 2 (d) None of these

96. If $\cos x-\sin x\geq 1$ and $0\leq x\leq 2\pi$ then the solution set for x is

(a) $\left[0,\frac{\pi}{4}\right]\cup\left[\frac{7\pi}{4},2\pi\right]$ (b) $\left[\frac{3\pi}{2},\frac{7\pi}{4}\right]\cup\{0\}$ (c) $\left[\frac{3\pi}{2},2\pi\right]\cup\{0\}$ (d) None of these

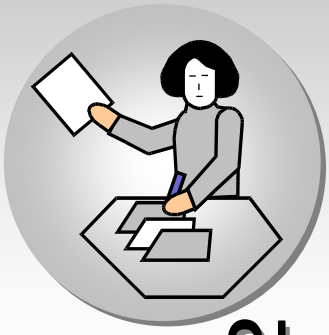
97. If $|\tan x|\leq 1$ and $x\in[-\pi,\pi]$ then the solution for x is

(a) $\left[-\pi,\frac{-3\pi}{4}\right]\cup\left[\frac{-\pi}{4},\frac{\pi}{4}\right]\cup\left[\frac{3\pi}{4},\pi\right]$ (b) $\left[\frac{-\pi}{4},\frac{\pi}{4}\right]\cup\left[\frac{3\pi}{4},\pi\right]$

(c) $\left[\frac{-\pi}{4},\frac{\pi}{4}\right]$ (d) None of these

98. The set of values of x for which $\sin x.\cos^3 x>\cos x.\sin^3 x,\ 0\leq x\leq 2\pi$ is

(a) $(0,\pi)$ (b) $\left(0,\frac{\pi}{4}\right)$ (c) $\left(\frac{\pi}{4},\pi\right)$ (d) None of these



Answer Sheet

Trigonometrical Equations and ***Assignment (Basic & Advance Level)***

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20
b	a	b	b	c	c	d	b	c	c	a	b	a	a	a	b	a	d	b	b
21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38	39	40
c	a	a	a	d	c	a	d	d	b	a	a	c	b	d	d	c	d	a	c
41	42	43	44	45	46	47	48	49	50	51	52	53	54	55	56	57	58	59	60
b	a	c	c	c	a	c	b	b	b	c	d	a	a	b	a	b	c	b	b
61	62	63	64	65	66	67	68	69	70	71	72	73	74	75	76	77	78	79	80
c	c	c	c	b	d	c	d	b	a,b	b	c,d	b	c	c	c	b	d	c	d
81	82	83	84	85	86	87	88	89	90	91	92	93	94	95	96	97	98		
a	d	c	c	c	b	a	a	b	d	c	d	c	d	b	c	a	b		