Topic: Trigonometric Equation

Sub: Mathematics **Practice Questions** Chetan Sir

1. If $\cos\theta = \frac{-1}{2}$ and $0° < \theta < 360°$ then the values of θ are

(A) 120° and 300° (B) 60° and 120° (C) 120° and 240° (D) 60° and 240°

2. Values of θ $(0 < \theta < 360°)$ satisfying $\operatorname{cosec}\theta + 2 = 0$ are

(A) 210°, 300° (B) 240°, 300° (C) 210°, 240° (D) 210°, 330°

3. If $\sin\theta = \sqrt{3}\cos\theta, -\pi < \theta < 0$, then $\theta =$

(A) $-\frac{5\pi}{6}$ (B) $-\frac{2\pi}{3}$ (C) $\frac{2\pi}{3}$ (D) $\frac{5\pi}{6}$

4. The general solution of $\tan 3x = 1$ is (n ∈ I)

(A) $x = n\pi + \frac{\pi}{4}$ (B) $x = \frac{n\pi}{3} + \frac{\pi}{12}$ (C) $x = n\pi$ (D) $x = n\pi \pm \frac{\pi}{4}$

5. General solution of $\tan 5\theta = \cot 2\theta$ is

(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) $\theta = \frac{n\pi}{7} + \frac{\pi}{3}$

6. The general value of θ satisfying $\sin^2\theta + \sin\theta = 2$ is

(A) $n\pi + (-1)^n\frac{\pi}{6}$ (B) $n\pi + (-1)^n\frac{\pi}{4}$ (C) $n\pi + (-1)^n\frac{\pi}{2}$ (D) $n\pi + (-1)^n\pi$

7. General solution of the equation $\cot\theta - \tan\theta = 2$ is

(A) $\theta = n\pi + \frac{\pi}{4}$ (B) $\theta = \frac{n\pi}{2} + \frac{\pi}{8}$ (C) $\theta = \frac{n\pi}{2} \pm \frac{\pi}{8}$ (D) $\theta = n\pi \pm \frac{\pi}{4}$

8. If $\sin^2\theta = \frac{1}{4}$ then the general value of θ is

(A) $2n\pi \pm (-1)^n\frac{\pi}{6}$ (B) $\frac{n\pi}{2} \pm (-1)^n\frac{\pi}{6}$ (C) $n\pi \pm \frac{\pi}{6}$ (D) $2n\pi \pm \frac{\pi}{6}$

9. The general solution of the equation $4\cos^2 x + 6\sin^2 x = 5$, is

(A) $x = n\pi \pm \frac{\pi}{2}$ (B) $x = n\pi \pm \frac{\pi}{4}$ (C) $x = n\pi \pm \frac{3\pi}{2}$ (D) $x = n\pi \pm \frac{3\pi}{4}$

10. If $3(\sec^2\theta+\tan^2\theta)=5$, then the general value of θ is

(A) $2n\pi+\frac{\pi}{6}$ (B) $2n\pi\pm\frac{\pi}{6}$ (C) $n\pi\pm\frac{\pi}{6}$ (D) $n\pi\pm\frac{\pi}{3}$

11. The value of θ satisfying the given equation $\cos\theta+\sqrt{3}\sin\theta=2$ is

(A) $\frac{\pi}{3}$ (B) $\frac{5\pi}{3}$ (C) $\frac{2\pi}{3}$ (D) $\frac{4\pi}{3}$

12. If $(2\cos x-1)(3+2\cos x)=0$, $0\le x\le 2\pi$, then $x=$

(A) $\frac{\pi}{3}$ (B) $\frac{\pi}{3},\frac{5\pi}{3}$ (C) $\frac{\pi}{3},\frac{5\pi}{3},\cos^{-1}(-\frac{3}{2})$ (D) $\frac{5\pi}{3}$

13. 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

(A) $\frac{\pi}{6}$ (B) $\frac{5\pi}{6}$ (C) $\frac{7\pi}{6}$ (D) $-\frac{\pi}{6}$

14. If $\cot\theta+\tan\theta=2\operatorname{cosec}\theta$, the general value of θ is

(A) $n\pi\pm\frac{\pi}{3}$ (B) $n\pi\pm\frac{\pi}{6}$ (C) $2n\pi\pm\frac{\pi}{3}$ (D) $2n\pi\pm\frac{\pi}{6}$

15. The general value of θ satisfying the equation $\tan\theta+\tan(\frac{\pi}{2}-\theta)=2$, is

(A) $n\pi\pm\frac{\pi}{4}$ (B) $n\pi+\frac{\pi}{4}$ (C) $2n\pi\pm\frac{\pi}{4}$ (D) $n\pi+(-1)^n\frac{\pi}{4}$

16. 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

(A) $n\pi+(-1)^n\frac{\pi}{6}$ (B) $n\pi+\frac{\pi}{6}$ (C) $2n\pi\pm\frac{\pi}{6}$ (D) $2n\pi+\frac{7\pi}{6}$

17. If $1+\cot\theta=\operatorname{cosec}\theta$, then the general value of θ is

(A) $n\pi+\frac{\pi}{2}$ (B) $2n\pi-\frac{\pi}{2}$ (C) $2n\pi+\frac{\pi}{2}$ (D) $2n\pi\pm\frac{\pi}{2}$

18. The general solution of $\sin x-\cos x=\sqrt{2}$, for any integer n is

(A) $x=n\pi$ (B) $x=2n\pi+\frac{3\pi}{4}$ (C) $x=2n\pi$ (D) $x=(2n+1)\pi$

19. The number of solutions of the given equation $\tan\theta+\sec\theta=\sqrt{3}$, where $0\le\theta\le 2\pi$ is

(A) 0 (B) 1 (C) 2 (D) 3

20. If $\cot\theta+\cot(\frac{\pi}{4}+\theta)=2$, then the general value of θ is

(A) $2n\pi\pm\frac{\pi}{6}$ (B) $2n\pi\pm\frac{\pi}{3}$ (C) $n\pi\pm\frac{\pi}{3}$ (D) $n\pi\pm\frac{\pi}{6}$

21. If $\sin^2 x-2\cos x+\frac{1}{4}=0$, then x has value

(A) $2n\pi+\frac{\pi}{4}$ (B) $2n\pi\pm\frac{\pi}{3}$ (C) $2n\pi+\frac{\pi}{6}$ (D) $2n\pi+\frac{\pi}{12}$

22. If $4\sin^2\theta+2(\sqrt{3}+1)\cos\theta=4+\sqrt{3}$ then the general value of θ is

(A) $2n\pi\pm\frac{\pi}{3}$ (B) $2n\pi+\frac{\pi}{4}$ (C) $n\pi\pm\frac{\pi}{3}$ (D) $n\pi-\frac{\pi}{3}$

23. If $\cos 7\theta=\cos\theta-\sin 4\theta$ then the general value of θ is

(A) $\frac{n\pi}{4},\frac{n\pi}{3}+\frac{\pi}{18}$ (B) $\frac{n\pi}{3},\frac{n\pi}{3}+(-1)^n\frac{\pi}{18}$ (C) $\frac{n\pi}{4},\frac{n\pi}{2}+\frac{\pi}{12}$ (D) $\frac{n\pi}{3}+(-1)^n\frac{\pi}{18}$

24. If $\frac{1-\tan^2\theta}{\sec^2\theta}=\frac{1}{2}$, then the general value of θ is

(A) $n\pi\pm\frac{\pi}{6}$ (B) $n\pi+\frac{\pi}{6}$ (C) $2n\pi\pm\frac{\pi}{6}$ (D) $n\pi\pm\frac{\pi}{3}$

25. If $\frac{\tan 3\theta-1}{\tan 3\theta+1}=\sqrt{3}$, then the general value of θ is

(A) $\frac{n\pi}{3}+\frac{\pi}{12}$ (B) $\frac{n\pi}{3}+\frac{7\pi}{36}$ (C) $n\pi+\frac{7\pi}{12}$ (D) $n\pi+\frac{\pi}{12}$

26. If $\sqrt{3}\tan 2\theta + \sqrt{3}\tan 3\theta + \tan 2\theta \tan 3\theta = 1$, then the general value of θ is

(A) $n\pi + \frac{\pi}{5}$ (B) $(n + \frac{1}{6})\frac{\pi}{5}$ (C) $(2n \pm \frac{1}{6})\frac{\pi}{5}$ (D) $(n + \frac{1}{3})\frac{\pi}{5}$

27. If equation $\tan\theta + \tan 2\theta + \tan\theta \tan 2\theta = 1$, then $\theta =$

(A) $\frac{n\pi}{2} + \frac{\pi}{6}$ (B) $\frac{n\pi}{3} + \frac{\pi}{12}$ (C) $\frac{n\pi}{2} + \frac{\pi}{12}$ (D) $\frac{n\pi}{3} - \frac{\pi}{12}$

28. If $2\tan^2\theta = \sec^2\theta$, then the general value of θ is

(A) $n\pi + \frac{\pi}{4}$ (B) $n\pi - \frac{\pi}{4}$ (C) $n\pi \pm \frac{\pi}{4}$ (D) $2n\pi \pm \frac{\pi}{4}$

29. General solution of the equation $\tan\theta \tan 2\theta = 1$ is given by

(A) $(2n+1)\frac{\pi}{6}, n \in I$ (B) $n\pi + \frac{\pi}{6}, n \in I$ (C) $n\pi - \frac{\pi}{6}, n \in I$ (D) $n\pi \pm \frac{\pi}{6}, n \in I$

30. If $\sin 3\alpha = 4\sin\alpha \sin(x+\alpha)\sin(x-\alpha)$, then $x =$

(A) $n\pi \pm \frac{\pi}{3}$ (B) $n\pi \pm \frac{\pi}{6}$ (C) $n\pi \pm \frac{\pi}{4}$ (D) $n\pi \pm \frac{\pi}{2}$

31. If $\cos\theta + \cos 7\theta + \cos 3\theta + \cos 5\theta = 0$, then θ is

(A) $\frac{n\pi}{4}$ (B) $\frac{n\pi}{2}$ (C) $\frac{n\pi}{8}$ (D) none of these

32. If $\sin\theta + \cos\theta = 1$, then the general value of θ is

(A) $2n\pi$ (B) $n\pi + (-1)^n\frac{\pi}{4} - \frac{\pi}{4}$ (C) $2n\pi + \frac{\pi}{2}$ (D) $(2n-1) + \frac{\pi}{4}$

33. The equation $\sin x + \cos x = 2$ has

(A) one solution (B) two solutions (C) infinite solutions (D) no solution

34. The equation $\sin x + \sin y + \sin z = -3$ for $0 \le x \le 2\pi, 0 \le y \le 2\pi, 0 \le z \le 2\pi$, has

(A) One solution (B) Two sets of solutions (C) Four sets of solutions (D) No solution

35. If $\tan(\pi\cos\theta) = \cot(\pi\sin\theta)$ then the value of $\cos(\theta - \frac{\pi}{4}) =$

(A) $\frac{1}{2\sqrt{2}}$ (B) $\frac{1}{\sqrt{2}}$ (C) $\frac{1}{3\sqrt{2}}$ (D) $\frac{1}{4\sqrt{2}}$

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

(A) $(-\frac{\pi}{4}, \frac{\pi}{4})$ (B) $(\frac{\pi}{4}, \frac{3\pi}{4})$ (C) $(\frac{3\pi}{4}, \frac{5\pi}{4})$ (D) $(\frac{5\pi}{4}, \frac{7\pi}{4})$

37. If $\sin(\frac{\pi}{4}\cot\theta) = \cos(\frac{\pi}{4}\tan\theta)$, then $\theta =$

(A) $n\pi + \frac{\pi}{4}$ (B) $2n\pi \pm \frac{\pi}{4}$ (C) $n\pi - \frac{\pi}{4}$ (D) $2n\pi \pm \frac{\pi}{6}$

38. The general value of θ in the equation $2\sqrt{3}\cos\theta = \tan\theta$ is

(A) $n\pi + (-1)^n\frac{\pi}{3}$ (B) $n\pi + (-1)^n\frac{\pi}{4}$ (C) $2n\pi \pm \frac{\pi}{6}$ (D) $2n\pi \pm \frac{\pi}{4}$

39. If $\sqrt{2}\sec\theta + \tan\theta = 1$, then the general value of θ is

(A) $n\pi + \frac{3\pi}{4}$ (B) $2n\pi + \frac{\pi}{4}$ (C) $2n\pi - \frac{\pi}{4}$ (D) $2n\pi \pm \frac{\pi}{4}$

40. The general solution of $\sin x - 3\sin 2x + \sin 3x = \cos x - 3\cos 2x + \cos 3x$ is

(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) $2n\pi + \cos^{-1}(\frac{3}{2})$

41. If $\sec 4\theta - \sec 2\theta = 2$, then the general value of θ is

(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

42. If $\sin 2x + \sin 4x = 2\sin 3x$, then $x =$

(A) $\frac{n\pi}{3}$ (B) $n\pi + \frac{\pi}{3}$ (C) $2n\pi \pm \frac{\pi}{3}$ (D) None of these

43. The general solution of the equation $(\sqrt{3}-1)\sin\theta + (\sqrt{3}+1)\cos\theta = 2$ is

(A) $2n\pi \pm \frac{\pi}{4} + \frac{\pi}{12}$ (B) $n\pi + (-1)^n \frac{\pi}{4} + \frac{\pi}{12}$ (C) $2n\pi \pm \frac{\pi}{4} - \frac{\pi}{12}$ (D) $n\pi + (-1)^n \frac{\pi}{4} - \frac{\pi}{12}$

44. The solution of the equation $\sec\theta - \operatorname{cosec}\theta = \frac{4}{3}$ is

(A) $\frac{1}{2}[n\pi + (-1)^n \sin^{-1}(\frac{3}{4})]$ (B) $n\pi + (-1)^n \sin^{-1}(\frac{3}{4})$ (C) $\frac{n\pi}{2} + (-1)^n \sin^{-1}(\frac{3}{4})$ (D) $n\pi + (-1)^n \sin^{-1}(\frac{4}{3})$

45. General value of θ satisfying the equation $\tan^2\theta + \sec 2\theta = 1$ is

(A) $m\pi, n\pi + \frac{\pi}{3}$ (B) $m\pi, n\pi \pm \frac{\pi}{3}$ (C) $m\pi, n\pi \pm \frac{\pi}{6}$ (D) $\frac{m\pi}{2}, n\pi \pm \frac{\pi}{3}$

46. If $\sec^2\theta = \frac{4}{3}$, then the general value of θ is

(A) $2n\pi \pm \frac{\pi}{6}$ (B) $n\pi \pm \frac{\pi}{6}$ (C) $2n\pi \pm \frac{\pi}{3}$ (D) $n\pi \pm \frac{\pi}{3}$

47. If $\cos 2\theta = (\sqrt{2}+1)(\cos\theta - \frac{1}{\sqrt{2}})$, then the value of θ is

(A) $2n\pi + \frac{\pi}{4}$ (B) $2n\pi \pm \frac{\pi}{3}$ (C) $2n\pi - \frac{\pi}{4}$ (D) none of these

48. If $\cos x = |\sin x|$, then the general solution is

(A) $x = 2n\pi \pm \frac{\pi}{4}, n \in Z$ (B) $x = (2n+1)\pi \pm \frac{\pi}{4}, n \in Z$ (C) $x = n\pi \pm \frac{\pi}{4}, n \in Z$ (D) $x = n\pi + (-1)^n \frac{\pi}{4}, n \in Z$

49. If $\sin 6\theta + \sin 4\theta + \sin 2\theta = 0$ then the general value of θ is

(A) $\frac{n\pi}{4}, n\pi \pm \frac{\pi}{3}$ (B) $\frac{n\pi}{4}, n\pi \pm \frac{\pi}{6}$ (C) $\frac{n\pi}{4}, 2n\pi \pm \frac{\pi}{3}$ (D) $\frac{n\pi}{4}, 2n\pi \pm \frac{\pi}{6}$

50. 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) $\frac{\pi}{3}, \frac{\pi}{4}$

51. The number of solutions of $\cos 2\theta = \sin\theta$ in $(0, 2\pi)$ is

(A) 1 (B) 2 (C) 3 (D) 4

52. If $0 \le x < 2\pi$, then the number of real values of x, which satisfy the equation $\cos x + \cos 2x + \cos 3x + \cos 4x = 0$, is

(A) 5 (B) 7 (C) 9 (D) 3

53. The number of integral values of k for which the equation $7\cos x + 5\sin x = 2k + 1$ has a solution is

(A) 4 (B) 6 (C) 8 (D) 10

54. If sum of all the solutions of the equation $8\cos x \cos(\frac{\pi}{6}+x)\cos(\frac{\pi}{6}-x) - \frac{1}{2} = 1$ in $[0, \pi]$ is $k\pi$, then k is equal to

(A) $\frac{13}{9}$ (B) $\frac{8}{9}$ (C) $\frac{20}{9}$ (D) $\frac{2}{3}$

Answer Key

1 (C)	**2** (D)	**3** (B)	**4** (B)	**5** (A)	**6** (C)	**7** (B)	**8** (C)	**9** (B)	**10** (C)
11 (A)	**12** (B)	**13** (B)	**14** (C)	**15** (B)	**16** (D)	**17** (C)	**18** (B)	**19** (C)	**20** (D)
21 (B)	**22** (A)	**23** (C)	**24** (A)	**25** (B)	**26** (B)	**27** (C)	**28** (C)	**29** (D)	**30** (B)
31 (C)	**32** (B)	**33** (D)	**34** (A)	**35** (D)	**36** (A)	**37** (A)	**38** (C)	**39** (B)	**40** (B)
41 (B)	**42** (A)	**43** (A)	**44** (A)	**45** (B)	**46** (B)	**47** (B)	**48** (A)	**49** (A)	**50** (A)
51 (C)	**52** (B)	**53** (A)	**54** (A)						