HINTS

3. $Cos^2\theta = Cos^2\alpha \Rightarrow \theta = n\pi \pm \alpha$

5. $Cos\,2\theta = 1 - 2Sin^2\theta$

15. use transformation

19. Factorisation

27. Multiply and divide by $\sqrt{a^2+b^2}$

67. $\dfrac{\cos x + \sin x}{\cos x - \sin x} = (\cos x + \sin x)^2$

LEVEL-II

1. Given that TanA, TanB are the roots of the equation x^2-bx+c = 0, the value of $Sin^2(A+B)$ is

1) $\dfrac{b}{(b+c)^2}$ 2) $\dfrac{b^2}{b^2+c^2}$

3) $\dfrac{b^2}{c^2+(1-b^2)}$ 4) $\dfrac{b^2}{b^2+(1-c)^2}$

2. If α and β are two different solutions lying between $\dfrac{-\pi}{2}$ and $\dfrac{\pi}{2}$ of the equation $2Tan\theta + Sec\theta = 2$ then $Tan\alpha + Tan\beta$ is

1) 0 2) 1 3) 4/3 4) 8/3

3. If α and β satisfying the equation $Sin\alpha + Sin\beta = \sqrt{3}(Cos\alpha - Cos\beta)$, then

1) $Sin3\alpha + Sin3\beta = 1$ 2) $Sin3\alpha + Sin3\beta = 0$

3) $Sin3\alpha - Sin3\beta = 0$ 4) $Sin3\alpha - Sin3\beta = 1$

4. The equation aSinx + Cos2x = 2a-7 possess a solution only if

1) a>6 2) $2 \le a \le 6$ 3)a>2 4) $0 \le a \le 2$

5. The values if x in $(-\pi,\pi)$ which satisfy the equation $8^{1+|Cosx|+|Cos^2x|+|Cos^3x|+.....\alpha} = 4^3$ are

1) $\dfrac{\pi}{3},\dfrac{2\pi}{3}$ 2) $\dfrac{\pi}{3},\dfrac{-2\pi}{3}$

3) $\dfrac{-\pi}{3},\dfrac{2\pi}{3}$ 4) $\pm\dfrac{\pi}{3},\pm\dfrac{2\pi}{3}$

6. The general solution of $Sin^{100}x - Cos^{100}x = 1$

1) $2n\pi + \dfrac{\pi}{3}, n \in I$ 2) $n\pi + \dfrac{\pi}{4}, n \in I$

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

7. If θ_1 and θ_2 are two solutions of the equation $aCos2\theta + bSin2\theta = c$ then $Tan\theta_1 + Tan\theta_2 =$

1) $\dfrac{2b}{c+a}$ 2) $\dfrac{2a}{b+c}$

3) $\dfrac{2a}{b+c}$ 4) $\dfrac{abc}{a+b+c}$

8. The solution set of Tan(4k+2)x - Tan(4k+1)x - Tan(4k+2)xTan(4k+1)x = 1 $k \in Z$ is

1) ϕ 2) $\dfrac{\pi}{4}$

3) $\left\{n\pi + \dfrac{\pi}{4} : n \in Z\right\}$ 4) $\left\{2n\pi + \dfrac{\pi}{4} : n \in Z\right\}$

9. The equation $3^{Sin2x+2Cos^2x} + 3^{1-\sin 2x+2Sin^2x} = 28$ is satisfied for the values of x given by

1) Cosx = 0 2) Sinx = -1

3) Tanx = 1 4) Sinx = 1/2

10. If $Tan\theta + Sec\theta = \sqrt{3}$ then $\theta =$

1) $2n\pi + \dfrac{\pi}{6}$ 2) $2n\pi + \dfrac{\pi}{3}$

3) $2n\pi + \dfrac{\pi}{3}, 2n\pi + \dfrac{\pi}{6}$ 4) $2n\pi + \dfrac{\pi}{4}$

11. If $Cosm\theta = Sink\theta$, then $\theta =$

1) $\dfrac{n\pi + \frac{\pi}{2}}{m \pm k}$ 2) $\dfrac{n\pi \pm \frac{\pi}{3}}{m \pm k}$

3) $\dfrac{2n\pi \pm \frac{\pi}{2}}{m \pm k}$ 4) $\dfrac{n\pi \pm \frac{\pi}{4}}{m \pm k}$

12. The equation (Cosp - 1) x^2 + (Cosp) x + Sinp = 0, where x is a variable has real roots. then the interval of p may be any one of the followings

1) $(0,2\pi)$ 2) $(-\pi,0)$

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

13. If the complex numbers Sinx + i Cos2x and Cosx - i Sin2x are conjugate to each other, then x =

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

3) 0 4) Not possible

14. If $\alpha,\beta,\gamma,\delta$ are the four solutions of the equation $Tan\left(\theta + \dfrac{\pi}{4}\right) = 3Tan\,3\theta$. No. two of which have equal tangents, then the value of $Tan\alpha + Tan\beta + Tan\gamma + Tan\delta =$

1) 1 2) 0 3) -1 4) 4

15. If $\sin 2\theta - \cos 3\theta = 0$ and θ is acute then θ =

1) 36^0 2) 54^0 3) 18^0 4) None

16. The number of roots of the equation $x^3 + x^2 + 2x + \sin x = 0$ in $(-2\pi, 2\pi)$

1) 4 2) 3 3) 2 4) 1

17. If Sinx + Cosx = $\sqrt{2}Cos\alpha \Rightarrow$ x =----

1) $2n\pi - \frac{\pi}{4} \pm \alpha$ 2) $n\pi - \frac{\pi}{4} + \alpha$

3) $2n\pi + \frac{\pi}{4} \pm \alpha$ 4) $n\pi - \frac{\pi}{4} \pm \alpha$

18. The general solution of Cosx.Cos2x.Cos4x.Cos8x=0

1) $\frac{n\pi}{12}$ 2) $\frac{n\pi}{15}$ 3) $\frac{n\pi}{16}$ 4) $\frac{n\pi}{3}$

19. The solution of $Sec4\theta - Sec2\theta = 2$ is

1) $n\pi + \frac{\pi}{2}$ 2) $(2n+1)\frac{\pi}{2}, (2n+1)\frac{\pi}{10}$

3) $(2n+1)\frac{\pi}{10}$ 4) $(2n+1)\frac{\pi}{2}$

20. If $32Tan^8\theta = 2Cos^2\alpha - 3Cos\alpha$ and $3Cos2\theta = 1$ then the general value of 'α' is

1) $n\pi \pm \frac{\pi}{3}$ 2) $2n\pi \pm \frac{2\pi}{3}$

3) $n\pi \pm \pi$ 4) $2n\pi \pm \frac{\pi}{2}$

21. If Sinx, Sin2x, Sin3x are in A.P then x =---

1) $\frac{n\pi}{2}, 2n\pi$ 2) $\frac{n\pi}{3}$

3) $n\pi, \frac{n\pi}{6}$ 4) $\frac{n\pi}{3}, \frac{n\pi}{6}$

22. If Sinx + Cosx = 1 + Sinx.Cosx then x = ---

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

3) $n\pi + (-1)^n \frac{\pi}{2}$ 4) $n\pi$

23. If $Sin\,x.Sin(60^0 + x).Sin(60^0 - x) = \frac{1}{8}$, then x =

1) $n\pi + (-1)^n \frac{\pi}{6}$ 2) $\frac{n\pi}{3} + (-1)^n \frac{\pi}{18}$

3) $n\pi + (-1)^n \frac{\pi}{3}$ 4) $\frac{n\pi}{3} + (-1)^n \frac{\pi}{9}$

24. The value of $x \in (-2\pi, 2\pi)$ such that $\frac{Sinx + iCosx}{1+i}$ is purely imaginary are given by

1) $n\pi - \frac{\pi}{4}$ 2) $n\pi + \frac{\pi}{4}$ 3) $n\pi$ 4) $n\pi + \frac{\pi}{3}$

25. Most general solution of $2^{sinx} + 2^{cosx} = 2^{1-\frac{1}{\sqrt{2}}}$ is

1) $n\pi - \frac{\pi}{4}$ 2) $n\pi + \frac{\pi}{4}$

3) $n\pi + (-1)^n \frac{\pi}{4}$ 4) $2n\pi \pm \frac{\pi}{4}$

26. If $1 + Sin^2\theta = 3Sin\theta Cos\theta$ then the solution set in $\left(0, \frac{\pi}{2}\right)$ is

1) $\left\{\frac{\pi}{4}, Cos^{-1}\frac{1}{3}\right\}$ 2) $\left\{\frac{\pi}{4}, Tan^{-1}\frac{1}{2}\right\}$

3) $\left\{\frac{\pi}{3}, Tan^{-1}\frac{1}{3}\right\}$ 4) $\left\{\frac{\pi}{6}, Sin^{-1}\frac{1}{3}\right\}$

27. The solution of $Cos2\alpha = (\sqrt{2}+1)\left[Cos\alpha - \frac{1}{\sqrt{2}}\right]$ is

1) $\pm\frac{\pi}{3}, \pm\frac{\pi}{4}$ 2) $\pm\frac{\pi}{4}, \pm\frac{\pi}{6}$

3) $\pm\frac{\pi}{4}, \pm\frac{\pi}{2}$ 4) $\pm\frac{\pi}{4}, \pm\frac{\pi}{5}$

28. Let $Cos(\alpha - \beta)$ = -1 then only one of the following statements is always true which one is it?

1) α is not less than β

2) Angles α and β are both positive

3) $Sin\alpha + Sin\beta = 0 = Cos\alpha + Cos\beta$

4) $Sin\alpha + Sin\beta = 0$ but $Cos\alpha + Cos\beta$ may not be Zero

29. If $(2+\sqrt{3})Cosx = 1 - Sinx$ then x =

1) $2n\pi + \frac{\pi}{2}, \quad 2n\pi - \frac{\pi}{3}$ 2) $n\pi \pm \frac{\pi}{2}, n\pi \pm \frac{\pi}{3}$

3) $n\pi \pm \frac{\pi}{2}, n\pi - \frac{\pi}{3}$ 4) $n\pi - \frac{\pi}{2}, n\pi \pm \frac{\pi}{3}$

30. Number of solutions of the equation Tan x + Sec x = 2 Cos x in the interval $[0, 2\pi]$ is

1) 0 2) 1 3) 2 4) 3

31. In a ΔABC, the angle A is greater than angle B. If the values of angles A and B satisfy the equation $3Sinx - 4Sin^3x - k = 0, 0 < k < 1$, then the measure of angle C =

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{2}$ 3) $\frac{2\pi}{3}$ 4) $\frac{5\pi}{6}$

32. If A and B are acute positive angles satisfying the equations 3 Sin^2A + 2 Sin^2B =1 and 3 Sin2A - 2 Sin2B = 0 then A+2B =

1) 0 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{4}$ 4) $\frac{\pi}{3}$

33. If $\frac{5\pi}{4} < \theta < \frac{7\pi}{4}$ and $5Cos^2\theta - 2Sin\theta - 2 = 0$ then the value of $Tan\frac{\theta}{2} =$

1) -1 2) 1 3) $\frac{-1}{\sqrt{2}}$ 4) $\frac{-1}{2}$

34. If $5Cos2\theta + 2Cos^2\left(\frac{\theta}{2}\right) + 1 = 0,\ 0 < \theta < \pi$ then θ =

1) $\frac{\pi}{3}$ 2) $\frac{\pi}{3}, Cos^{-1}\left(\frac{3}{5}\right)$

3) $Cos^{-1}\left(\frac{3}{5}\right)$ 4) $\frac{\pi}{3}, \pi - Cos^{-1}\left(\frac{3}{5}\right)$

35. The number of solutions of the equation $3(Sinx+Cosx)-2(Sin^3x+Cos^3x) = 8$ in $\left[0, \frac{\pi}{2}\right]$ is

1) 0 2) 1 3) 2 4) 3

36. If 3 sinx+ 4 cosx=5 then the value of $Tan\frac{x}{2}$ is

1) $\frac{1 \pm \sqrt{2}}{4}$ 2) $\frac{-1 \pm \sqrt{2}}{4}$

3) $\frac{-1 \pm \sqrt{2}}{3}$ 4) 1/3

37. If - $\pi \le x \le \pi, -\pi \le y \le \pi$ and cos x+ cosy =2 then cos (x-y) =

1) -1 2) 0 3) 1 4) 2

KEY

1. 4	2. 4	3. 2	4. 2	5. 4
6. 3	7. 1	8. 1	9. 1	10. 1
11. 3	12. 4	13. 4	14. 2	15. 3
16. 4	17. 3	18. 3	19. 2	20. 2
21. 1	22. 3	23. 2	24. 1	25. 2
26. 2	27. 1	28. 3	29. 1	30. 3
31. 3	32. 2	33. 1	34. 4	35. 1
36.4	37. 3			

HINTS

1. $\tan A + \tan B = b,\ \tan A.\tan B = c$

2. $2\tan\theta + \sqrt{1 + \tan^2\theta} = 2$ and squaring

3. $\frac{\sin\alpha + \sin\beta}{\cos\alpha - \cos\beta} = \sqrt{3}$ and using transformations.

6. $\sin^{100} x = 1 + \cos^{100} x$
since L.H.S. never exceeds 1
$\therefore \cos x = 0$
$\Rightarrow x = n\pi + \frac{\pi}{2}$

8. Put $k = 0$

9. $3^{\sin 2x + 2\cos^2 x} = y$
$y + \frac{27}{y} = 28$

28. $Cos(\alpha - \beta) = -1$
$\alpha - \beta = \pi$

29. Using $2 + \sqrt{3} = \cot 15^0 = \frac{\cos 15^0}{\sin 15^0}$

LEVEL-III

1. If 0 < x, y < $\frac{\pi}{2}$ then the system of equations Sinx.Siny = 3/4 and Tanx.Tany = 3 has

1) $x = \frac{\pi}{6}, y = \frac{\pi}{6}$ 2) $x = \frac{\pi}{3}, y = \frac{\pi}{3}$

3) $x = \frac{\pi}{12}, y = \frac{\pi}{12}$ 4) $x = \frac{\pi}{4}, y = \frac{\pi}{4}$

2. The general solution of Sinx - 3Sin2x + Sin3x = Cosx - 3Cos2x + Cos3x is

1) $n\pi + \frac{\pi}{8}$ 2) $\frac{n\pi}{2} + \frac{\pi}{8}$

3) $(-1)^n \frac{n\pi}{2} + \frac{\pi}{8}$ 4) $2n\pi + Cos^{-1}\frac{3}{2}$

3. If α is a root of
$25Cos^2\theta + 5Cos\theta - 12 = 0, \frac{\pi}{2} < \alpha < \pi$
then $Sin2\alpha$ is equal to

1) 24/25 2) -24/25 3) 13/18 4) - 13/18

4. The equation 8Cosx.Cos2x.Cos4x = $\frac{Sin6x}{Sinx}$ has a solution of

1) sinx = 0 2) Cos7x=0
3) sin7x = 0 4) sin8x = 0

5. If $4n\alpha = \pi$ then the value of
$Tan\alpha.Tan2\alpha.Tan3\alpha.---Tan(2n-1)\alpha$
is

1) 0 2) 1 3) -1 4) 2

6. If Sin2x.Cos2x.Cos4x = γ has a solution then γ lies in the interval

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

7. In a right angled triangle, the hypotenuse is $2\sqrt{2}$ times the lenght of the perpendicular drawn from the opposite vertex on the hypotenuse. Then the other two angles are

1) $\frac{\pi}{3}, \frac{\pi}{6}$ 2) $\frac{\pi}{4}, \frac{\pi}{4}$ 3) $\frac{\pi}{8}, \frac{3\pi}{8}$ 4) $\frac{\pi}{12}, \frac{5\pi}{12}$

8. If $\sin^3x + \sin x\cos x + \cos^3x = 1$ then x = ---

1) $n\pi, n\pi \pm \frac{\pi}{3}$ 2) $2n\pi, 2n\pi + \frac{\pi}{2}$

3) $n\pi, 2n\pi \pm \frac{\pi}{3}$ 4) $2n\pi, 2n\pi \pm \frac{\pi}{2}$

9. The number of solutions of the equation $\sin x = x$

1) 3 2) 1 3) 0 4) 2

10. The number of solutions of the equation $2^{\cos x} = |\sin x|$ in $[-2\pi, 2\pi]$ in

1) 1 2) 4 3) 3 4) 2

11. $\tan x + \tan 2x + \tan 3x = 0$ then x =

1) $n\pi + \frac{\pi}{3}$ 2) $n\pi + \frac{\pi}{4}$ 3) $n\pi$ or $n\pi \pm \frac{\pi}{3}$ 4) $2n\pi$

12. The equation $4\sin^2x + 4\sin x + a^2 - 3 = 0$ has a solution if

1) $-2 \le a \le 2$ 2) $-1 \le a \le 1$

3) $-3 \le a \le 3$ 4) $-4 \le a \le 4$

13. The set of values of x for which

$\sin x\cos^3 x > \cos x\sin^3 x$, $0 \le x \le \pi$ is

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

14. The least positive root of the equation cos 3x+sin5x=0 is

1) $\frac{\pi}{12}$ 2) $\frac{\pi}{16}$ 3) $\frac{3\pi}{16}$ 4) $\frac{3\pi}{4}$

15. If 1/6 sinx, cosx, tan x are in G.P. then x =

1) $n\pi \pm \frac{\pi}{3}, n \in z$ 2) $2n\pi \pm \frac{\pi}{3}, n \in z$

3) $n\pi \pm (-1)^n \frac{\pi}{3}, n \in z$ 4) $n\pi \pm \frac{\pi}{6}, n \in z$

16. The number of points of intersection of 2y=1 and y = cos x in $-\frac{\pi}{2} \le x < \frac{\pi}{2}$ is

1) 1 2) 2 3) 3 4) 4

17. The number of integral value of k for which the equation 7 cosx+ 5 sinx=2k +1 has a solution is

1) 4 2) 8 3) 10 4) 12

18. The number of distinct real roots of $\begin{vmatrix} \sin x & \cos x & \cos x \\ \cos x & \sin x & \cos x \\ \cos x & \cos x & \sin x \end{vmatrix} = 0$ in the interval $-\frac{\pi}{4} \le x \le \frac{\pi}{4}$ is

1) 0 2) 2 3) 1 4) 3

KEY

1) 2	2) 2	3) 2	4) 2	5) 2
6)2	7) 3	8) 2	9) 2	10) 2
11)3	12) 1	13) 2	14)4	15)2
16)2	17)2	18)3		

HINTS

3. $\cos\alpha = \frac{-5 \pm 35}{50}$

5. $4n\alpha = \pi \Rightarrow 2n\alpha = \frac{\pi}{2}$

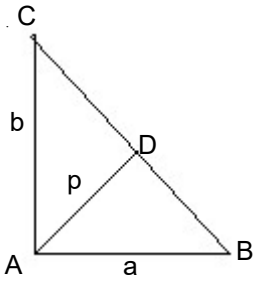
7. From $\Delta^{le} ABC$, $AD = p$ $BC = 2\sqrt{2}p$

Since $a^2 + b^2 = 8p^2$

$p^2\left[\frac{1}{\sin^2\theta} + \frac{1}{\cos^2\theta}\right] = 8p^2$

$\Rightarrow 2\sin^2 2\theta = 1$

$\Rightarrow 2\theta = \frac{\pi}{4}$



13. $\sin x\cos x(\cos^2 x - \sin^2 x) > 0$

$\frac{1}{2}\sin 2x \cos 2x > 0$

$\sin 4x > 0$

New Pattern Questions:

1. I) Principal value of cos θ=-1 is π

II) Principal value of sin θ=0 is π

Which of the above statement is correct?

1) Only I 2) Only II

3) Both I and II 4) Neither I or II

2. I) The set of values of x for which $\frac{\tan 3x - \tan 2x}{1 + \tan 3x \tan 2x} = 1$ is $\left\{n\pi + \frac{\pi}{4}, n \in I\right\}$

II) The expression $(1+\tan x+ \tan^2 x)$ $(1-\cot x+ \cot^2 x)$ is positive for all $x \in R$.

III) $e^{\sin x} - e^{-\sin x} \neq 4$ for any real values of x.

Which of the following is correct?

1) only I, II 2) only II, III

3) only I, III 4) I,II,III

3. I) If cot $\left(\frac{\pi}{3}\cos 2\pi x\right)=\sqrt{3}$, then the general solution of the equation is $x=n\pm\frac{1}{6}, n\in I$.

II) If tan P θ = tan Q θ, then the values of θ from an A.P with common difference $\frac{\pi}{P-Q}$.

Which of the above statements are correct?

1) only I 2) only II

3) Both I and II 4) neither I or II

4. I) If x lies in the 1st Quadrant and cos x+ cos 3x=cos 2x then x = 30° or 45°

II) x $\in$ (0, 2π) and cosec x + 2=0 then $x=\frac{7\pi}{6},\frac{11\pi}{6}$

III) x $\in$ [0,2π] and (2 cos x-1) (3+2 cos x) =0 then x = $\frac{\pi}{3},\frac{5\pi}{3}$

Which of the above statements are correct?

1) only I, II 2) only II, III

3) only I, III 4) I,II,III

5. Match the trigonometric equations from List-I to solutions in List-II

List-I	***List-II***
I) Cosx =-1/2	a) x= 7 π /3
II) Sinx = $\frac{\sqrt{3}}{2}$	b) x = $\frac{7\pi}{6}$
III) Tanx = $\frac{1}{\sqrt{3}}$	c) x = $\frac{8\pi}{3}$
IV) Cot x =1	d) x = 3 π /4
	e) x = 5 π /4

1) b,d,c,a 2) c,a,b,e

3) b,c,e,a 4) b,e,e,a

6. For $0\le x\le 2\pi$, match the equations in List-I to no.of solutions in List-II

List-I **(Trigonometric equation)**	***List-II*** **(no. of solutions)**
I) $\tan^2x+\cot^2x=2$	a) 2
II) $\sin^2x-\cos x= 1/4$	b) 0
III) $4\sin^2 x+ 6\cos^2x=10$	c)1
IV) sinx=1	d) 4

1) d,a,b,c 2) d,a,c,b

3) d,b,a,c 4) d,c,a,b

7. Match the equations in List-I to general solutions in List-II

List-I	***List-II***
I) $\tan^2\theta$ =1	a) $n\pi\pm\pi/6$
II) $\cos^2\theta$ =1/4	b) $n\pi\pm\pi/4$
III) $\sin^2\theta$ =1/4	c) $n\pi\pm\pi/3$
IV) cosec θ =1	d) $n\pi\pm\pi/2$
	e) $n\pi\pm\pi/8$

1) b,d,a,c 2) c,a,e,b

3) b,c,a,d 4) d,a,b,c

8. Match the trigonometric equations from List-I to solutions in List-II

List-I	***List-II***
A) $3(1+\sin x)=$ $1+\cos 2x$	1) x = π
B) $\sin^2 x+2\cos^2 x=2$	2) x = $\sin^{-1}$ (1/3)
C) sin x =1/3	3) x = $\sin^{-1}$ (-1)
	4) $x=\frac{\pi}{3}$

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

9. Ascending order of number of solutions in the given interval of the following equations.

A) sin x=-1 in (0, 4π)

B) cos x= -1/2 in (0, 4π)

C) tan x = -1 in (0, 6π)

D) tan x = 1 in (0, $\pi/2$)

1) D,A,C,B 2) D,A,B,C

3) A,B,D,C 4) A,B,C,D

10. If p_1, p_2, p_3 are the principal values of following trigonometric equations

I) $\sin\theta = -1/2$

II) $\cos\theta = -\frac{\sqrt{3}}{2}$

III) $\tan\theta = \sqrt{3} - 2$

1) $p_1 < p_2 < p_3$ 2) $p_1 < p_3 < p_2$

3) $p_3 < p_1 < p_2$ 4) $p_2 < p_3 < p_1$

11. In $[0,2\pi]$, S_1, S_2, S_3 are the no. of solutions for the following trigonometric equations.

A) sin θ=1 B) sin θ=-1/2 C) sin θ=2 , Then

1) $S_1 > S_2 > S_3$ 2) $S_3 < S_1 < S_2$

3) $S_1 < S_3 < S_2$ 4) $S_2 < S_3 < S_1$

12. Arrange the following equations in decreasing order of their number of solutions in $[0,2\pi]$

I) $3\sin^2\theta + 4\cos^2\theta = 5$

II) $4\sin^2\theta + 3\cos^2\theta = 7/2$

III) $3\sin^2\theta + 4\cos^2\theta = 4$

1) II,III,I 2) I, II, III

3) III, I, II 4) III, II,I

13. Arrange the following in ascending order of their number of solutions in $[0,5\pi]$

A) cos θ-1 B) sin θ=1/2

C) $\tan^2\theta$=1

1) B,C,A 2) C,B,A 3) A,B,C 4) C,A,B

14. If α, β are the different values of θ satisfying the equation 3 cos θ+ 4 sin θ =9/2 then

A) $\tan\left(\frac{\alpha}{2} + \frac{\beta}{2}\right)$ B) $\tan\frac{\alpha}{2}\tan\frac{\beta}{2}$

C) sin $(\alpha + \beta)$

1) A>B>C 2) C>B>A

3) A>C>B 4) B<A<C

15. If θ_1, θ_2 are two solutions of the equation $3\cos 2\theta + 5\sin 2\theta = 7$ then

A) $\tan\theta_1 + \tan\theta_2$ B) $\tan\theta_1 \tan\theta_2$

C) $\tan(\theta_1 + \theta_2)$

1) A> B> C 2) A> C> B

3) C > A > B 4) B < C < A

16. Observe the following statements

Assertion (A): The general solution of sin x = -1 is $n\pi + (-1)^n \frac{3\pi}{2}$

Reason (R): The principal value of sin x = K lies in $\left[-\frac{\pi}{2}, \frac{\pi}{2}\right]$

1) Both A and R are true and R is correct explanation of A

2) Both A and R are true and R is not the correct explanation of A

3) A is true but R is false

4) A is false but R is true

17. Assertion (A): 3 sinx+ 4 cos x =7 has no solution

Reason (R): a cos x+ b sinx = c has no solution if |c| > $\sqrt{a^2 + b^2}$

1) Both A and R are true and R is correct explanation of A

2) Both A and R are true and R is not the correct explanation of A

3) A is true but R is false

4) A is false but R is true

18. Assertion (A): In $\left[0,\frac{\pi}{4}\right]$; $\cos x \geq \sin x$ and in $(\frac{\pi}{4},\pi], \cos x < \sin x$

Reason (R): If cos x = $\sqrt{1-\sin 2x}, 0 \leq x \leq \pi$ then x = 1 or $\tan^{-1} 3$.

1) Both A and R are true and R is correct explanation of A
2) Both A and R are true and R is not the correct explanation of A
3) A is true but R is false
4) A is false but R is true

KEY

1) 1	2) 2	3) 3	4) 2	5) 2
6) 1	7) 3	8) 2	9) 2	10) 2
11) 2	12) 1	13) 3	14) 3	15) 3
16) 4	17) 1	18) 3		

PREVIOUS QUESTIONS FROM EAMCET & IIT (JEE)

EAMCET -1981

1. If $Tan5\theta = Cot3\theta$, then general value of θ

1) $\frac{n\pi}{8}+\frac{\pi}{16}$ 2) $\frac{n\pi}{4}+\frac{\pi}{3}$

3) $\frac{n\pi}{4}+\frac{\pi}{4}$ 4) $\frac{n\pi}{2}+\frac{\pi}{4}$

EAMCET -1983

2. If $Sin\left(\frac{\pi Cot\theta}{4}\right) = Cos\left(\frac{\pi Tan\theta}{4}\right)$, then θ =

1) $\frac{\pi}{4}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{6}$ 4) None

EAMCET -1986

3. If α, β are different values of x satisfying

aCosx + bSinx = c, Then $Tan\left(\frac{\alpha+\beta}{2}\right)$ =

1) a + b 2) a - b 3) a/b 4) b/a

4. The general solution of $Sin^2x - 2Cosx + 1/4 = 0$ is

1) $2n\pi \pm \frac{\pi}{2}$ 2) $n\pi \pm \frac{\pi}{2}$

3) $2n\pi \pm \frac{\pi}{3}$ 4) None

EAMCET -1987

5. Solution of $7Sin^2x + 3Cos^2x = 4$ is

1) $n\pi \pm \frac{\pi}{2}$ 2) $n\pi \pm \frac{\pi}{4}$ 3) $n\pi \pm \frac{\pi}{3}$ 4) $n\pi \pm \frac{\pi}{6}$

EAMCET -1989

6. The values of x satisfying Sin2x + Sin4x = 2Sin3x are

1) $\frac{n\pi}{3}$ 2) $2n\pi$ 3) $n\pi$ 4) $n\pi + \frac{\pi}{3}$

EAMCET -1990

7. The value of θ satisfying $Sin7\theta = Sin4\theta - Sin\theta$ in $0 < \theta < \frac{\pi}{2}$ are

1) $\frac{\pi}{9},\frac{\pi}{4}$ 2) $\frac{\pi}{3},\frac{\pi}{9}$ 3) $\frac{\pi}{6},\frac{\pi}{4}$ 4) $\frac{\pi}{3},\frac{\pi}{4}$

EAMCET -1994

8. The value of θ satisfying $Cosec\theta + 2 = 0$ in $(0,2\pi)$ are

1) $210^0, 300^0$ 2) $240^0, 300^0$
3) $210^0, 240^0$ 4) $210^0, 330^0$

EAMCET -1996

9. The number of solutions of the equation $2Sin^2\theta + 3Sin\theta + 1 = 0$ in $(0,2\pi)$ is

1) 1 2) 2 3) 3 4) 4

10. The general value of x for the equation $9^{Cosx} - 2.3^{Cosx} + 1 = 0$ is

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

3) $2n\pi$ 4) $(2n+1)\frac{\pi}{2}$

11. If $1 + Sinx + Sin^2x + ...\alpha = 4 + 2\sqrt{3}, 0 < x < \frac{\pi}{2}$, $x \neq \frac{\pi}{2}$ then x =

1) $\frac{\pi}{6},\frac{\pi}{3}$ 2) $\frac{\pi}{3},\frac{5\pi}{6}$ 3) $\frac{2\pi}{3},\frac{\pi}{6}$ 4) $\frac{\pi}{3},\frac{2\pi}{3}$

12. If $\sqrt{3}Cos\theta + Sin\theta = \sqrt{2}$ then θ =

1) $n\pi + (-1)^n \frac{\pi}{4} + \frac{\pi}{6}$ 2) $2n\pi \pm \frac{\pi}{4} + \frac{\pi}{6}$

3) $n\pi + \frac{\pi}{6}$ 4) $2n\pi \pm \frac{\pi}{6}$

13. If $\sqrt{3}Cos\theta - Sin\theta = 1$ then $\theta =$

1) π 2) $\frac{\pi}{2}$ 3) $\frac{\pi}{3}$ 4) $\frac{\pi}{6}$

EAMCET -1993

14. If $3Tan(\theta - 15^0) = Tan(\theta + 15^0), 0 < \theta < \pi$ then $\theta =$

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{4}$ 3) $\frac{\pi}{6}$ 4) $\frac{\pi}{3}$

EAMCET -1995

15. The smallest value of θ satisfying the equation $\sqrt{3}(Cot\theta + Tan\theta) = 4$ is

1) $\frac{2\pi}{3}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{6}$ 4) $\frac{\pi}{12}$

16. If a is any real number, the number of roots of Cotx - Tanx = a in the first quardrant is

1) 2 2) 0 3) 1 4) None of these

EAMCET -1997

17. The value of θ satisfying $Sin5\theta = Sin3\theta - Sin\theta$ and $0 < \theta < \frac{\pi}{2}$ are

1) $\frac{\pi}{6}, \frac{\pi}{3}$ 2) $\frac{\pi}{6}, \frac{\pi}{4}$ 3) $\frac{\pi}{4}, \frac{\pi}{3}$ 4) $\frac{\pi}{4}, \frac{\pi}{2}$

EAMCET -1998

18. If $\sqrt{Sinx} + Cosx = 0$ then Sinx =

1) $\frac{\sqrt{5}+1}{2}$ 2) $\frac{\sqrt{5}+1}{8}$ 3) $\frac{\sqrt{5}-1}{8}$ 4) $\frac{\sqrt{5}-1}{2}$

EAMCET -1999

19. The solution set of $Tan^2\theta - 3 = 0$ is

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

3) $n\pi \pm \frac{\pi}{3}$ 4) $2n\pi + (-1)^n \frac{\pi}{3}$

EAMCET -2000

20. The smallest positive x satisfying $\log_{Cosx} Sinx + \log_{Sinx} Cosx = 2$ is

1) $\frac{\pi}{2}$ 2) $\frac{\pi}{3}$ 3) $\frac{\pi}{4}$ 4) $\frac{\pi}{6}$

21. If $Tan\theta + Sec\theta = \sqrt{3}$, then the principal value of $\theta + \frac{\pi}{6}$ is

1) $\frac{\pi}{4}$ 2) $\frac{\pi}{3}$ 3) $\frac{2\pi}{3}$ 4) $\frac{3\pi}{4}$

EAMCET -2001

22. The equation $\sqrt{3}Sinx + \cos x = 4$ has

1) Only one solution
2) Two solutions
3) Infinitely many solutions
4) No solution

EAMCET-2002

23. If $\frac{3 + 2i\sin\theta}{1 - 2i\sin\theta}$ is a real number and $0 < \theta < 2\pi$, then θ =

1) π 2) $\pi/2$ 3) $\pi/3$ 4) $\pi/6$

EAMCET-2003

24. If $\begin{vmatrix} \cos(A+B) & -\sin(A+B) & \cos 2B \\ \sin A & \cos A & \sin B \\ -\cos A & \sin A & \cos B \end{vmatrix} = 0$

then B =

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

3) $(2n+1)\pi$ 4) $2n\pi$

EAMCET-2003

25. The solution set of $(5+4\cos\theta)(2\cos\theta + 1) = 0$ in the interval $[0, 2\pi]$ is

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

3) $\left\{\frac{2\pi}{3}, \frac{4\pi}{3}\right\}$ 4) $\left\{\frac{2\pi}{3}, \frac{5\pi}{3}\right\}$

EAMCET-2004

26. For $x \in R$, $3\cos(4x-5)+4$ lies in the interval

1) [1, 7] 2) [4, 7] 3) [0, 7] 4) [2, 7]

EAMCET-2004

27. If the distance between the points $(a\cos\theta, a\sin\theta)$, $(a\cos\phi, a\sin\phi)$ is 2a then θ=...

1) $2n\pi \pm \pi + \phi, n \in z$ 2) $n\pi \pm \frac{\pi}{2} + \phi, n \in z$

3) $n\pi - \phi, n \in z$ 4) $2n\pi + \phi, n \in z$

EAMCET-2005

28. Cos 2x = $\left(\sqrt{2}+1\right)\left(\cos x-\frac{1}{\sqrt{2}}\right), \cos x \neq \frac{1}{2}$

$\Rightarrow x \in$

1) $\left\{2n\pi \pm \frac{\pi}{3}, n \in z\right\}$ 2) $\left\{2n\pi \pm \frac{\pi}{6}, n \in z\right\}$

3) $\left\{2n\pi \pm \frac{\pi}{2}, n \in z\right\}$ 4) $\left\{2n\pi \pm \frac{\pi}{4}, n \in z\right\}$

KARNATAKA CET -2002

29. The general solution of the equation $Sinx + Cosx = 1$ is

1) $x = 2n\pi + \frac{\pi}{2}, n = 0, \pm 1, \pm 2$

2) $x = n\pi + \left((-1)^n + 1\right)\frac{\pi}{4}, n = 0, \pm 1, \pm 2$

3) $x = n\pi + \left((-1)^n - 1\right)\frac{\pi}{4}, n = 0, \pm 1, \pm 2$

4) $x = 2n\pi, n = 0, \pm 1, \pm 2$

WEST BENGAL JEE - 2002

30. The inequation $3^{Sin^2\theta} + 3^{Cos^2\theta} \geq 2\sqrt{3}$ is true

1) for all real values of θ

2) some real values of θ

3) for imaginary values

4) None

NDA - 2002

31. If $Sin\theta = Sin\alpha$, then

1) $\frac{\theta+\alpha}{2}$ is any odd multiple of $\frac{\pi}{2}$ and $\frac{\theta-\alpha}{2}$ is any multiple of π

2) $\frac{\theta+\alpha}{2}$ is any even multiple of $\frac{\pi}{2}$ and $\frac{\theta-\alpha}{2}$ is any multiple of π

3) $\frac{\theta+\alpha}{2}$ is any multiple of $\frac{\pi}{2}$ and $\frac{\theta-\alpha}{2}$ is any odd multiple of π

4) $\frac{\theta+\alpha}{2}$ is any multiple of $\frac{\pi}{2}$ and $\frac{\theta-\alpha}{2}$ is any even multiple of π

KERALA CET - 2001

32. If $Sin(\pi Cos\theta) = Cos(\pi \sin\theta)$, then which of the following is correct

1) $Cos\theta = \frac{3}{2\sqrt{2}}$ 2) $Cos\left(\theta - \frac{\pi}{2}\right) = \frac{1}{2\sqrt{2}}$

3) $Cos\left(\theta - \frac{\pi}{4}\right) = \frac{1}{2\sqrt{2}}$ 4) $Cos\left(\theta + \frac{\pi}{4}\right) = \frac{1}{2\sqrt{2}}$

33. Find the value of k for which $(Cosx + Sinx)^2 + kSinx - 1 = 0$ is an identity

1) -1 2) -2 3) 0 4) 1

34. If the solutions for θ of $Cosp\theta + Cosq\theta = 0$, p > q > 0 are in A.P then numerically smallest common differenceof A.P is

1) $\frac{\pi}{p+q}$ 2) $\frac{2\pi}{p+q}$ 3) $\frac{\pi}{2(p+q)}$ 4) $\frac{1}{p+q}$

(IIIT) ALLAHABAD -2001

35. The solution set of $Sin\left(x + \frac{\pi}{4}\right) = Sin2x$ equals to

1) $\frac{n\pi - \left(\frac{\pi}{4}\right)}{1+(-1)^n 2}$ 2) $\frac{n\pi + \left(\frac{\pi}{4}\right)}{1+(-1)^n 2}$

3) $\frac{n\pi + \left(\frac{\pi}{4}\right)}{1-(-1)^n 2}$ 4) $\frac{n\pi - \left(\frac{\pi}{4}\right)}{1-(-1)^n 2}$

UPCET - 2001

36. The equation $3Sin^2x + 10Cosx - 6 = 0$ is satisfied if

1) $x = n\pi \pm Cos^{-1}\frac{1}{3}$ 2) $x = 2n\pi \pm Cos^{-1}\frac{1}{3}$

3) $x = n\pi \pm Cos^{-1}\frac{1}{6}$ 4) $x = 2n\pi \pm Cos^{-1}\frac{1}{6}$

KEY

1. 1	2. 1	3. 4	4. 3	5. 4
6. 1	7. 1	8. 4	9. 3	10. 4
11. 4	12. 2	13. 4	14. 2	15. 3
16. 3	17. 1	18. 4	19. 3	20. 3
21. 2	22. 4	23.1	24.1	25.3
26.1	27.1	28.4	29. 3	30. 1
31. 1	32. 3	33. 2	34. 2	35. 4
36. 2				