1. Value of $\cos^{-1}\left(\cos\frac{5\pi}{3}\right)+\sin^{-1}\left(\sin\frac{5\pi}{3}\right)$ is

(a) 0 (b) $\frac{\pi}{2}$ (c) $\frac{2\pi}{3}$ (d) $\frac{10\pi}{3}$

2. The equation $2\cos^{-1}x+\sin^{-1}x=\frac{11\pi}{6}$ has

(a) No solution (b) Only one solution
(c) Two solutions (d) Three solutions

3. If $\sin^{-1}x+\sin^{-1}y=\frac{2\pi}{3}$, then $\cos^{-1}x+\cos^{-1}y=$

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

4. If $\sin^{-1}\left(x-\frac{x^2}{2}+\frac{x^3}{4}-\ldots\right)+\cos^{-1}\left(x^2-\frac{x^4}{2}+\frac{x^6}{4}-\ldots\right)=\frac{\pi}{2}$ for $0<|x|<\sqrt{2}$, then x equals

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

5. The number of real solutions of

$\tan^{-1}\sqrt{x(x+1)}+\sin^{-1}\sqrt{x^2+x+1}=\frac{\pi}{2}$ is

(a) Zero (b) One (c) Two (d) Infinite

6. $\sin^{-1}\frac{1}{\sqrt{5}}+\cot^{-1}3$ is equal to

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

7. If $\sin^{-1}\frac{3}{5}+\cos^{-1}\left(\frac{12}{13}\right)=\sin^{-1}C$, then $C=$

(a) $\frac{65}{56}$ (b) $\frac{24}{65}$ (c) $\frac{16}{65}$ (d) $\frac{56}{65}$

8. $\sin^{-1}\frac{12}{13}+\cos^{-1}\frac{4}{5}+\tan^{-1}\frac{63}{16}=$

(a) 0 (b) $\frac{\pi}{2}$ (c) π (d) $\frac{3\pi}{2}$

9. The number of solutions of $\sin^{-1}x+\sin^{-1}2x=\frac{\pi}{3}$ is

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

10. The equation $2\cos^{-1}x=\sin^{-1}\left(2x\sqrt{1-x^2}\right)$ is valid for all values of x satisfying

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

11. If $1< x <\sqrt{2}$, then number of solutions of the equation $\tan^{-1}(x-1)+\tan^{-1}x+\tan^{-1}(x+1)=\tan^{-1}3x$, is/are

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

12. If $(\cot^{-1}x)^2-3(\cot^{-1}x)+2>0$, then x lies in

(a) (cot 2, cot 1) (b) $(-\infty, \cot 2)\cup(\cot 1,\infty)$
(c) (cot 1, ∞) (d) $(-\infty, \cot 1)\cup(\cot 2,\infty)$

13. The value of $\tan\left[\cos^{-1}\left(\frac{4}{5}\right)+\tan^{-1}\left(\frac{2}{3}\right)\right]$ is:

(a) 6/17 (b) 7/16 (c) 16/7 (d) None of these

14. Complete solution set of $\tan^2(\sin^{-1}x)>1$ is-

(a) $\left(-1,-\frac{1}{\sqrt{2}}\right)\cup\left(\frac{1}{\sqrt{2}},1\right)$ (b) $\left(-\frac{1}{\sqrt{2}},\frac{1}{\sqrt{2}}\right)\sim\{0\}$
(c) (-1, 1) ~ {0} (d) None of these

15. If $\theta=\sin^{-1}x+\cos^{-1}x-\tan^{-1}x,\ x\ge 0$ then the smallest interval in which θ lies is

(a) $\frac{\pi}{2}\le\theta\le\frac{3\pi}{4}$ (b) $0\le\theta\le\frac{\pi}{4}$
(c) $-\frac{\pi}{4}\le\theta\le 0$ (d) $\frac{\pi}{4}\le\theta\le\frac{\pi}{2}$

16. If $\cos^{-1}\left(\frac{x}{a}\right)+\cos^{-1}\left(\frac{y}{b}\right)=\alpha$, then $\frac{x^2}{a^2}-\frac{2xy}{ab}\cos\alpha+\frac{y^2}{b^2}=$

(a) $\sin^2\alpha$ (b) $\cos^2\alpha$ (c) $\tan^2\alpha$ (d) $\cot^2\alpha$

17. If a, b, c be positive real numbers and the value of

$\theta=\tan^{-1}\sqrt{\frac{a(a+b+c)}{bc}}+\tan^{-1}\sqrt{\frac{b(a+b+c)}{ca}}$

$+\tan^{-1}\sqrt{\frac{c(a+b+c)}{ab}}$, then $\tan\theta$ is

(a) 0 (b) 1 (c) $a+b+c$ (d) None of these

18. $\sin\left\{\tan^{-1}\left(\frac{1-x^2}{2x}\right)+\cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)\right\}$ is equal to

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

19. The value of $\sin\left(2\tan^{-1}\left(\frac{1}{3}\right)\right)+\cos(\tan^{-1}2\sqrt{2})=$

(a) $\frac{16}{15}$ (b) $\frac{14}{15}$ (c) $\frac{12}{15}$ (d) $\frac{11}{15}$

20. The number of positive integral solutions of the equation

$\tan^{-1}x+\cos^{-1}\frac{y}{\sqrt{1+y^2}}=\sin^{-1}\frac{3}{\sqrt{10}}$

or $\tan^{-1}x+\cot^{-1}y=\tan^{-1}3$ is

(a) One (b) Two (c) Zero (d) None

21. $2\tan^{-1}\left(\text{cosec}\tan^{-1}\sqrt{3}-\tan\cot^{-1}\sqrt{3}\right)$ is equal to

(a) $\pi/16$ (b) $\pi/6$ (c) $\pi/3$ (d) $\pi/2$

22. $2\left(\tan^{-1}1+\tan^{-1}2+\tan^{-1}3\right)$ is equal to

(a) $\pi/4$ (b) $\pi/2$ (c) π (d) 2π

23. If $\tan^{-1}\dfrac{\sqrt{1-x^2}-1}{x}=4$, then

(a) $x=\tan 2$ (b) $x=\tan 4$

(c) $x=\tan(1/4)$ (d) $x=\tan 8$

24. $\sec^2\left(\tan^{-1}2\right)+\text{cosec}^2\left(\cot^{-1}3\right)$ is equal to

(a) 1 (b) 5 (c) 10 (d) 15

25. The number of solution of equation

$\pi\cot^{-1}(x-1)+(\pi-1)\cot^{-1}x=2\pi-1$

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

26. If $x\in[-1,0)$ then $\cos^{-1}(2x^2-1)-2\sin^{-1}x$ equals

(a) $\dfrac{-\pi}{2}$ (b) $\dfrac{3\pi}{2}$ (c) -2π (d) None

27. The inequality $\log_2(x)<\sin^{-1}(\sin(5))$ holds if $x\in$

(a) $(0,2^{5-2\pi})$ (b) $(2^{5-2\pi},\infty)$ (c) $(2^{2\pi-5},\infty)$ (d) $(0,2^{2\pi-5})$

28. If $A=2\tan^{-1}(2\sqrt{2}-1)$ and $B=3\sin^{-1}\left(\dfrac{1}{3}\right)+\sin^{-1}\left(\dfrac{3}{5}\right)$, then-

(a) A = B (b) A < B (c) A > B (d) None of these

29. Which of the following identities does not hold?

(a) $\sin^{-1}x=\cot^{-1}\left[\dfrac{\sqrt{(1-x^2)}}{x}\right];\ 0<x\le 1$

(b) $\sin^{-1}x=\cot^{-1}\left[\dfrac{\sqrt{(1-x^2)}}{x}\right];\ -1\le x<0$

(c) $\sin^{-1}x=\cos^{-1}\sqrt{(1-x^2)};\ 0\le x\le 1$

(d) $\sin^{-1}x=1-\sin^{-1}(-x);\ -1\le x\le 1$

30. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\dfrac{3\pi}{2}$ and $f(1)=2$, $f(p+q)=f(p)$. $f(q)\ \forall\ p,q\in R$, then

$$x^{f(1)}+y^{f(2)}+z^{f(3)}-\frac{x+y+z}{x^{f(1)}+y^{f(2)}+z^{f(3)}}=$$

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

31. Which one of the following is correct?

(a) $\tan 1>\tan^{-1}$ (b) $\tan 1<\tan^{-1}1$

(c) $\tan 1=\tan^{-1}1$ (d) None of these

32. The no. of pair of solutions (x, y) of equation $1+x^2+2x\sin(\cos^{-1}y)=0$ is/are

(a) 4 (b) 3 (c) 2 (d) 1

33. Set of values of x satisfying $\cos^{-1}\sqrt{x}>\sin^{-1}\sqrt{x}$

(a) $\left(0,\dfrac{1}{2}\right)$ (b) $\left[0,\dfrac{1}{2}\right)$ (c) $\left(\dfrac{1}{2},1\right)$ (d) $\left(\dfrac{1}{2},1\right]$

34. If α,β,γ are roots of $x^3-mx^2+3x-m=0$, then general value of $\tan^{-1}\alpha+\tan^{-1}\beta+\tan^{-1}\gamma$ is-

(a) Depends on m (b) Depends on p

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

35. Equation of the image of the line $x+y=\sin^{-1}(a^3+1)+\cos^{-1}(a^2+1)-\tan^{-1}(a+1)$, $a\in R$ about y-axis is given by

(a) $x-y+\dfrac{\pi}{4}=0$ (b) $x-y=0$

(c) $x-y=\dfrac{\pi}{4}$ (d) $x-y=\dfrac{\pi}{2}$

36. Which one of the following is correct?

(a) $\tan 1>\tan^{-1}$ (b) $\tan 1<\tan^{-1}1$

(c) $\tan 1=\tan^{-1}1$ (d) None of these

37. The minimum value of $(\sin^{-1}x)^3+(\cos^{-1}x)^3$ is equal to-

(a) $\dfrac{\pi^3}{32}$ (b) $\dfrac{5\pi^3}{32}$ (c) $\dfrac{9\pi^3}{32}$ (d) $\dfrac{11\pi^3}{32}$

38. If $\sin^{-1}x+\sin^{-1}y+\sin^{-1}z=\pi$, then $x^4+y^4+z^4+4x^2y^2z^2=k(x^2y^2+y^2z^2+z^2x^2)$, where k is equal to -

(a) 1 (b) 2 (c) 4 (d) None of these

39. $\cos^{-1}\dfrac{1}{2}+2\sin^{-1}\dfrac{1}{2}$ is equal to-

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

40. The principal value of $\sin^{-1}\left[\sin\left(\dfrac{2\pi}{3}\right)\right]$ is-

(a) $-\dfrac{2\pi}{3}$ (b) $\dfrac{2\pi}{3}$ (c) $\dfrac{4\pi}{3}$ (d) None of these

41. $\tan\left[\cos^{-1}\dfrac{4}{5}+\tan^{-1}\dfrac{2}{3}\right]=$

(a) $\dfrac{6}{17}$ (b) $\dfrac{17}{6}$ (c) $\dfrac{7}{16}$ (d) $\dfrac{16}{7}$

42. If $\cos^{-1} x + \cos^{-1} y + \cos^{-1} z = \pi$, then-

(a) $x^2 + y^2 + z^2 + xyz = 0$ (b) $x^2 + y^2 + z^2 + 2xyz = 0$

(c) $x^2 + y^2 + z^2 + xyz = 1$ (d) $x^2 + y^2 + z^2 + 2xyz = 1$

43. If $\sin^{-1}\left(\frac{2a}{1+a^2}\right) + \sin^{-1}\left(\frac{2a}{1+b^2}\right) = 2\tan^{-1}x$ the x =

(a) $\frac{a-b}{1+ab}$ (b) $\frac{b}{1+ab}$ (c) $\frac{b}{1-ab}$ (d) $\frac{a+b}{1-ab}$

44. If $\tan^{-1} x + 2\cot^{-1} x = \frac{2\pi}{3}$, then x =

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

45. f $f(x) = \sin^{-1}\left[\frac{\sqrt{3}}{2}x - \frac{1}{2}\sqrt{1-x^2}\right]$, $\frac{-1}{2} \le x \le 1$ then $f(x)$ =

(a) $\sin^{-1}\frac{1}{2} - \sin^{-1}x$ (b) $\sin^{-1}x - \frac{\pi}{6}$

(c) $\sin^{-1}x + \frac{\pi}{6}$ (d) None of these

46. $\sin^{-1} x/5 + \text{cosec}^{-1} 5/4 = \pi/2$ then x =

(a) 4 (b) 5 (c) 1 (d) 3

47. $\cos(\tan^{-1}x)$ =

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

48. The solution set of the equation $\sin^{-1} x = 2\tan^{-1}a$ is

(a) {1, 2} (b) {-1, 2} (c) {-1, 1, 0} (d) {1, 1/2, 0}

49. $\cot^{-1}(\sqrt{\cos\alpha}) - \tan^{-1}(\sqrt{\cos\alpha}) = x$ then $\sin x$ =

(a) $\tan^2\frac{\alpha}{2}$ (b) $\cot^2\left(\frac{\alpha}{2}\right)$ (c) $\tan\alpha$ (d) $\cos\frac{\alpha}{2}$

50. $\sin^{-1}\frac{x}{5} + \text{cosec}^{-1}\frac{5}{4} = \frac{\pi}{2}$ then x=

(a) 4 (b) 5 (c) 1 (d) 3

51. $3\sin^{-1}\frac{2x}{1+x^2} - 4\cos^{-1}\frac{1-x^2}{1+x^2} + 2\tan^{-1}\frac{2x}{1-x^2} = \frac{\pi}{3}$ then principal x =

(a) $\sqrt{3}$ (b) $\frac{1}{\sqrt{3}}$ (c) 1 (d) None of these

52. $\tan^{-1}\frac{153}{23} + \tan^{-1}\frac{77}{39}$ =

(a) $\tan^{-1}\frac{17}{39} - \pi$ (b) $\tan^{-1}\frac{39}{17}$

(c) $\tan^{-1}\frac{23}{77}$ (d) None of these

53. $\sin^{-1}\sin 22 + \cos^{-1}\cos 33 + \tan^{-1}\tan 44$ =

(a) $55 - 17\pi$ (b) $16\pi - 48$

(c) $45 - 18\pi$ (d) None of these

54. Find $\cos^{-1}\left\{\frac{1}{\sqrt{2}}\left(\cos\frac{9\pi}{10} - \sin\frac{9\pi}{10}\right)\right\}$ =

(a) $\frac{3\pi}{20}$ (b) $\frac{7\pi}{20}$ (c) $\frac{7\pi}{10}$ (d) $\frac{17\pi}{20}$

55. $\cos^{-1}\left\{\frac{1}{2}x^2 + \sqrt{1-x^2}\sqrt{1-\frac{x^2}{4}}\right\} = \cos^{-1}\frac{x}{2} - \cos^{-1}x$ holds if -

(a) $|x| \le 1$ (b) $x \in R$ (c) $0 \le x \le 1$ (d) $-1 \le x \le 0$

56. If $x > 0$ and $\sin^{-1}\left(\frac{5}{x}\right) + \sin^{-1}\left(\frac{12}{x}\right) = \frac{\pi}{2}$ then x =

(a) 7 (b) 13 (c) 17 (d) 34

57. The value of $\tan\left[\cos^{-1}\left(\frac{4}{5}\right) + \tan^{-1}\left(\frac{2}{3}\right)\right]$ is

(a) $\frac{6}{17}$ (b) $\frac{17}{6}$ (c) $\frac{16}{7}$ (d) None of these

58. The equation $(\sin^{-1}x)^3 + (\cos^{-1}x)^3 = \alpha\pi^3$ has no solution for

(a) $\alpha > \frac{1}{32}$ (b) $\alpha = \frac{1}{32}$ (c) $\alpha < 1$ (d) $\alpha < \frac{1}{32}$

59. If $A = 2\tan^{-1}(2\sqrt{2}-1)$ and

$B = 3\sin^{-1}\frac{1}{3} + \sin^{-1}\frac{3}{5}$, then

(a) $B < A < 105^0$ (b) $105^0 < B < A$

(c) $B < 105^0 < A$ (d) $105^0 < A < B$

60. The value of $\cos^{-1}\left(-\sin\frac{7\pi}{6}\right)$ is-

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

61. If $\alpha \in \left(-\frac{3\pi}{2}, -\pi\right)$, then the value of

$\tan^{-1}(\cot\alpha) - \cot^{-1}(\tan\alpha) + \sin^{-1}(\sin\alpha) + \cos^{-1}(\cos\alpha)$ is equal to-

(a) $2\pi + \alpha$ (b) $\pi + \alpha$ (c) 0 (d) $\pi - \alpha$

62. If $z = \sec^{-1}\left(x+\frac{1}{x}\right)+\sec^{-1}\left(y+\frac{1}{y}\right)$, where $xy > 0$, then the value of z (among the given values) is not possible-

(a) $\frac{5\pi}{6}$ (b) $\frac{7\pi}{10}$ (c) $\frac{9\pi}{10}$ (d) $\frac{5\pi}{3}$

63. If α, β, γ are the roots of the equation $x^3 + mx^2 + 3x + m = 0$, then the general value of $\tan^{-1}\alpha + \tan^{-1}\beta + \tan^{-1}\gamma$ is:

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

(c) $\frac{n\pi}{2}$ (d) Dependent upon the value of p

64. If $x \in \left(\frac{3\pi}{2}, 2\pi\right)$, then value of the expression $\sin^{-1}(\cos^{-1}(\cos x) + \sin^{-1}(\sin x)))$, is equal to

(a) $-\pi/2$ (b) $\pi/2$ (c) 0 (d) None of these

65. If $x > 0$, $y > 0$ and $x > y$, then $\tan^{-1}(x/y) + \tan^{-1}[(x+y)/(x-y)]$ is equal to-

(a) $-\pi/4$ (b) $\pi/4$ (c) $3\pi/4$ (d) None of these

66. The value of $\sin(2\tan^{-1}(1/3)) + \cos(\tan^{-1} 2\sqrt{2})$ is-

(a) 12/13 (b) 13/14 (c) 14/15 (d) None of these

67. Find x satisfying $[\tan^{-1} x] + [\cot^{-1} x] = 2$, $[\cdot] \rightarrow$greatest Integer function

(a) (cot 3, cot 2) (b) (cot 3, - cot 1)

(c) (cot 3, 0) (d) None of these

68. The solution of $\tan^{-1} 2x + \tan^{-1} 3x = \frac{\pi}{4}$ is-

(a) 1/6 (b) -1 (c) $\left\{\frac{1}{6}, -1\right\}$ (d) ½

69. The inequality $\sin^{-1}(\sin 5) > x^2 - 4x$ holds if-

(a) $x = 2 - \sqrt{9-2\pi}$ (b) $x = 2 + \sqrt{9-2\pi}$

(c) $x \in (2 - \sqrt{9-2\pi}, 2 + \sqrt{9-2\pi})$ (d) $x > 2 + \sqrt{9-2\pi}$

70. f $\sin^{-1}(x-3) + \cos^{-1}(x-1) + \tan^{-1}\left(\frac{x}{2-x^2}\right) = \cos^{-1} k - \pi$ then value of k is

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

71. $\text{cosec}^{-1}(\text{cosec } x)$ and $\text{cosec}(\text{cosec}^{-1} x)$ are equal functions then maximum range of value of x is-

(a) $\left[-\frac{\pi}{2}, -1\right] \cup \left[1, \frac{\pi}{2}\right]$ (b) $\left[-\frac{\pi}{2}, 0\right) \cup \left[0, \frac{\pi}{2}\right]$

(c) $(-\infty, -1] \cup [1, \infty)$ (d) $[-1, 0) \cup [0, 1)$

72. If $\alpha = \sin^{-1}(\cos(\sin^{-1} x))$ and $\beta = \cos^{-1}(\sin(\cos^{-1} x))$, then-

(a) $\tan\alpha = \cot\beta$ (b) $\tan\alpha = -\cot\beta$

(c) $\tan\alpha = \tan\beta$ (d) $\tan\alpha = -\tan\beta$

73. There exists a positive real number x satisfying $\cos(\tan^{-1} x) = x$, the value of $\cos^{-1}\left(\frac{x^2}{2}\right)$ is-

(a) $\frac{\pi}{10}$ (b) $\frac{\pi}{5}$ (c) $\frac{2\pi}{5}$ (d) $\frac{4\pi}{5}$

74. If x & $y > 0$, $x > y$ then $\tan^{-1}\left(\frac{x}{y}\right) + \tan^{-1}\left(\frac{x+y}{x-y}\right)$ is equal to

(a) $-\pi/4$ (b) $\pi/4$ (c) $3\pi/4$ (d) None of these

75. If x_1, x_2, x_3, x_4 are the roots of the equation $x^4 - x^3 \sin 2\beta + x^2 \cos 2\beta - x\cos\beta - \sin\beta = 0$, then, $\tan^{-1}x_1 + \tan^{-1}x_2 + \tan^{-1}x_3 + \tan^{-1}x_4$ is equal to-

(a) β (b) $\pi/2 - \beta$ (c) $\pi - \beta$ (d) $-\beta$

76. $\tan^{-1}\left(\frac{\pi}{4} + \frac{1}{2}\cos^{-1}\left(\frac{3a}{b}\right)\right) + \tan\left(\frac{\pi}{4} - \frac{1}{2}\cos^{-1}\left(\frac{3a}{b}\right)\right)$ is equal to -

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

77. $\sum_{m=1}^{n} \tan^{-1}\frac{2m}{m^4+m^2+2} =$

(a) $\tan^{-1}(n^2+n+1)$ (b) $\tan^{-1}(n^2-n+1)$

(c) $\tan^{-1}\frac{n^2+n}{n^2+n+2}$ (d) None of these

78. Total number of ordered pairs (x, y) satisfying $|y| = \cos x$ and $y = \sin^{-1}(\sin x)$ where $|x| \le 3\pi$, is equal to-

(a) 2 (b) 4 (c) 6 (d) 8

79. $\sum_{i=1}^{1000} \sin^{-1} x_i = 500\,\pi$ then value of $\sum_{i=1}^{1000} x_i$

(a) 500 (b) 100 (c) 100000 (d) 1000

80. The number of real solution of

$\tan^{-1}\sqrt{x(x+1)} + \sin^{-1}\sqrt{x^2+x+1} = \frac{\pi}{2}$ is-

(a) Zero (b) One (c) Two (d) Infinite

81. If $\cos^{-1}\left(\frac{1}{x}\right) = \theta$, then $\tan\theta =$

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

82. $\tan(\cos^{-1} x)$ is equal to-

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

83. $\sin\left(\frac{1}{2}\cos^{-1}\frac{4}{5}\right) =$

(a) $\frac{1}{\sqrt{10}}$ (b) - 10 (c) $\frac{1}{10}$ (d) $-\frac{1}{10}$

84. $\tan\left[2\tan^{-1}\left(\frac{1}{5}\right)-\frac{\pi}{4}\right] =$

(a) $\frac{17}{7}$ (b) $-\frac{17}{7}$ (c) $\frac{7}{17}$ (d) $-\frac{7}{17}$

85. If $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z = \pi$ then $x + y + z =$

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

86. $\sin^{-1}\sin 22 + \cos^{-1}\cos 33 + \tan^{-1}\tan 44 =$

(a) $55 - 17\pi$ (b) $16\pi - 48$ (c) $45 - 18\pi$ (d) None

87. $\cos^{-1}\left\{\frac{1}{2}x^2+\sqrt{1-x^2}\sqrt{1-\frac{x^2}{4}}\right\} = \cos^{-1}\frac{x}{2} - \cos^{-1} x$ holds if

(a) $|x| \le 1$ (b) $x \in R$ (c) $0 \le x \le 1$ (d) $-1 \le x \le 0$

88. $\theta = \tan^{-1}(2\tan^2\theta) - \tan^{-1}\left(\frac{1}{3}\tan\theta\right)$ then $\tan\theta =$

(a) -2 (b) -1 (c) 2/3 (d) 2

89. If $\frac{1}{2}\sin^{-1}\left[\frac{3\sin 2\theta}{5+4\cos 2\theta}\right] = \tan^{-1} x$ then $x =$

(a) $\tan 3\theta$ (b) $3\tan\theta$

(c) $\frac{1}{3}\tan\theta$ (d) $3\cot\theta$

90. The greater of two angles $A = 2\tan^{-1}(2\sqrt{2}-1)$ and $B = 3\sin^{-1}(1/3) + \sin^{-1}(3/5)$ is

(a) A (b) B (c) Both are equal (d) None of these

92. If $xy + yz + zx = 1$, than $\tan^{-1} x + \tan^{-1} y + \tan^{-1} z$ is equal to -

(a) π (b) $\pi/2$ (c) 0 (d) None of these

93. If $A = \tan^{-1}\left(\frac{x\sqrt{3}}{2k-x}\right)$ and $B = \tan^{-1}\left(\frac{2x-k}{k\sqrt{3}}\right)$, then the value of A - B is

(a) 0^0 (b) 45^0 (c) 60^0 (d) 30^0

94. If $\sin^{-1} x = \frac{\pi}{5}$ for some $x \in (-1,1)$, then the value of $\cos^{-1} x$ is

(a) $\frac{3\pi}{10}$ (b) $\frac{5\pi}{10}$ (c) $\frac{7\pi}{10}$ (d) $\frac{9\pi}{10}$

95. If $\tan(\cos^{-1} x) = \sin\left(\cot^{-1}\frac{1}{2}\right)$, then $x =$

(a) $\pm\frac{5}{3}$ (b) $\pm\frac{\sqrt{5}}{3}$ (c) $\pm\frac{5}{\sqrt{3}}$ (d) None of these

96. $\sin(2\sin^{-1} 0.8) =$

(a) 0.96 (b) 0.48 (c) 0.64 (d) None of these

97. If $\sec^{-1}x = \operatorname{cosec}^{-1}y$, then $\cos^{-1}\frac{1}{x} + \cos^{-1}\frac{1}{y} =$

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

98. The number of real solutions of

$\tan^{-1}\sqrt{x(x+1)} + \sin^{-1}\sqrt{x^2+x+1} = \frac{\pi}{2}$ is

(a) Zero (b) One (c) Two (d) Infinite

99. If $0 < x < 1$,

then $\sqrt{1+x^2}\,[\{\cos(\cot^{-1}x) + \sin(\cot^{-1}x)\}^2 - 1]^{1/2}$ is equal to

(a) $\frac{x}{\sqrt{1+x^2}}$ (b) x

(c) $x\sqrt{1+x^2}$ (d) $\sqrt{1+x^2}$

100. $\tan^{-1}\frac{1}{3} + \tan^{-1}\frac{2}{9} + \tan^{-1}\frac{4}{33} + \ldots\ldots\infty =$

(a) $\pi/4$ (b) $\pi/2$ (c) π (d) None