1. The value of $\cos^{-1}(-1) - \sin^{-1}(1)$ is- **[AIEEE-2002]**

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

2. The domain of $\sin^{-1}\left(\log_3\left(\frac{x}{3}\right)\right)$ **[AIEEE 2002]**

(1) [1, 9] (2) [–1, 9] (3) [–9, 1] (4) [–9, –1]

3. The trigonometric equation $\sin^{-1} x = 2\sin^{-1} a$, has a solution for- **[AIEEE-2003]**

(1) $|a| \le \frac{1}{\sqrt{2}}$ (2) $\frac{1}{2} < |a| < \frac{1}{\sqrt{2}}$

(3) all real values of a (4) $|a| < \frac{1}{2}$

4. The domain of the function $f(x) = \frac{\sin^{-1}(x-3)}{\sqrt{9-x^2}}$ is- **[AIEEE - 2004]**

(1) [1, 2) (2) [2, 3) (3) [1, 2] (4) [2, 3]

5. Let $f : (-1, 1) \to B$, be a function defined by $f(x) = \tan^{-1}\frac{2x}{1-x^2}$, then f is both one-one and onto when B is the interval- **[AIEEE-2005]**

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

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

6. If $\cos^{-1}x - \cos^{-1}\frac{y}{2} = \alpha$, then $4x^2 - 4xy\cos\alpha + y^2$ is equal to - **[AIEEE-2005]**

(1) 2 sin 2α (2) 4 (3) 4 $\sin^2\alpha$ (4) $-4\sin^2\alpha$

7. If $\sin^{-1}\left(\frac{x}{5}\right) + \text{cosec}^{-1}\left(\frac{5}{4}\right) = \frac{\pi}{2}$, then a value of x is- **[AIEEE-2007]**

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

8. The value of $\cot\left(\text{cosec}^{-1}\frac{5}{3} + \tan^{-1}\frac{2}{3}\right)$ is equal to- **[AIEEE-2008]**

(1) $\frac{6}{17}$ (2) $\frac{3}{17}$ (3) $\frac{4}{17}$ (4) $\frac{5}{17}$

9. If x, y, z are in A.P. and $\tan^{-1}x$, $\tan^{-1}y$ and $\tan^{-1}z$ are also in A.P., then **[JEE (Main)-2013]**

(1) x = y = z (2) 2x = 3y = 6z

(3) 6x = 3y = 2z (4) 6x = 4y = 3z

10. The number of solutions of the equation, $\sin^{-1}x = 2\tan^{-1}x$ (in principal values) is :- **[JEE(Main)-2013 (Online)]**

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

11. Let $\tan^{-1} y = \tan^{-1} x + \tan^{-1}\left(\frac{2x}{1-x^2}\right)$, where $|x| < \frac{1}{\sqrt{3}}$. Then a value of y is : **[JEE (Main)-2015]**

(1) $\frac{3x-x^3}{1+3x^2}$ (2) $\frac{3x+x^3}{1+3x^2}$

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

12. Domain of $f(x) = \sqrt{\sin^{-1}(2x) + \frac{\pi}{6}}$ is - **[IIT 2003 (Sc.)]**

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

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

13. If $\sin(\cot^{-1}(x+1)) = \cos(\tan^{-1}x)$, then x = **[IIT 2004 (Sc.)]**

(1) $-\frac{1}{2}$ (2) $\frac{1}{2}$ (3) 0 (4) $\frac{9}{4}$

14. Let (x,y) be such that

$\sin^{-1}(ax) + \cos^{-1}(y) + \cos^{-1}(bxy) = \frac{\pi}{2}$

If a=1 and b=0, then (x,y) lies on the **[IIT 2007]**

(1) circle $x^2 + y^2 = 1$ (2) $(x^2-1)(y^2-1)=0$

(3) y = x (4) $(4x^2-1)(y^2-1) = 0$

15. Let (x,y) be such that

$\sin^{-1}(ax) + \cos^{-1}(y) + \cos^{-1}(bxy) = \frac{\pi}{2}$

If a=1 and b=1, then (x,y) lies on the **[IIT 2007]**

(1) circle $x^2 + y^2 = 1$ (2) $(x^2-1)(y^2-1)=0$

(3) y = x (4) $(4x^2-1)(y^2-1) = 0$

16. Let (x,y) be such that

$\sin^{-1}(ax) + \cos^{-1}(y) + \cos^{-1}(bxy) = \frac{\pi}{2}$

If a=1 and b=2, then (x,y) lies on the **[IIT 2007]**

(1) circle $x^2 + y^2 = 1$ (2) $(x^2-1)(y^2-1)=0$
(3) $y = x$ (4) $(4x^2-1)(y^2-1) = 0$

17. Let (x,y) be such that

$\sin^{-1}(ax) + \cos^{-1}(y) + \cos^{-1}(bxy) = \frac{\pi}{2}$

If a=2 and b=2, then (x,y) lies on the **[IIT 2007]**

(1) circle $x^2 + y^2 = 1$ (2) $(x^2-1)(y^2-1)=0$
(3) $y = x$ (4) $(4x^2-1)(y^2-1) = 0$

18. If $0 < x < 1$, then

$\sqrt{1+x^2}\,[\{x\cos(\cot^{-1}x) + \sin(\cot^{-1}x)\}^2 - 1]^{1/2} =$ **[IIT 2008]**

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

(3) $x\sqrt{1+x^2}$ (4) $\sqrt{1+x^2}$

19. Let $f(\theta) = \sin\left(\tan^{-1}\left(\frac{\sin\theta}{\sqrt{\cos 2\theta}}\right)\right)$,

where $-\frac{\pi}{4} < \theta < \frac{\pi}{4}$. Then the value of

$\frac{d}{d(\tan\theta)}(f(\theta))$ is :- **[IIT 2011]**

(1) 1 (2) – 1
(3) 2 (4) None of these

20. The value of $\cot\left(\sum_{n=1}^{23}\cot^{-1}\left(1+\sum_{k=1}^{n}2k\right)\right)$ is

[JEE(Advanced) 2013]

(1) $\frac{23}{25}$ (2) $\frac{25}{23}$ (3) $\frac{23}{24}$ (4) $\frac{24}{23}$

21. $\left(\frac{1}{y^2}\left(\frac{\cos\left(\tan^{-1}y\right)+y\sin\left(\tan^{-1}y\right)}{\cot\left(\sin^{-1}y\right)+\tan\left(\sin^{-1}y\right)}\right)^2+y^4\right)^{1/2}$

takes value **[JEE(Advanced) 2013)]**

(1) $\frac{1}{2}\sqrt{\frac{5}{3}}$ (2) $\sqrt{2}$ (3) $\frac{1}{2}$ (4) 1

22. If $\cot\left(\sin^{-1}\sqrt{1-x^2}\right)=\sin\left(\tan^{-1}\left(x\sqrt{6}\right)\right), x\neq 0$

then possible value of x is **[JEE(Advanced) 2013)]**

(1) $\frac{1}{2}\sqrt{\frac{5}{3}}$ (2) $\sqrt{2}$ (3) $\frac{1}{2}$ (4) 1

23. Let $f:[0,4\pi]\to[0,\pi]$ be defined by $f(x)=\cos^{-1}(\cos x)$. The number of points $x\in[0,4\pi]$ satisfying the equation $f(x)=\frac{10-x}{10}$ is **[JEE(Advanced)-2014]**

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

24. Number of positive solutions satisfying the equation **[JEE(Advanced)-2014]**

$\tan^{-1}\left(\frac{1}{2x+1}\right)+\tan^{-1}\left(\frac{1}{4x+1}\right)=\tan^{-1}\left(\frac{2}{x^2}\right)$

is
(1) 1 (2) 2
(3) 3 (4) 4

***25.** If $\alpha = 3\sin^{-1}\left(\frac{6}{11}\right)$ and $\beta = 3\cos^{-1}\left(\frac{4}{9}\right)$ where the inverse trigonometric functions take only the principal values, then the correct option(s) is(are) **[JEE(Advanced)-2015]**

(1) $\cos\beta > 0$ (2) $\sin\beta < 0$
(3) $\cos(\alpha+\beta) > 0$ (4) $\cos\alpha < 0$

* **Marked Question is multiple answer**

PREVIOUS YEARS QUESTIONS — ANSWER KEY — Exercise-II

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