**N K MATHS ACADEMY**

**12**

**TIRUPUR-98434 34491**

**UNIT TEST-2022-23**

**MATHEMATICS**

**UNIT TEST -4**

**INVERSE TRIGONAMETRICAL FUNCTIONS**

**MARKS: 40**                                                    **TIME: 1.00 HR**

**I. CHOOSE THE BEST ANSWER:**                                    **8X1=8**

1.  The value of $\sin^{-1}(\cos x)$, $0 \le x \le \pi$ is

    (1) $\pi - x$      (2) $x - \dfrac{\pi}{2}$      (3) $\dfrac{\pi}{2} - x$      (4) $\pi - x$

2.  If $\sin^{-1} x = 2\sin^{-1}\alpha$ has a solution, then

    (1) $|\alpha| \le \dfrac{1}{\sqrt{2}}$    (2) $|\alpha| \ge \dfrac{1}{\sqrt{2}}$    (3) $|\alpha| < \dfrac{1}{\sqrt{2}}$    (4) $|\alpha| > \dfrac{1}{\sqrt{2}}$

3.  If $\cot^{-1} x = \dfrac{2\pi}{5}$ for some $x \in R$, the value of $\tan^{-1} x$ is

    (1) $-\dfrac{\pi}{10}$    (2) $\dfrac{\pi}{5}$    (3) $\dfrac{\pi}{10}$    (4) $-\dfrac{\pi}{5}$

4.  $\tan^{-1}\left(\dfrac{1}{4}\right) + \tan^{-1}\left(\dfrac{2}{9}\right)$ is equal to

    (1) $\dfrac{1}{2}\cos^{-1}\left(\dfrac{3}{5}\right)$    (2) $\dfrac{1}{2}\sin^{-1}\left(\dfrac{3}{5}\right)$    (3) $\dfrac{1}{2}\tan^{-1}\left(\dfrac{3}{5}\right)$    (4) $\tan^{-1}\left(\dfrac{1}{2}\right)$

5.  If $|x| \le 1$ then $2\tan^{-1} x - \sin^{-1}\dfrac{2x}{1+x^2}$ is equal to

    (1) $\tan^{-1} x$    (2) $\sin^{-1} x$    (3) $0$    (4) $\pi$

6.  If $\sin^{-1}\dfrac{x}{5} + \csc^{-1}\dfrac{5}{4} = \dfrac{\pi}{2}$, then the value of x is

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

7.  If $\sin\left(\sin^{-1}\dfrac{1}{5} + \cos^{-1} x\right) = 1$, then x is equal to

    (1) 1    (2) 0    (3) $\dfrac{4}{5}$    (4) $\dfrac{1}{5}$

8.  The principal value of $\sin^{-1}\left(\sin\dfrac{5\pi}{3}\right)$ is

    (1) $\dfrac{5\pi}{3}$    (2) $-\dfrac{5\pi}{3}$    (3) $-\dfrac{\pi}{3}$    (4) $\dfrac{4\pi}{3}$

## II. ANSWER ANY 4 QUESTIONS:                                    4X2=8

9.    Find the period of amplitude of $y = 4\sin(-2x)$

10.   Find value of $\cos^{-1}\left(\dfrac{1}{2}\right) + \sin^{-1}(-1)$

11.   Find the domain of $\dfrac{1}{2}\tan^{-1}\left(1-x^2\right) - \dfrac{\pi}{4}$

12.   Find the value of $\sin\left[\dfrac{\pi}{3} - \sin^{-1}\left(\dfrac{1}{2}\right)\right]$

13.   Simplify $\cos^{-1}\left(\cos\left(\dfrac{13\pi}{3}\right)\right)$

## III. ANSWER ANY 3 QUESTIONS:                                   3X3=9

14.   Prove that $\tan^{-1}\dfrac{2}{11} + \tan^{-1}\dfrac{7}{24} = \tan^{-1}\dfrac{1}{2}$

15.   Find the domain of $g(x) = 2\sin^{-1}(2x-1) - \dfrac{\pi}{4}$

16.   Prove that $\tan(\sin^{-1}x) = \dfrac{x}{\sqrt{1-x^2}}$, $-1 < x < 1$

17.   Prove that $2\cos^{-1}x = \tan^{-1}\left(\dfrac{1-x^2}{1+x^2}\right)$, if $x \geq 1$

## IV. ANSWER ANY 3 QUESTIONS:                                    3X5=15

18.   If $\cos^{-1}x + \cos^{-1}y + \cos^{-1}z = \pi$, and $0 < x, y, z < 1$ Show that $x^2 + y^2 + z^2 - 2xyz = 1$

19.   Solve $\tan^{-1}2x + \tan^{-1}3x = \dfrac{\pi}{4}$, if $6x^2 < 1$.

20.   Solve $\cos\left[\sin^{-1}\left(\dfrac{x}{\sqrt{1+x^2}}\right)\right] = \sin\left[\cot^{-1}\left(\dfrac{3}{4}\right)\right]$

21.   Solve $2\tan^{-1}(\cos x) = \tan^{-1}(2\cos ecx)$