# N K MATHS ACADEMY
## TIRUPUR-9843434491
## UNIT TEST 2021-22
## MATHEMATICS

**Marks: 50**                                                      **Time 1.30 hrs**

## I.   CHOOSE THE BEST ANSWER:                                  10X1=10

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.   $\sin^{-1}\dfrac{3}{5} - \cos^{-1}\dfrac{12}{13} + \sec^{-1}\dfrac{5}{3} + \csc^{-1}\dfrac{13}{12}$  is equal to

   (1) $2\pi$          (2) $\pi$          (3) 0          (4) $\tan^{-1}\dfrac{12}{65}$

3.   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) $|\alpha| > \dfrac{1}{\sqrt{2}}$

4.   If $\sin^{-1}x + \sin^{-1}y + \sin^{-1}z = \dfrac{3\pi}{2}$ , the value of $x^{2017} + y^{2018} + z^{2019} - \dfrac{9}{x^{101} + y^{101} + z^{101}}$ is

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

5.   The domain of the function defined by $f(x) = \sin^{-1}\sqrt{x-1}$ is

   (1)[1,2]          (2)[-1,1]          (3)[0,1]          (4)[-1,0]

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

7.   If $\cot^{-1}2$ and $\cot^{-1}3$ are two angles of a triangle , then the third angle is

   (1) $\dfrac{\pi}{4}$          (2) $\dfrac{3\pi}{4}$          (3) $\dfrac{\pi}{6}$          (4) $\dfrac{\pi}{3}$

8.   If $\cot^{-1}\left(\sqrt{\sin\alpha}\right) + \tan^{-1}\left(\sqrt{\sin\alpha}\right) = \mu$ , then $\cos 2\mu$ is equal to

   (1) $\tan^2\alpha$          (2)0          (3)-1          (4) $\tan 2\alpha$

9.   The equation $\tan^{-1}x - \cot^{-1}x = \tan^{-1}\left(\dfrac{1}{\sqrt{3}}\right)$ has

   (1)No solution          (2) unique solution          (3) two solution          (4) infinite number of solution

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

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

## II ANSWER ANY 5 QUESTIONS:                     5X2=10

11. Find the principal value of $\sin^{-1}\left(-\dfrac{1}{2}\right)$ (in radians and degrees)

12. Find the principal value of $\sin^{-1}\left(\sin\left(\dfrac{5\pi}{6}\right)\right)$

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

14. Find the value of $\tan^{-1}\left(\tan\left(\dfrac{5\pi}{4}\right)\right)$

15. Find the principal value of $\cos ec^{-1}\left(-\sqrt{2}\right)$

16. Find the value of $\sin^{-1}\left(\sin\dfrac{5\pi}{9}\cos\dfrac{\pi}{9}+\cos\dfrac{5\pi}{9}\sin\dfrac{\pi}{9}\right)$

## III ANSWER ANY 5 QUESTIONS:                     5X3=15

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

18. Find the domain of $f(x)=\sin^{-1}\left(\dfrac{|x|-2}{3}\right)+\cos^{-1}\left(\dfrac{1-|x|}{4}\right)$

19. For what value of x, the inequality $\dfrac{\pi}{2}<\cos^{-1}(3x-1)<\pi$ holds?

20. Find the value of $\cos\left(\sin^{-1}\left(\dfrac{4}{5}\right)-\tan^{-1}\left(\dfrac{3}{4}\right)\right)$

21. Show that $\cot^{-1}\left(\dfrac{1}{\sqrt{x^2-1}}\right)=\sec^{-1}x,\ |x|>1$

22. Find the value of $\cot^{-1}\left(-1\right)-\sin^{-1}\left(\dfrac{-\sqrt{3}}{2}\right)+\sec^{-1}\left(-\sqrt{2}\right)$

## III ANSWEWR THE FOLLOWING     3X5=15

23. (i) Find the value of $\cos\left[\dfrac{1}{2}-\cos^{-1}\left(\dfrac{1}{8}\right)\right]$     (ii) . Find the value of $\sin^{-1}\left(\cos\left(\sin^{-1}\left(\dfrac{\sqrt{3}}{2}\right)\right)\right)$

**(OR)**

Evaluate $\sin\left[\sin^{-1}\left(\dfrac{3}{5}\right)+\sec^{-1}\left(\dfrac{5}{4}\right)\right]$

24.  Find the value of $\tan\left(\sin^{-1}\dfrac{3}{5}+\cot^{-1}\dfrac{3}{2}\right)$

**(OR)**

Find the domain of $f(x)=\sin^{-1}\left(\dfrac{x^2+1}{2x}\right).$

25.  Find the value of $\tan^{-1}(-1)+\cos^{-1}\left(\dfrac{1}{2}\right)+\cos^{-1}\left(\dfrac{-1}{2}\right)$   (ii) Find the value of $\sin\left[\dfrac{\pi}{3}-\sin^{-1}\left(\dfrac{1}{2}\right)\right]$

**(OR)**

(i) Evaluate $\sin\left[\sin^{-1}\left(\dfrac{3}{5}\right)+\sec^{-1}\left(\dfrac{5}{4}\right)\right]$    (ii)    Prove that $\tan\left(\sin^{-1}\right)=\dfrac{x}{\sqrt{1-x^2}}$ for $|x|<1$

**CONTACT FOR HOME TUITIONS / ONLINE CLASSES**

**(9, 10, 11, 12 MATRIC /CBSE/ISC/ICSE)**

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