SUBJECT	MATHEMATICS
CLASS II PUC – A1, A2, B1, B2	Topic : INVERSE TRIGONOMETRIC FUNCTIONS

INVERSE TRIGONOMETRIC FUNCTIONS

SECTIONS	MARKS	NO OF QUESTIONS	TOTAL MARKS
PART A	1mk	1	1
PART B	2mk	2	4
PART C	3mk	1	3
		TOTAL MARKS	8

PART A - 1 MARK QUESTIONS :

1) Write the range of the function $f(x) = \sin^{-1} x$

2) Write the domain of the function $f(x) = \sin^{-1} x$

3) Write the principal value of the function $f(x) = \cos^{-1} x$

4) Write the domain of the function $f(x) = \cos^{-1} x$

5) Write the range of the function $f(x) = \tan^{-1} x$

6) Write the domain of the function $f(x) = \tan^{-1} x$

7) Write the range of the function $f(x) = \csc^{-1} x$

8) Write the domain of the function $f(x) = \csc^{-1} x$

9) Write the range of the function $f(x) = \sec^{-1} x$

10) Write the domain of the function $f(x) = \sec^{-1} x$

11) Write the principal value branch of the function $f(x) = \cot^{-1} x$

12) Write the domain of the function $f(x) = \cot^{-1} x$

13) Write possible values of x for which $2\tan^{-1} x = \cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$ holds good.

14) Find the principal value of $\csc^{-1}(-\sqrt{2})$

15) Write the possible values of x for which $\tan^{-1}(1/x) = \cot^{-1}x$

16) Find the principal value of $\cos^{-1}(-\frac{1}{2})$

17) Find the principal value of $\cot^{-1}(-\frac{1}{\sqrt{3}})$

18) Find the value of $\cos(\sec^{-1}x+\csc^{-1}x)$, $|x| \geq 1$

19) Find the principal value of $Sec^{-1}(-1)$

20) Find the principal value of $Tan^{-1}(-\sqrt{3})$.

PART B - 2 MARK QUESTIONS :

1) Write the simplest form of $\tan^{-1}\left(\sqrt{\frac{1-Cosx}{1+cosx}}\right)$, $0<x<\pi$

2) Evaluate $Sin\left(\frac{\pi}{3} - Sin^{-1}\left(-\frac{1}{2}\right)\right)$

3) Prove that $\tan^{-1}x + Cot^{-1}x = \frac{\pi}{2}$

4) Prove that $Sin^{-1}(2x\sqrt{1-x^2}) = 2Sin^{-1}x$, for $-\frac{1}{\sqrt{2}} \le x \le \frac{1}{\sqrt{2}}$

5) Write $tan^{-1}\left(\frac{Cos\,x-Sin\,x}{Cos\,x+Sin\,x}\right)$, $0<x<\pi$ in the simplest form.

6) Prove that $Sin^{-1}x + Cos^{-1}x = \frac{\pi}{2}$, $x \in [-1,1]$

7) Prove that $Sin^{-1}(2x\sqrt{1-x^2}) = 2Cos^{-1}x$, for $-\frac{1}{\sqrt{2}} \le x \le 1$

8) Write the simplest form of $tan^{-1}\left(\frac{3Cos\,x-4Sin\,x}{4Cos\,x+3Sin\,x}\right)$, if $\frac{3}{4}tanx > -1$

9) Prove that $3Sin^{-1}x = Sin^{-1}(3x - 4x^3)$, $x \in \left[-\frac{1}{2},\frac{1}{2}\right]$

10) Solve the equation , $tan^{-1}\left(\frac{1-x}{1+x}\right) = \frac{1}{2}tan^{-1}x$, (x>0)

11) Show that $2tan^{-1}x = Cos^{-1}\left(\frac{1-x^2}{1+x^2}\right)$, $x \ge 0$

12) Find the value of $Sin^{-1}\left(Sin\left(\frac{3\pi}{5}\right)\right)$

13) If $Sin\left(sin^{-1}\left(\frac{1}{5}\right) + Cos^{-1}x\right) = 1$, then find the value of x.

14) Find the value of $Cos^{-1}\left(Cos\left(\frac{13\pi}{6}\right)\right)$

15) Prove that $tan^{-1}\left(\frac{2}{11}\right) + tan^{-1}\left(\frac{7}{24}\right) = tan^{-1}\left(\frac{1}{2}\right)$

16) Write $Cot^{-1}\left(\frac{1}{\sqrt{x^2-1}}\right)$, x> 1 in the simplest form.

17) Prove that $Cot^{-1}(-x) = \pi - Cot^{-1}x$, $x \in \mathbf{R}$

18) Prove that $Sec^{-1}x + Cosec^{-1}x = \frac{\pi}{2}$, $x \in R - (-1,1)$

19) Find the value of $tan^{-1}\left(tan\left(\frac{7\pi}{6}\right)\right)$

20) Prove that $3Cos^{-1}x = Cos^{-1}(4x^3 - 3x)$, $x \in \left[-\frac{1}{2},1\right]$

21) Prove that $3Sin^{-1}x = Sin^{-1}(3x - 4x^3)$, $x \in \left[-\frac{1}{2},1\right]$

PART C - 3 MARKS QUESTIONS :

1) Solve for x : $sin^{-1}(1-x) - Sin^{-1}x = \frac{\pi}{2}$

2) Prove that $tan^{-1}x + tan^{-1}\left(\frac{2x}{1-x^2}\right) = tan^{-1}\left(\frac{3x-x^3}{1-3x^2}\right)$, $|x| < \frac{1}{\sqrt{3}}$

3) Solve for x : $tan^{-1}\left(\frac{x-1}{x-2}\right) + tan^{-1}x\left(\frac{x+1}{x+2}\right) = \frac{\pi}{4}$

4) Solve for x : $tan^{-1} 2x + tan^{-1} 3x = \frac{\pi}{4}$

5) Prove that $tan^{-1}\left(\frac{1}{2}\right) + tan^{-1}\left(\frac{2}{11}\right) + tan^{-1}\left(\frac{4}{3}\right) = \frac{\pi}{2}$

6) Write $tan^{-1}\left(\frac{\sqrt{1+x^2}-1}{x}\right)$, $x \neq 0$ in the simplest form.

7) Prove that $2tan^{-1}\left(\frac{1}{2}\right) + tan^{-1}\left(\frac{1}{7}\right) = tan^{-1}\left(\frac{31}{17}\right)$

8) Prove that $Cos^{-1}\left(\frac{4}{5}\right) + cos^{-1}\left(\frac{12}{13}\right) = cos^{-1}\left(\frac{33}{65}\right)$