

**MM 20****Inverse Trigonometric Functions****Time 45 Min****Section A 1 Mark Each**

Paper prepared by

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1. Find the principal value of $\cot^{-1}\left(-\frac{1}{\sqrt{3}}\right)$.
2. Prove that $\tan^{-1} x = \sin^{-1}\left(\frac{2x}{1+x^2}\right)$
3. Prove $\cos^{-1} x = \tan^{-1}\left(\frac{\sqrt{1-x^2}}{x}\right)$
4. Evaluate, $\cos^{-1}\left(\cos\frac{5\pi}{3}\right)$
5. Solve for x, $\sin^{-1}\frac{2\alpha}{1+\alpha^2} + \sin^{-1}\frac{2\beta}{1+\beta^2} = 2\tan^{-1} x$.
6. Prove that $\tan^{-1} t = \cot^{-1}\frac{1}{t}$

Section B 4 Marks Each

7. Express, $\tan^{-1}\left(\frac{\cos x}{1-\sin x}\right)$, $-\frac{\pi}{2} < x < \frac{\pi}{2}$ in the simplest form.
8. Prove that, $\tan^{-1} x + \tan^{-1}\frac{2x}{1-x^2} = \tan^{-1}\tan\frac{3x-x^3}{1-3x^2}$, $|x| < \frac{1}{\sqrt{3}}$.

Section C 6 Marks Each

9. If $\cos^{-1} a + \cos^{-1} b + \cos^{-1} c = \pi$, prove that $a^2 + b^2 + c^2 + 2abc = 1$.

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