73. If $\cos ecx = 1 + \cot x$ **then** $x = 2n\pi, 2n\pi + \frac{\pi}{2}$**.**

Ans: Given, $\cos ecx = 1 + \cot x$

$\Rightarrow \frac{1}{\sin x} = 1 + \frac{\cos x}{\sin x}$

$\Rightarrow \frac{1}{\sin x} = \frac{\sin x + \cos x}{\sin x}$

$\Rightarrow \sin x + \cos x = 1$

Divide whole equation by $\sqrt{2}$.

$\Rightarrow \frac{1}{\sqrt{2}}\sin x + \frac{1}{\sqrt{2}}\cos x = \frac{1}{\sqrt{2}}$

We know that $\sin\frac{\pi}{4} = \frac{1}{\sqrt{2}}$ and $\cos\frac{\pi}{4} = \frac{1}{\sqrt{2}}$. Therefore, we can write above written equation as,

$\Rightarrow \sin\frac{\pi}{4}\sin x + \cos\frac{\pi}{4}\cos x = \frac{1}{\sqrt{2}}$

Or

$\Rightarrow \cos x\cos\frac{\pi}{4} + \sin x\sin\frac{\pi}{4} = \frac{1}{\sqrt{2}}$

We know that $\cos(x - y) = \cos x\cos y + \sin x\sin y$. Therefore, we get

$\Rightarrow \cos\left(x - \frac{\pi}{4}\right) = \frac{1}{\sqrt{2}}$

$\Rightarrow \cos\left(x - \frac{\pi}{4}\right) = \cos\frac{\pi}{4}$

We know that if $\cos\theta = \cos\alpha$, then $\theta = 2n\pi \pm \alpha$. Therefore, we get

$\Rightarrow x - \frac{\pi}{4} = 2n\pi \pm \frac{\pi}{4}$

$\Rightarrow x = 2n\pi \pm \frac{\pi}{4} + \frac{\pi}{4}$

$\Rightarrow x = 2n\pi + \frac{\pi}{4} + \frac{\pi}{4}$ or $\Rightarrow x = 2n\pi - \frac{\pi}{4} + \frac{\pi}{4}$

$\Rightarrow x = 2n\pi + \frac{\pi}{2}$ or $\Rightarrow x = 2n\pi$

Thus, the given statement is true.