Trigonometric Equations Ex 11.1 Q3(vii)

We have,

$\cos 4\theta = \cos 2\theta$

$\Rightarrow \quad \cos 4\theta - \cos 2\theta = 0$

$\Rightarrow \quad 2\sin\theta.\sin 3\theta = 0$

$\Rightarrow$ either

$\sin\theta = 0$ or $\sin 3\theta = 0$

$\Rightarrow \quad \theta = n\pi, n \in z$ or $3\theta = m\pi, m \in$

Thus,

$\theta = n\pi$ or $m\frac{\pi}{3}, n, m \in z$

Trigonometric Equations Ex 11.1 Q4(i)

$\cos\theta + \cos 2\theta + \cos 3\theta = 0$

$\Rightarrow \quad \cos 2\theta + 2\cos 2\theta.\cos\theta = 0 \quad [\because \cos\theta + \cos 3\theta = 2\cos 2\theta.\cos\theta]$

$\Rightarrow \quad \cos 2\theta(1 + 2\cos\theta) = 0$

either

$\cos 2\theta = 0$ or $1 + 2\cos\theta = 0$

$\Rightarrow \quad 2\theta = (2n+1)\frac{\pi}{4}, n \in z$ or $\cos\theta = -\frac{1}{2}$

$\Rightarrow \quad \theta = (2n+1)\frac{\pi}{4}, n \in z$ or $\cos\theta = +\cos\left(\pi - \frac{\pi}{3}\right)$

or $\cos\theta = \cos 2\frac{\pi}{3}$

or $\theta = 2n\pi \pm \frac{2\pi}{3}, n \in z$

Thus,

$\theta = (2n+1)\frac{\pi}{4},$ or $\left(2n\pi \pm \frac{2\pi}{3}\right), n \in z$

Trigonometric Equations Ex 11.1 Q4(ii)

$\cos\theta + \cos 3\theta - \cos 2\theta = 0$

$\Rightarrow \quad 2\cos 2\theta.\cos\theta - \cos 2\theta = 0$

$\Rightarrow \quad \cos 2\theta(2\cos\theta - 1) = 0$

either

$\cos 2\theta = 0$ or $2\cos\theta = 1$

$\Rightarrow \quad 2\theta = (2n+1)\frac{\pi}{2}, n \in z$ or $\cos\theta = \frac{1}{2} = \cos\frac{\pi}{3}$

$\Rightarrow \quad \theta = (2n+1)\frac{\pi}{4}, n \in z$ or $\theta = 2m\pi \pm \frac{\pi}{3}, m \in z$

Trigonometric Equations Ex 11.1 Q4(iii)

$\sin\theta + \sin 5\theta = \sin 3\theta$

$\Rightarrow \quad 2\sin 3\theta.\cos 2\theta - \sin 3\theta = 0 \quad \left[\because \sin C + \sin D = 2\sin\frac{C+D}{2}.\cos\frac{C-D}{2}\right]$

$\Rightarrow \quad \sin 3\theta\left[2\cos 2\theta - 1\right] = 0$

$\Rightarrow$ either

$\sin 3\theta = 0$ or $2\cos 2\theta - 1 = 0$

$\Rightarrow \quad 3\theta = n\pi, n \in z$ or $\cos 2\theta = \frac{1}{2} = \cos\frac{\pi}{3}$

$\Rightarrow \quad \theta = \frac{n\pi}{3}, n \in z$ or $2\theta = 2m\pi \pm \frac{\pi}{3}, m \in z$

or $\theta = m\pi \pm \frac{\pi}{6}$

Thus,

$\theta = \frac{n\pi}{3}$ or $m\pi \pm \frac{\pi}{6}, n, m \in z$

********** END **********