XI – Assignment No. 15 – Trigonometrical Equations

Q1. Find the principal solutions of the following equations:-

(i) $\tan\theta = \sqrt{3}$ (ii) $\sin\theta = \frac{1}{2}$ (iii) $\sec\theta = 2$

[ANS:- (i) $\frac{\pi}{3}$ and $\frac{4\pi}{3}$ (ii) $\frac{\pi}{6}$ and $\frac{5\pi}{6}$ (iii) $\frac{\pi}{3}$ and $\frac{5\pi}{3}$]

Q2. Find the general solution of the following Trigonometrical Equations.

$\cos x = \frac{1}{2}$ [ANS:- $x = 2n\pi \pm \frac{\pi}{3}, n \in Z$]

Q3. $\tan 2\theta = -\cot(\theta + \pi/3)$ [ANS $\theta = n\pi + \frac{5\pi}{6}, n \in Z$]

Q4. $\sin 2\theta - \sin 4\theta + \sin 6\theta = 0$ [ANS $\theta = \frac{n\pi}{4}, n\pi \pm \frac{\pi}{6}, n \in Z$]

Q5. $\operatorname{cosec}\theta = -\sqrt{2}$ [ANS. $\theta = n\pi - (-1)^n \frac{\pi}{4}, n \in Z$]

Q6. $2\sin^2\theta + \sqrt{3}\cos\theta + 1 = 0$ [ANS. $\theta = 2n\pi \pm \frac{5\pi}{6}, n \in Z$]

Q7. $2\cos^2\theta + 3\sin\theta = 0$ [ANS. $\theta = n\pi + (-1)^n \frac{7\pi}{6}, n \in Z$]

Q8. $\sin x + \sin 3x + \sin 5x = 0$ [ANS. $x = \frac{n\pi}{3}$ OR, $n\pi \pm \frac{\pi}{3}, n \in Z$]

Q9. $\cos 3x + \cos x - \cos 2x = 0$ [ANS:- $x = (2n+1)\pi/4$ OR $x = 2n\pi \pm \frac{\pi}{3}, n \in Z$]

Q10. What is the most general value of θ which satisfies both of the Equations $\sin\theta = -\frac{1}{2}$ and $\tan\theta = \frac{1}{\sqrt{3}}$?

[ANS:- $\theta = 2n\pi + \frac{7\pi}{6}$, $n \in Z$]