



Question 5:

$$\begin{aligned} \text{(i) LHS} &= \sin 53^\circ \cos 37^\circ + \cos 53^\circ \sin 37^\circ \\ &= \sin 53^\circ \cos (90^\circ - 53^\circ) + \cos 53^\circ \sin (90^\circ - 53^\circ) \\ &= \sin^2 53^\circ + \cos^2 53^\circ = 1 = \text{RHS} \end{aligned}$$

$$\therefore \text{LHS} = \text{RHS}$$

$$\begin{aligned} \text{(ii) LHS} &= \cos 54^\circ \cos 36^\circ + \sin 54^\circ \sin 36^\circ \\ &= \cos 54^\circ \cos (90^\circ - 54^\circ) - \sin 54^\circ \sin (90^\circ - 54^\circ) \\ &= \cos 54^\circ \sin 54^\circ - \sin 54^\circ \cos 54^\circ \\ &= 0 = \text{RHS} \end{aligned}$$

$$\therefore \text{LHS} = \text{RHS}$$

$$\begin{aligned} \text{(iii) LHS} &= \sec 70^\circ \sin 20^\circ + \cos 20^\circ \operatorname{cosec} 70^\circ \\ &= \sec 70^\circ \sin (90^\circ - 70^\circ) + \cos 20^\circ \operatorname{cosec} (90^\circ - 20^\circ) \\ &\quad [\because \sin (90^\circ - \theta) = \cos \theta \text{ and } \operatorname{cosec} (90^\circ - \theta) = \sec \theta] \\ &= \sec 70^\circ \cos 70^\circ + \cos 20^\circ \sec 20^\circ \\ &= \left(\frac{1}{\cos 70^\circ} \times \cos 70^\circ \right) + \left(\cos 20^\circ \times \frac{1}{\cos 20^\circ} \right) \\ &= 1 + 1 = 2 = \text{RHS} \end{aligned}$$

$$\therefore \text{LHS} = \text{RHS}$$

***** END *****