



Exercise 6

Question 1:

On substituting the value of various T-ratios, we get

$$\sin 60^\circ \cos 30^\circ + \cos 60^\circ \sin 30^\circ$$

$$= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times \frac{1}{2} = \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$$

Question 2:

On substituting the value of various T-ratios, we get

$$\sin 60^\circ \cos 30^\circ - \cos 60^\circ \sin 30^\circ$$

$$= \frac{1}{2} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{2}$$

$$= \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4}$$

$$= 0$$

Question 3:

On substituting the value of various T-ratios, we get

$$\cos 45^\circ \cos 30^\circ + \sin 45^\circ \sin 30^\circ$$

$$= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2} = \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2\sqrt{2}} = \frac{\sqrt{3} + 1}{2\sqrt{2}}$$

Question 4:

On substituting the value of various T-ratios, we get

$$2 \cos^2 60^\circ + 3 \sin^2 45^\circ - 3 \sin^2 30^\circ + 2 \cos^2 90^\circ$$

$$= 2 \times \left(\frac{1}{2}\right)^2 + 3 \times \left(\frac{1}{\sqrt{2}}\right)^2 - 3 \times \left(\frac{1}{2}\right)^2 + 2(0)^2$$

$$= \frac{1}{2} + \frac{3}{2} - \frac{3}{4} \Rightarrow \frac{2+6-3}{4} = \frac{5}{4}$$

Question 5:

On substituting the value of various T-ratios, we get

$$\cot^2 30^\circ - 2 \cos^2 30^\circ - \frac{3}{4} \sec^2 45^\circ + \frac{1}{4} \operatorname{cosec}^2 30^\circ$$

$$= (\sqrt{3})^2 - 2 \times \left(\frac{\sqrt{3}}{2}\right)^2 - \frac{3}{4} \times \left(\frac{\sqrt{2}}{1}\right)^2 + \frac{1}{4} \times (2)^2$$

$$= 3 - 2 \times \frac{3}{4} - \frac{3}{4} \times 2 + \frac{1}{4} \times 4$$

$$= 3 - \frac{3}{2} - \frac{3}{2} + 1$$

$$= \frac{6-3-3+2}{2}$$

$$= \frac{2}{2} = 1$$

***** END *****