Exercise 6

Question 1:
On substituting the value of various T-ratios, we get
sin60° cos30° + cos60° sin30°
$= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times \frac{1}{2} = \frac{3}{4} + \frac{1}{4} = \frac{4}{4} = 1$

Question 2:
On substituting the value of various T-ratios, we get
sin60° cos30° - cos60° sin30°
$= \frac{1}{2} \times \frac{\sqrt{3}}{2} - \frac{\sqrt{3}}{2} \times \frac{1}{2}$
$= \frac{\sqrt{3}}{4} - \frac{\sqrt{3}}{4}$
$= 0$

Question 3:
On substituting the value of various T-ratios, we get
cos45° cos30° + sin40° sin30°
$= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2} + \frac{1}{\sqrt{2}} \times \frac{1}{2} = \frac{\sqrt{3}}{2\sqrt{2}} + \frac{1}{2\sqrt{2}} = \frac{\sqrt{3}+1}{2\sqrt{2}}$

Question 4:
On substituting the value of various T-ratios, we get
$2\cos^2 60° + 3\sin^2 45° - 3\sin^2 30° + 2\cos^2 90°$
$= 2 \times \left(\frac{1}{2}\right)^2 + 3 \times \left(\frac{1}{\sqrt{2}}\right)^2 - 3 \times \left(\frac{1}{2}\right)^2 + 2(0)^2$
$= \frac{1}{2} + \frac{3}{2} - \frac{3}{4} \Rightarrow \frac{2+6-3}{4} = \frac{5}{4}$

Question 5:
On substituting the value of various T-ratios, we get
$\cot^2 30° - 2\cos^2 30° - \frac{3}{4}\sec^2 45° + \frac{1}{4}\operatorname{cosec}^2 30°$
$= \left(\sqrt{3}\right)^2 - 2 \times \left(\frac{\sqrt{3}}{2}\right)^2 - \frac{3}{4} \times \left(\frac{\sqrt{2}}{1}\right)^2 + \frac{1}{4} \times (2)^2$
$= 3 - 2 \times \frac{3}{4} - \frac{3}{4} \times 2 + \frac{1}{4} \times 4$
$= 3 - \frac{3}{2} - \frac{3}{2} + 1$
$= \frac{6-3-3+2}{2}$
$= \frac{2}{2} = 1$

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