

## NCERT Maths Solutions by Dev Anoop (Bathinda) Ex 8.2

$$\begin{aligned}
 1 \text{ (i)} \quad & \sin 60^\circ \cos 30^\circ + \sin 30^\circ \cos 60^\circ \\
 &= \frac{\sqrt{3}}{2} \times \frac{\sqrt{3}}{2} + \frac{1}{2} \times \frac{1}{2} \\
 &= \frac{3}{4} + \frac{1}{4} \\
 &= \frac{4}{4} \\
 &= 1
 \end{aligned}$$

$$\begin{aligned}
 1 \text{ (ii)} \quad & 2 \tan^2 45^\circ + \cos^2 30^\circ - \sin^2 60^\circ \\
 &= 2 \times 1^2 + \left(\frac{\sqrt{3}}{2}\right)^2 - \left(\frac{\sqrt{3}}{2}\right)^2 \\
 &= 2 + \frac{3}{4} - \frac{3}{4} \\
 &= 2
 \end{aligned}$$

$$\begin{aligned}
 1 \text{ (iii)} \quad & \frac{\cos 45^\circ}{\sec 30^\circ + \operatorname{cosec} 30^\circ} \\
 &= \frac{\frac{1}{\sqrt{2}}}{\frac{2}{\sqrt{3}} + \frac{2}{1}} \\
 &= \frac{\frac{1}{\sqrt{2}}}{\frac{2+2\sqrt{3}}{\sqrt{3}}} \\
 &= \frac{1}{\sqrt{2}} \times \frac{\sqrt{3}}{2+2\sqrt{3}} \\
 &= \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}(2-2\sqrt{3})}{(2+2\sqrt{3})(2-2\sqrt{3})}
 \end{aligned}$$

$$\begin{aligned}
 &= \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}(2-2\sqrt{3})}{4-4 \times 3} \\
 &= \frac{\sqrt{2}}{2} \times \frac{\sqrt{3}(2-2\sqrt{3})}{4-12} \\
 &= \frac{2\sqrt{6}(1-\sqrt{3})}{2 \times (-8)} \\
 &= \frac{\sqrt{18} - \sqrt{6}}{8} \\
 &= \frac{3\sqrt{2} - \sqrt{6}}{8}
 \end{aligned}$$

$$\begin{aligned}
 1 \text{ (iv)} \quad & \frac{\sin 30^\circ + \tan 45^\circ - \operatorname{cosec} 60^\circ}{\sec 30^\circ + \cos 60^\circ + \cot 45^\circ} \\
 &= \frac{\frac{1}{2} + 1 - \frac{2}{\sqrt{3}}}{\frac{2}{\sqrt{3}} + \frac{1}{2} + 1} \\
 &= \frac{\sqrt{3} + 2\sqrt{3} - 4}{2\sqrt{3}} \\
 &= \frac{4 + \sqrt{3} + 2\sqrt{3}}{2\sqrt{3}} \\
 &= \frac{3\sqrt{3} - 4}{3\sqrt{3} + 4} \times \frac{3\sqrt{3} - 4}{3\sqrt{3} - 4} \\
 &= \frac{(3\sqrt{3} - 4)^2}{(3\sqrt{3})^2 - 4^2} \\
 &= \frac{27 + 16 - 24\sqrt{3}}{27 - 16} \\
 &= \frac{43 - 24\sqrt{3}}{11}
 \end{aligned}$$