

Question 3:

(i)
$$\frac{\sin 50^{\circ}}{\cos 40^{\circ}} + \frac{\cos \cot 40^{\circ}}{\sec 50^{\circ}} - 4\cos 52^{\circ} \cos \cot 38^{\circ}$$

$$\Rightarrow \frac{\sin (90^{\circ} - 40^{\circ})}{\cos 40^{\circ}} + \frac{\cos \cot (90^{\circ} - 50^{\circ})}{\sec 50^{\circ}} - 4\cos (90^{\circ} - 38^{\circ}) \cos \cot 38^{\circ}$$

$$= \frac{\cos 40^{\circ}}{\cos 40^{\circ}} + \frac{\sec 50^{\circ}}{\sec 50^{\circ}} - \frac{4\sin 38^{\circ}}{\sin 38^{\circ}}$$

$$= 1 + 1 - 4 = -2$$
(ii)
$$\frac{\cos 75^{\circ}}{\sin 15^{\circ}} + \frac{\sin 12^{\circ}}{\cos 78^{\circ}} - \cos 18^{\circ} \cos \cot 2^{\circ}$$

$$= \frac{\cos (90^{\circ} - 15^{\circ})}{\sin 15^{\circ}} + \frac{\sin (90^{\circ} - 78^{\circ})}{\cos 78^{\circ}} - \cos (90^{\circ} - 72^{\circ}) \cos \cot 2^{\circ}$$

$$[\because \sin (90^{\circ} - \theta) = \cos \theta \text{ and } \cos (90^{\circ} - \theta) = \sin \theta]$$

$$= \frac{\sin 15^{\circ}}{\sin 15^{\circ}} + \frac{\cos 78^{\circ}}{\cos 78^{\circ}} - \sin 72^{\circ} \cos \cot 2^{\circ}$$

$$= 1 + 1 - 1 = 1$$
(iii)
$$\frac{2\cos \cot 67^{\circ}}{\sec 23^{\circ}} - \frac{\tan 70^{\circ}}{\cot 20^{\circ}} - \cos 0^{\circ} + \tan 38^{\circ} \tan 52^{\circ}$$

$$= \frac{2\cos \cot (90^{\circ} - 23^{\circ})}{\cot 20^{\circ}} - \frac{\tan (90^{\circ} - 20^{\circ})}{\cot 20^{\circ}}$$

$$- \cos 0^{\circ} + \tan (90^{\circ} - 52^{\circ}) \tan 52^{\circ}$$

$$[\because \sin (90^{\circ} - \theta) = \cos \theta \text{ and } \cos (90^{\circ} - \theta) = \sin \theta]$$

$$= \frac{2\sec 23^{\circ}}{\sec 23^{\circ}} - \frac{\cot 20^{\circ}}{\cot 20^{\circ}} - \cos 0^{\circ} + \cot 52^{\circ} \tan 52^{\circ}$$

$$= 2 - 1 - 1 + \frac{\tan 52^{\circ}}{\tan 52^{\circ}} = 2 - 1 - 1 + 1 = 1$$
(iv)
$$\frac{\tan 76^{\circ}}{\cot 14^{\circ}} + \frac{\sec 58^{\circ}}{\cos \cos 32^{\circ}} - \sin 35^{\circ} \sec 55^{\circ} - 8\sin^{2} 30^{\circ}$$

$$= \frac{\cot 14^{\circ}}{\cot 14^{\circ}} + \frac{\sec (90^{\circ} - 32^{\circ})}{\cos \cos 32^{\circ}} - \sin (90^{\circ} - 55^{\circ}) \sec 55^{\circ} - 8\sin^{2} 30^{\circ}$$

$$= \frac{\cot 14^{\circ}}{\cot 14^{\circ}} + \frac{\cos \cot 32^{\circ}}{\cos \cot 32^{\circ}} - \frac{\cos 55^{\circ}}{\cos 55^{\circ}} - 8 \sin^{2} 30^{\circ}$$

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$$= \frac{\cot 14^{\circ}}{\cot 14^{\circ}} + \frac{\cos 32^{\circ}}{\cot 14^{\circ}} - \frac{\cos 52^{\circ}}{\cot 14^{\circ}} - \frac{\cos$$

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