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Question 6:
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(i)

LHS = tan 35° tan 40° tan 45° tan 50° tan 55°

- = tan 35° tan 40° tan 45° tan (90° 40°) tan (90° 35°)
- = tan 35° tan 40° tan 45° cot 40° cot 35°

$$= \left(\tan 35^{\circ} \times \frac{1}{\tan 35^{\circ}}\right) \times \left(\tan 40^{\circ} \times \frac{1}{\tan 40^{\circ}}\right) \times \tan 45^{\circ}$$

- $= 1 \times 1 \times 1 = 1 = RHS$
- : LHS = RHS

(ii)

LHS = tan 1° tan 10° tan 20° tan 70° tan 80° tan 89°

- = tan 1° tan 10° tan 20° tan (90° 20°) tan (90° 10°) tan (90° 1°)
- = tan 1° tan 10° tan 20° cot 20° cot 10° cot 1°

=
$$\tan 1^{\circ} \tan 10^{\circ} \tan 20^{\circ} \times \frac{1}{\tan 20^{\circ}} \times \frac{1}{\tan 10^{\circ}} \times \frac{1}{\tan 1^{\circ}}$$

- = 1 = RHS
- : LHS = RHS

(iii)

LHS = tan 5° tan 25° tan 30° tan 65° tan 85°

- = tan5° tan25° × tan30° tan (90° 25°) tan (90° 30°)
- = tan5° tan25°× tan30° × cot 25° cot 5°

$$= \tan 5^{\circ} \tan 25^{\circ} \times \frac{1}{\sqrt{3}} \times \frac{1}{\tan 25^{\circ}} \times \frac{1}{\tan 5^{\circ}} = \frac{1}{\sqrt{3}}$$

= RHS

: LHS = RHS

- (iv) LHS = cot10°cot20° cot60°cot70° cot°
- $= \cot 10^{\circ} \cot 20^{\circ} \cot 60^{\circ} \cot (90^{\circ} 20^{\circ}) \cot (90^{\circ} 10^{\circ})$
- = cot10° cot20° cot60° tan20° tan10°

$$=\frac{1}{\tan 10^{\circ}} \times \frac{1}{\tan 20^{\circ}} \times \frac{1}{\sqrt{3}} \times \tan 20^{\circ} \times \tan 10^{\circ} = \frac{1}{\sqrt{3}}$$

= RHS

: LHS = RHS

- (v) cosec15°cosec355°cosec55°cosec60°cosec75°
- $= \cos 15^{\circ} \cos 35^{\circ} \cos ec(90^{\circ} 35^{\circ}) \cos 60^{\circ} \cos ec(90^{\circ} 15^{\circ})$
- = cos 15° cos 35° sec 35° cos 60° sec 15°

=
$$\cos 15^{\circ} \cos 35^{\circ} \times \frac{1}{\cos 35^{\circ}} \times \frac{1}{2} \times \frac{1}{\cos 15^{\circ}} = \frac{1}{2} = RHS$$

: LHS = RHS

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