

$\lim_{x \rightarrow 0} \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}$  is equal to :

(1) 3

(2) 2

(3)  $\frac{1}{2}$

(4) 4

**Solution**

We have,  $\lim_{x \rightarrow 0} \frac{(1 - \cos 2x)(3 + \cos x)}{x \tan 4x}$

$$= \lim_{x \rightarrow 0} \frac{1 - \cos 2x}{x \tan 4x} \times \lim_{x \rightarrow 0} (3 + \cos x)$$

$$= \lim_{x \rightarrow 0} \frac{2 \sin^2 x}{x} \times \frac{4x}{\tan 4x} \times \frac{1}{4x} \times (3 + \cos 0)$$

$$= \lim_{x \rightarrow 0} \frac{1}{2} \times \frac{\sin^2 x}{x^2} \times \frac{4x}{\tan 4x} \times (3 + 1)$$

$$= \frac{1}{2} \times 1^2 \times 1 \times 4 = 2$$

Hence, option (2).