DOPREP

$\lim\limits_{x\to 0} \dfrac{(1-\cos 2x)(3+\cos x)}{x\tan 4x}$ is equal to :

(1) 2

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

(3) 4

(4) 3

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

$\cos 2x = \cos^2 x - \sin^2 x$

$\tan 4x = \dfrac{4\tan x}{(1-\tan^2 x)(1-\tan^2 2x)}$

$$\therefore \lim_{x\to 0} \frac{2\sin^2 x(3+\cos x)}{(4x\tan x)/(1-\tan^2 x)(1-\tan^2 2x)}$$

$$\Rightarrow \frac{1}{2}\lim_{x\to 0}\left(\frac{\sin x}{x}\right)(3+\cos x)(1-\tan^2 x)(1-\tan^2 2x)(\cos x)$$

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

Correct option is (1)