

$$\int \cos 5x \cos 6x dx$$

$$\cos A \cos B = \frac{1}{2} [\cos(A+B) + \cos(A-B)]$$

$$= \frac{1}{2} [\cos 11x + \cos(-x)]$$

$$\cos(-x) = \cos x$$

$$= \frac{1}{2} [\cos 11x + \cos x]$$

$$\int \cos 5x \cos 6x dx = \frac{1}{2} \int (\cos 11x + \cos x) dx$$

$$= \frac{1}{2} \left( \frac{\sin 11x}{11} + \frac{\sin x}{1} \right) + C$$

$$\therefore \int \cos 5x \cos 6x dx = \frac{\sin 11x}{22} + \frac{\sin x}{2} + C$$

$$5 \int \sin 7x \cos 2x dx$$

$$\sin 7x \cos 2x = \frac{1}{2} [\sin 9x + \sin 5x]$$

$$\int \sin 7x \cos 2x dx = \frac{1}{2} \int (\sin 9x + \sin 5x) dx$$

$$= -\frac{1}{2} \left[ \frac{\cos 9x}{9} + \frac{\cos 5x}{5} \right] + C$$

$$= -\frac{\cos 9x}{18} - \frac{\cos 5x}{10} + C$$

$$\therefore \int \sin 7x \cos 2x dx = -\frac{\cos 9x}{18} - \frac{\cos 5x}{10} + C$$