

5 (b)

$$\begin{array}{lcl} \text{PCM} & m(u \cos 45) + m(0) & = mv_1 + mv_2 \\ \text{NEL} & v_1 - v_2 & = -e(u \cos 45 - 0) \end{array}$$

$$\Rightarrow v_1 = \frac{u}{2\sqrt{2}}(1-e)$$

$$\begin{aligned} \tan \theta &= \frac{\frac{u}{\sqrt{2}}}{\frac{u}{2\sqrt{2}}(1-e)} \\ &= \frac{2}{1-e} \end{aligned}$$

$$\begin{aligned} \tan \alpha &= \tan(\theta - 45) \\ &= \frac{\tan \theta - 1}{1 + \tan \theta} \\ &= \frac{\frac{2}{1-e} - 1}{1 + \frac{2}{1-e}} \end{aligned}$$

$$\tan \alpha = \frac{1+e}{3-e}$$

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