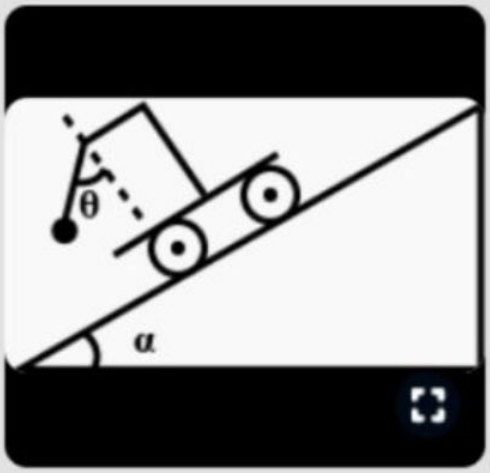
A pendulum of mass m hangs from a support fixed to a trolley. The direction of the string (ie angle θ) when the trolley rolls up a plane of inclination α with acceleration a is :



A zero

B $\tan^{-1} \alpha$

C $\tan^{-1} \frac{\alpha + g \sin \alpha}{g \cos \alpha}$

D $\tan^{-1} \frac{a}{g}$

Correct option is C)

$T \sin\theta = ma\alpha + mg \sin\alpha$

$T \cos\theta = mg \cos\alpha$

$$\tan\theta = \left(\frac{\alpha + g \sin\alpha}{g \cos\alpha}\right)$$

Hence,

option (C) is correct answer.