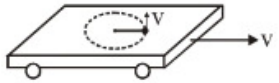
QUES 01:-

On a train moving along east with a constant speed v, a boy revolves a bob with string of length ℓ on smooth surface of a train, with equal constant speed v relative to train. Mark the correct option(s).

(A) Maximum speed of bob is 2 v in ground frame.

(B) Tension in string connecting bob is $\frac{4mv^2}{\ell}$ at an instant.



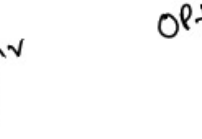
(C) Tension in string is $\frac{mv^2}{\ell}$ at all the moments.

(D) Minimum speed of bob is zero in ground frame.

Soln:→ Train is moving with velocity v and is inertial frame.

in the frame of train; no Pseudo force will act on the Bob.

Option A, D]



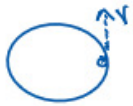
$V_{BOB/train} = +v\hat{i}$

$V_{train/ground} = v\hat{i}$

$V_{BOB/ground} = 2v\hat{i}$

Similarly $V_{min} = 0$

Option B]



Bob is in circular motion in the frame of train; so the eqn of circular motion will be used in the frame of train.

$$\frac{mv^2}{r} = T$$

Option C] always (v constant in circular motion)

↳ here it is in train frame.