MOTORCYCLIST ON A CURVED PATH

A cyclist having mass m moving with constant speed v on a curved path

We divide the motion of the cyclist in four parts :

1	From A to B	2	From B to C	3	From C to D	4	From D to E

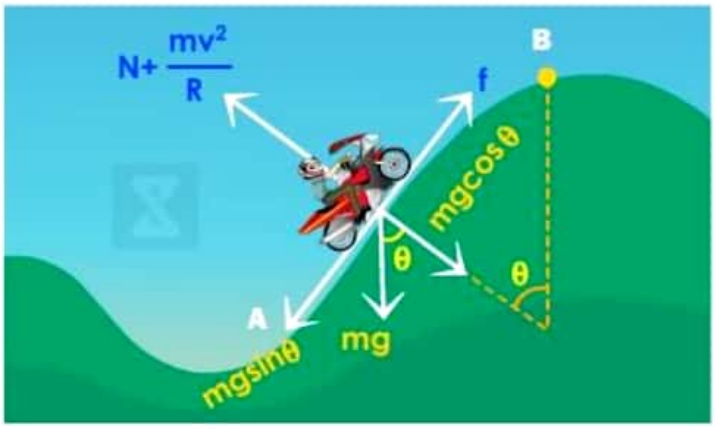
MOTION OF CYCLIST FROM A TO B

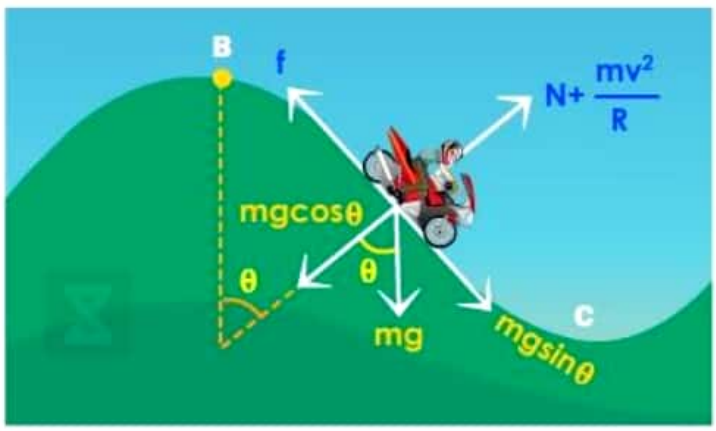
(1 and 3 are same type of motion)

$$N + \frac{mv^2}{R} = mg\cos\theta \quad : \quad f = mg\sin\theta$$

AS CYCLIST MOVE UPWARD

In 1 and 3 normal force increases but frictional force decreases because θ decreases.





MOTION OF CYCLIST FROM B TO C

$$N + \frac{mv^2}{R} = mg\cos\theta \implies N = mg\cos\theta - \frac{mv^2}{R}$$

$$f = mg\sin\theta$$

From B to C, Normal force decreases but friction force increases because θ increases.

MOTION OF CYCLIST FROM D TO E

$$N = \frac{mv^2}{R} + mg\cos\theta \quad : \quad f = mg\sin\theta$$

From D to E, 'θ' decreases therefore mg cosθ increases whereas Normal force increases but frictional force decreases.