A 50 kg skier is going down a hill sloped at 37 degrees. The coefficient of kinetic friction between the skies and the snow is .15.

A.Calculate the force down the hill.

B.Calculate the Normal force.

C.Find the frictional force.

D.Find the acceleration of skier.

E.How fast in the skier going 5.0 sec after starting from rest?

Solution:

Let:

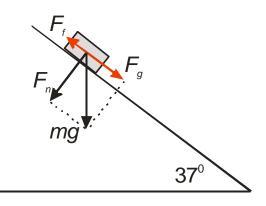$m = 50 \; kg$

$\alpha = 37°$

$\mu k = 0.15$

$t = 5 \; sec$

$F_g-?\; Force \; down \; the \; hill$

$F_n-?\; Normal \; force$

$F_f-?\; Frictional \; force$

$a-?\; Acceleration$

$v-?$

$F_g = mgcos\alpha = 50 * 9.8 * cos37° = 392 \; N$

$F_n = mgsin\alpha = 50 * 9.8 * sin37° = 352.8 \; N$

$F_f = \mu k F_g = 0.15 * 392 = 58.8 \; N$

$a = \frac{F_g - F_f}{m} = \frac{392 - 58.8}{50} = 6.664 \; m/s^2$

$v = at = 6.664 * 5 = 33.32 \; m/s$

Answers: $F_g = 392\ N,\ F_n = 352.8\ N, F_f = 58.8\ N, a = 6.664\ m/s^2, v = 33.32\ m/s.$