Quiz#4 Ch5&6-1

Name: ID#: Sec#:

Given the information below, calculate the friction forces between the block m and the surface indicating its direction and tell whether they are static or kinetic friction.

$$F\_{N}$$

$$F=4 N, m=1.0 kg, μ\_{k}=0.3 and μ\_{s}=0.5$$

(Hint: first, find$ f\_{smax}$)

$$f\_{s}$$

F

1. (2 points)

m

mg

$$F\_{N}=mg$$

$$f\_{smax}=μ\_{s}F\_{N}=μ\_{s}mg=0.5×1.0×9.8=4.9 N$$

$f\_{smax}>F ⟹ there is no motion ⟹ f=f\_{s}=F$

Fsin30

F

m

$$F\_{N}$$

$$f\_{s}$$

$$30^{o}$$

1. (3 points)

Fcos30

mg

$$F\_{N}=mg-Fsin30=1.0×9.8-4sin30=7.8 N$$

$f\_{smax}=0.5×7.8=3.9 N , Fcos30=4×cos30=3.46 N $

$$f\_{smax}>Fcos30 ⟹ there is no motion ⟹ f= f\_{s}=Fcos30=3.46 N$$

The direction of $f\_{s}$ is up since mgsinθ > F

F

$$F\_{N}$$

1. (5 points)

$$f\_{s}$$

m

$$mgsin30$$

$$mgcos30$$

$$30^{o}$$

$$F\_{N}=mgcos30=1.0×9.8×cos30=8.49N$$

$mgsin30$$ =4.9 N$

mg

$f\_{smax}=0.5×8.49=4.25 N, mgsin30-F=0.9 N$

$$f\_{smax}> mgsin30-F ⟹ there is no motion$$

$$ and f=f\_{s}=mgsin30-F=0.9 N$$