# Suggested problems
Chapter 06

The quiz questions will be same or very similar to the following text-book problems.
Refer to the course website for the latest version of this document.
You are encouraged to seek the help of your instructor during his office hours.

5. A 2.5 kg block is initially at rest on a horizontal surface. A horizontal force $\vec{F}$ of magnitude 6.0 N and a vertical force $\vec{P}$ are then applied to the block (Fig. 6-17).The coefficients of friction for the block and surface are $\mu_s = 0.40$ and $\mu_k = 0.25$. Determine the magnitude of the frictional force acting on the block if the magnitude of $\vec{P}$ is (a) 8.0 N, (b) 10 N, and (c) 12 N?


Fig. 6-17 Problem 5.
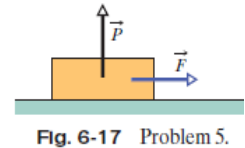
Answer: (a) 6.0 N; (b) 3.6 N; (c) 3.1 N

9. A 3.5 kg block is pushed along a horizontal floor by a force $\vec{F}$ of magnitude 15 N at an angle $\theta = 40°$ with the horizontal (Fig. 6-19). The coefficient of kinetic friction between the block and the floor is 0.25. Calculate the magnitudes of (a) the frictional force on the block from the floor and (b) the block's acceleration.


Fig. 6-19
Problems 9 and 32.
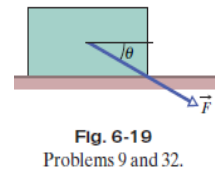
Answer: (a) 11 N; (b) 0.14 m/s^2

17. In Fig. 6-24, a force $\vec{P}$ acts on a block weighing 45 N. The block is initially at rest on a plane inclined at angle $\theta =15°$ to the horizontal. The positive direction of the x axis is up the plane. The coefficients of friction between block and plane are $\mu_s = 0.50$ and $\mu_k = 0.34$. In unit-vector notation, what is the frictional force on the block from the plane when $\vec{P}$ is (a) $(-5.0\text{ N})\hat{\text{i}}$, (b) $(-8.0\text{ N})\hat{\text{i}}$,and (c) $(-15\text{ N})\hat{\text{i}}$?
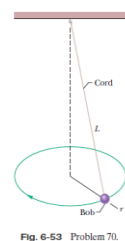

Fig. 6-24 Problem 17.
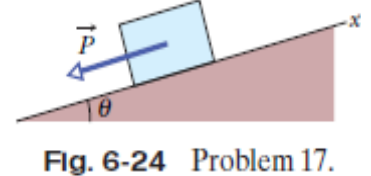
Answer: (a) (17 N)$\hat{\text{i}}$; (b) (20 N)$\hat{\text{i}}$ (c) (15N)$\hat{\text{i}}$

19. A 12 N horizontal force $\vec{F}$ pushes a block weighing 5.0 N against a vertical wall (Fig. 6-26).The coefficient of static friction between the wall and the block is 0.60, and the coefficient of kinetic friction is 0.40. Assume that the block is not moving initially. (a) Will the block move? (b) In unit-vector notation, what is the force on the block from the wall?

Fig. 6-26 Problem 19.
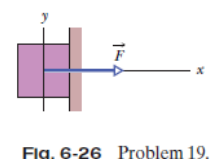
Answer: (a) no; (b) $(-12\,N)\hat{\text{i}} + (5.0\,N)\hat{\text{j}}$

70. Figure 6-53 shows a conical pendulum, in which the bob (the small object at the lower end of the cord) moves in a horizontal circle at constant speed. (The cord sweeps out a cone as the bob rotates.) The bob has a mass of 0.040 kg, the string has length L = 0.90 m and negligible mass, and the bob follows a circular path of circumference 0.94 m. What are (a) the tension in the string and (b) the period of the motion?

Fig. 6-53 Problem 70.

Answer: (a) 0.40 N (b) 1.9 s