17. (a) Although details in Fig. 6-27 might suggest otherwise, we assume (as the problem states) that only static friction holds block B in place. An excellent discussion and equation development related to this topic is given in Sample Problem 6-3. We merely quote (and apply) their main result (Eq. 6-13) for the maximum angle for which static friction applies (in the absence of additional forces such as the $\vec{F}$ of part (b) of this problem).

$$\theta_{\max} = \tan^{-1} \mu_s = \tan^{-1} 0.63 \approx 32^\circ \ .$$

This is greater than the dip angle in the problem, so the block does not slide.

(b) We analyze forces in a manner similar to that shown in Sample Problem 6-3, but with the addition of a downhill force F.

$$\begin{aligned} F + mg\sin\theta - f_{s,\max} &= ma = 0 \\ N - mg\cos\theta &= 0 \ . \end{aligned}$$

Along with Eq. 6-1 ($f_{s,\max} = \mu_s N$) we have enough information to solve for F. With $\theta = 24^\circ$ and $m = 1.8 \times 10^7$ kg, we find

$$F = mg\,(\mu_s \cos\theta - \sin\theta) = 3.0 \times 10^7 \text{ N} \ .$$