

UNIT 5 EXERCISES

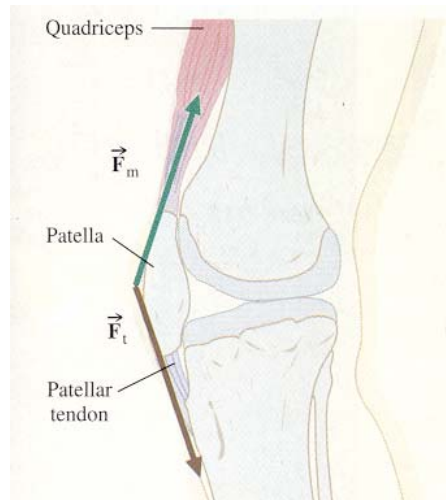
1) A skier has just begun descending a 30° slope. Assuming the coefficient of kinetic friction is 0.10,

a) draw a force diagram

b) find her acceleration

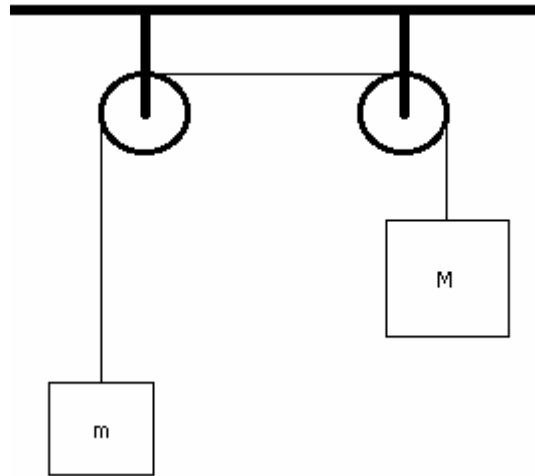
c) suppose, instead the snow is slushy and she moves down the hill at a constant speed. What will the coefficient of kinetic friction be? Show your work.

2) Determine the net compressive force acting on the patella as a result of the action of the quadriceps muscle (F_m upward) and the patellar tendon (F_t downward) as shown in the diagram below. Take the angle between the muscle group and the tendon to be 160° , and assume the leg is bent symmetrically so that $F_m = F_t = 100\text{N}$. Show your work.



(From *Physics: Algebra/Trig Second Edition*, Brooks/Cole Publishing Company, 1998.)

3) The diagram below shows two masses free to move, $M = 50\text{kg}$ and $m = 20\text{kg}$, connected by a massless cable on two frictionless pulleys.



- Draw a force diagram for each mass.
- Are the masses accelerating? Compare the acceleration of mass M and mass m . Explain.
- Find the tensile force in the cable. Show your work.
- Find the acceleration of each mass. Show your work.