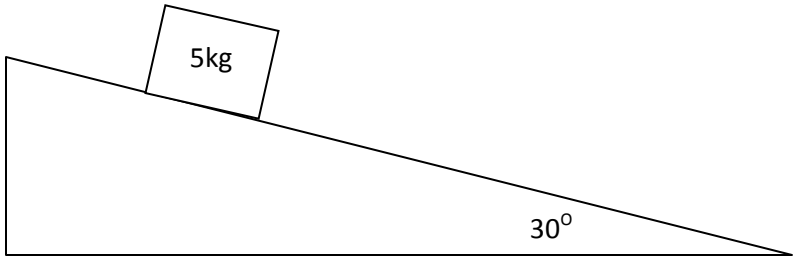
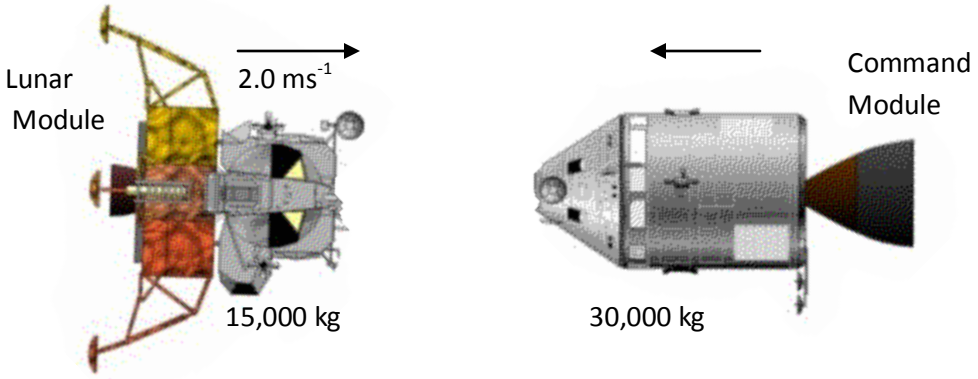
Higher Physics Assessment 004

1) A package of 5 kg slides down a bench which is at an angle of 30^O to the horizontal as shown.



   a) Calculate the package`s weight component parallel to the slope.
   b) If the force of friction acting on the package is 4.5 N show that the package accelerates down the slope at 4 ms^{-2}
   c) The package starts down the slope from rest and takes 1.5 seconds to reach the bottom. Find the distance the package moved down the slope.

2) In 1969 two spacecraft joined together to take men to the moon. Prior to landing the two spacecraft had to join together or dock as they say.
   The lunar module had a mass of 15,000kg and the command module had a mass of 30,000kg.
   The lunar module approached the command module with a velocity of 2.0 ms^{-1}



   a) The two spacecraft dock and immediately come to a stop. What would be the velocity of the command module before the collision for this to happen?
   b) Calculate the total kinetic energy before and after the docking and show that the docking is inelastic.