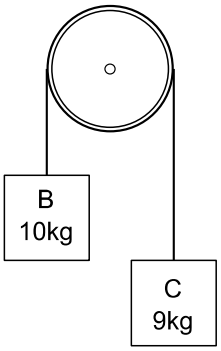
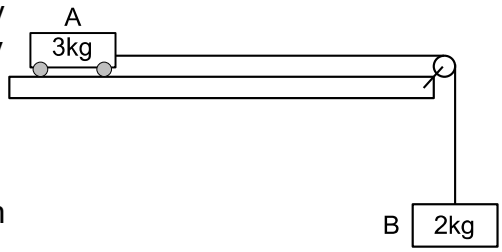
Newton's Laws – 2 – Practice

1. The engine of a car produces a driving force of 1800 N. The car has a mass of 1200 kg (including driver) and pulls a trailer of mass 600 kg.
   The resistive force on the car is 200 N. The resistive force on the trailer is 100 N.
   Calculate the acceleration and the tension in the tow-bar. *(0.83 m/s^2, 600 N)*

2. Particle B, mass 10kg, is joined to to particle C, mass 9kg, by a light string which passes over a smooth, light pulley.
   The particles are released from rest with the string taut.
   Calculate the acceleration of the masses and the tension in the string. *(0.52 m/s^2, 93 N)*



3. A trolley A (3kg) and mass B (2kg) are joined by a light string which passes over a smooth pulley fixed at the edge of a horizontal table.
   Initially, A is held at rest on the table while B hangs freely over the side.



   (a) Calculate the acceleration which the system will have when mass A is released. *(3.93 m/s^2)*

   (b) Calculate the tension in the string. *(11.8 N)*

   (c) Mass B is replaced by mass C. The acceleration is now 4.9m/s^2. Calculate the mass of C. *(3kg)*

4. Particles P and Q are joined by a string passing over a pulley.
   P has a mass of 11 kg. P is accelerating downwards at 2.2 m/s^2.

   Calculate:
   (i) the tension in the string, *(84N)*
   (ii) the mass of particle Q. *(7.0kg)*