10E Connected Particles

1. Two particles, P and Q, of masses 5kg and 3kg respectively, are connected by a light inextensible string. Particle P is pulled by a horizontal force of magnitude 40N along a rough horizontal plane. Particle P experiences a frictional force of 10N and particle Q experiences a frictional force of 6N.

a) Find the acceleration of the particles

b) Find the tension in the string

c) Explain how the modelling assumptions that the string is light and inextensible have been used

2. A light scale-pan is attached to a vertical light inextensible string. The scale pan carries two masses, A and B. The mass of A is 400g and the mass of B is 600g. A rests on top of B.

   The scale pan is raised vertically with an acceleration of 0.5ms^{-2}.

a) Find the Tension in the string

b) Find the force exerted on mass B by mass A

c) Find the force exerted on mass B by the scale pan

C Alt (Consider particles as one)