

1. (25%)

Block A has a mass m , is released from rest. It falls a distance h and strikes the plate B which has a mass of $2m$. If the coefficient of restitution between A and B is e , please determine the velocity of the plate just after the collision. The spring has a stiffness k . (Fig.1)

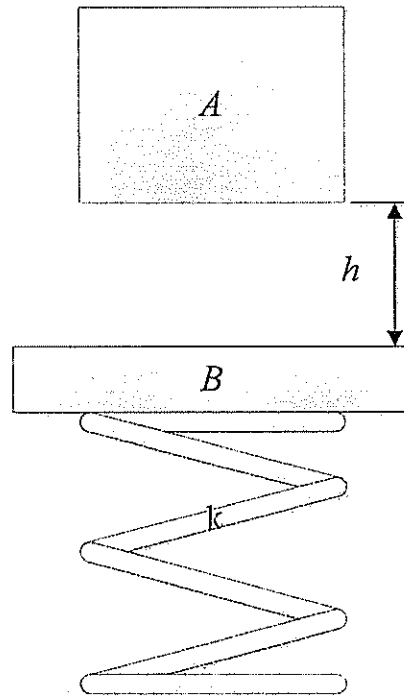


Fig. 1

2. (25%)

If the 75 kg crate starts from rest at A , determine its speed when it reaches point B . The cable is subjected to a constant force of $F=300\text{N}$. Neglect friction and the pulley size. (Fig.2)

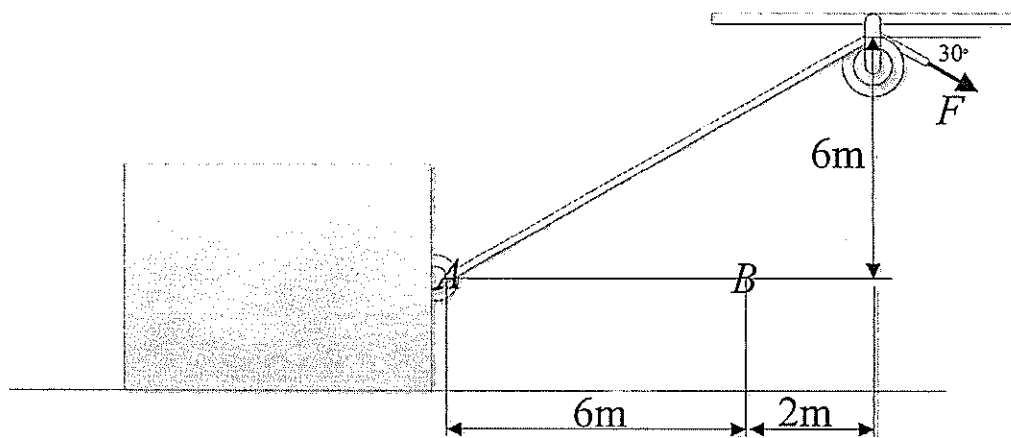


Fig. 2

見背面

3. (25%)

Each of the three plates has a mass of 10 kg. The coefficients of static and kinetic friction at each surface of contact are $\mu_s = 0.3$, and $\mu_k = 0.2$, respectively. Determine the acceleration of each plate when the three horizontal forces are applied at the same time. (Fig. 3)

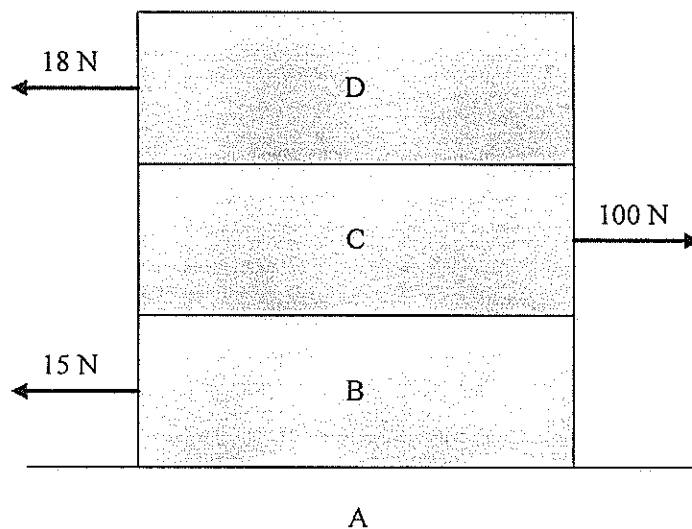


Fig. 3

4. (25%)

The particle travel along the path defined by the parabola $y = 0.5x^2$. If the component of the velocity along the x axis is $v_x = (5t)$ m/s, where t is the time in seconds. When $t=0$, $x=0$, $y=0$. Determine the particle's distance from the origin O and the magnitude of its acceleration when $t=1$ s. (Fig. 4)

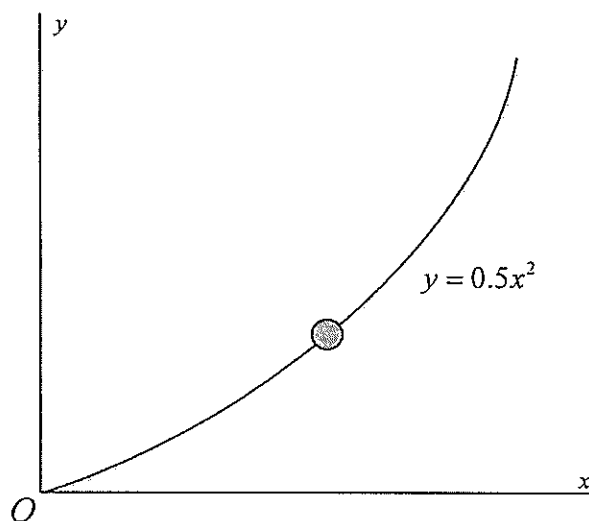


Fig. 4

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