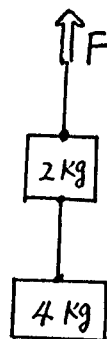
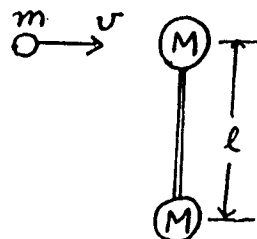


(1) Two blocks are tied together with a piece of string  
18% and another string is tied to the top block.  
How much force  $F$  must be applied to the top  
string to give both blocks an acceleration  
upward of  $2 \text{ m/s}^2$ ? What then is the tension  
in the string between the two blocks?

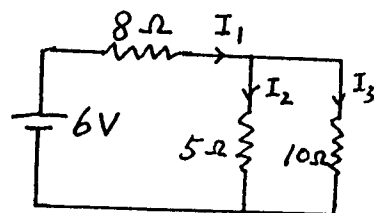


(2) A mass  $m$  moving with velocity  $v$  collides  
18% with one end of a rigid dumbbell and is  
bounced backward with velocity  $v'$ . If  
the dumbbell is initially at rest, how  
does it move just after the collision?



(3) What is the electric field at a point on the axis of a  
18% uniformly charged disk of radius  $R$  and surface charge  
density  $\sigma = Q/\pi R^2$ ?

(4) Find the current in each resistor of  
18% the circuit. The internal resistance of  
the battery may be neglected.



(5) 1 Kg of ice at  $0^\circ\text{C}$  is melted in 1 Kg of water at  $100^\circ\text{C}$   
18% in a thermally insulated container. What is the final  
temperature as the mixture comes to thermal equilibrium?  
What is the total change in entropy? You can assume  
that no heat is absorbed or released by the container.

(6)  $S_1$  and  $S_2$  are two sine wave sources of sound. If they  
10% are in phase and 3 m apart.

(a) List three different wavelengths that will give a  
destructive interference at point P.

(b) List three different wavelengths that will give a  
constructive interference at point P.

