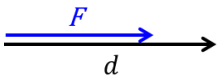
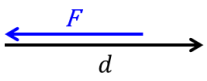
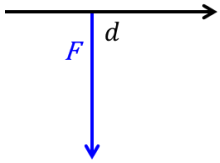
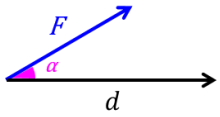
Nom : _____ PHYS 11

FINAL EXAM	Travail

Le Châtelard

Formulas :

Work			
 $W = F \cdot d$	 $W = -F \cdot d$	 $W = 0$	 $W = F \cdot d \cdot \cos\alpha$

Potential energy	Kinetic energy	Mechanical energy
$E_p = mgh$	$E_c = \frac{1}{2}mv^2$	$E_m = E_p + E_c$

units for length	units for velocity	units for energy
$1\ \text{m} = 100\ \text{cm}$	$1\ \text{m/s} = 3.6\ \text{km/h}$	$1\ \text{kJ} = 1000\ \text{J}$

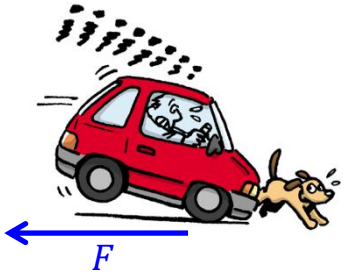
sans frottement	avec frottement
$E_m = E_m'$	$\Delta E_m = W_{frottement}$

Exercise 1 (3 points) A child pulls a toy using a string:

The traction force it exerts forms an angle of 60° with the movement of the toy and its intensity is equal to 25 N. What is the work done for a movement of 200 meters of the toy?

(procedure + result)

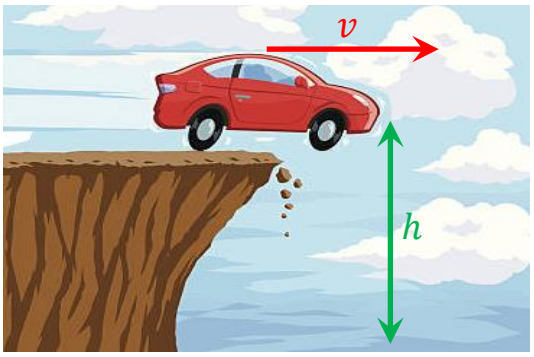
Exercise 2 (3 points) A car brakes with a force of 2000 N over a distance of 5 m:



What is the work of the braking force?

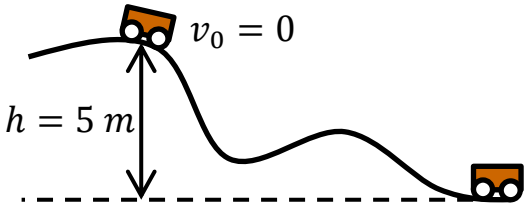
(procedure + result)

Exercise 3 (14 points) A 1200 kg car leaves the road on a cliff:



	procedure	result
a) If the speed of the car is 20 m/s, what is its kinetic energy?		
b) If the speed of the car is 108 km/h, what is its kinetic energy?		
c) If the car is 20 m high, what is its potential energy?		
d) If the car is 80 cm high, what is its potential energy?		
e) If the potential energy of the car is 10 000 J, what is its altitude?		
f) If the kinetic energy of the car is 375 000 J, what is its speed?		
g) If the speed of the car is 20 m/s and its altitude is 20 m *(see questions a and c),* what is its mechanical energy?		

Exercice 4 (10 points) Un charriot de 40 kg est lâché d'une hauteur de 5 m sans vitesse intiale :



	procedure	result
a) Que vaut la masse du charriot ?		
b) Que vaut sa vitesse initiale ?		
c) Que vaut son énergie potentielle au départ ?		
d) Que vaut son énergie potentielle à l'arrivée ?		
e) Que vaut sa vitesse à l'arrivée, s'il n'y a pas de frottement ?		
f) S'il y a une force de frottement de 2 N et que la vitesse à l'arrivée est nulle, que vaut la longueur du trajet ?		