Labor, Power and Energy

Labor

-The labor done by a constant force applied to an object is the prdouct of the object's displacement and the force in the dircection of the displacement.

-1 Joule labor is done when a force of 1N displaces an object over a distance of 1m.

- $W = F \Delta x - F \Delta x \cos \theta$

Labor- Energy principle

-The labor done by the non-concervative forces that act on an object = total change in E_K and E_P.

-$F_{net}\Delta x = \Delta E_K$ → objects on a straight level.

Power

-P = w/t (labor rate)

-P = applied force

-P = Fv (v has to be constant)

-Rate at which labor is being done

Energy

-The ability to do labor

-Mechanical energy is the sum of E_K and E_P.

-$E_M = E_K + E_P$

-Potential energy: the stored energy that an object has because of its position.

-$E_P = mgh$

-Kinetic energy: energy that is associated with the movement of an object.

-$E_K = ½ mv^2$

-Energy cannot be created or destroyed.

Friction through labor

-Scalar

-Friction is always against the direction of movement

-If labor is negative then force is removed.

-When labor is pisitive the energy is goven to the object.

Constante speed, Fnet = 0, .`. W = 0.

Retention of mechanical energy

-The sum of the gravity potential energy and the kinetic energy in a closed system is constant.

-When something comes to a standstill then: $W = F\Delta x.\cos\theta$

-$(E_M)BO = (E_M)ONDER$

$(E_P+E_K)BO = (E_P+E_K)ONDER$