Answer on Question #42047 – Physics - Mechanics | Kinematics | Dynamics

is there any work done by individual non conservative forces?

Solution:

A nonconservative force is one for which work depends on the path taken. Friction is a good example of a nonconservative force. Work done against friction depends on the length of the path between the starting and ending points. Because of this dependence on path, there is no potential energy associated with nonconservative forces.

An important characteristic is that the work done by a nonconservative force **adds or removes mechanical energy** from a system. Friction, for example, creates thermal energy that dissipates, removing energy from the system. Furthermore, even if the thermal energy is retained or captured, it cannot be fully converted back to work, so it is lost or not recoverable in that sense as well.

Work $\mathrm{W_{nc}}$ done by a nonconservative force changes the mechanical energy of a system. In equation form:

$$\mathrm{W_{nc}} = \Delta\mathrm{KE} + \Delta\mathrm{PE}$$

This equation means that the total mechanical energy (KE + PE) changes by exactly the amount of work done by nonconservative forces.

We rearrange $\mathrm{W_{nc}} = \Delta\mathrm{KE} + \Delta\mathrm{PE}$ to obtain:

$$KE_i + PE_i + \mathrm{W_{nc}} = KE_f + PE_f$$

This means that the amount of work done by nonconservative forces adds to the mechanical energy of a system. If $\mathrm{W_{nc}}$ is positive, then mechanical energy is increased. If $\mathrm{W_{nc}}$ is negative, then mechanical energy is decreased. If $\mathrm{W_{nc}}$ is zero, then mechanical energy is conserved, and nonconservative forces are balanced. For example, when you push a lawn mower at constant speed on level ground, your work done is removed by the work of friction, and the mower has a constant energy.