Module 09-Lesson 4

The Kinetic Energy / Work Theorem

Question 1: How much work is done by the force that accelerates a 1500-kg car from 60 km/h to 90 km/h?

Question 2: A large cruise ship of mass 7.0×10^7 kg moves with a speed of 10.0 m/s as it approaches the shore. How much work will be required in order to stop the ship?

Problem: A neutron of mass 1.67×10^{-27} kg travels at a speed of 10^3 m/s as it collides with a heavy nucleus. After the collision the neutron rebounds with a speed of 10^2 m/s.

(a) Determine the work done on the neutron by the interaction force between the nucleus and the neutron.

(b) Estimate the strength of the interaction if the distance over which the collision occurs is 10^{-15} m. Assume that the nucleus is much more massive than the neutron so that the force is constant during the collision.