3D Work Energy Principle 2.0

1. A light elastic string, of natural length 1.6m and modulus of elasticity 10N, has one end fixed at a point A on a smooth horizontal table. A particle of mass 2kg is attached to the other end of the string. The particle is held at point A and projected horizontally across the table with speed 2ms⁻¹. Find how far it travels before first coming to instantaneous rest.

2. A particle of mass 0.5kg is attached to one end of an elastic string, of natural length 2m and modulus of elasticity 19.6N. The other end of the elastic string is attached to the point O. If the particle is released from the point O, find the greatest distance it will reach below O.

Alternative approach to 2: just consider GPE (as KE goes from 0 -> 0)

3. A light elastic spring, of natural length 1m and modulus of elasticity 20N, has one end attached to a fixed point A. A particle of mass 2kg is attached to the other end of the spring and is held at a point B which is 0.8m vertically below A. The particle is projected vertically downwards from B with speed 2ms⁻¹. Find the distance it falls before first coming to rest.

4. A light elastic spring, of natural length 0.5m and modulus of elasticity 10N, has one end attached to a point A on a rough horizontal plane. The other end is attached to a particle P of mass 0.8kg. The coefficient of friction between the particle and the plane is 0.4. The particle initially lies on the plane with AP = 0.5m and is then projected with speed 2ms⁻¹ away from A, along the plane. Find the distance travelled by P before it first comes to rest.