Q1- A 100 Kg player runs at 8.0 m/s when he slides on one knee over the try line to score a try. Assume that friction between the knee and the grass surface converts 40% of the player's original kinetic energy to heat in the skin tissue of the knee (tissue mass is approximately 15g) and determine the rise in temperature in the skin tissue. The specific heat capacity of skin tissue is 1700 J/kg/K

The total kinetic energy of the player $(1/2)*mv^2 = 0.5*100*64 = 3200$ J

Heat absorbed by the tissue $Q= 40\%$ of 3200 J $= (40/100)*3200 = 1280$ J

Increase in temperature is given by $\Delta Q = m*s*\Delta t$

Hence increase in temperature

$\Delta t = \Delta Q /(m*s) = 1280/(0.015*1700) = 1280/25.5 = 50.2$ K