Questions 6

1. Evaluate the temperature of a dust grain at distances of 10^{-4} and 1 pc from a massive young main sequence star with a luminosity of 10^6 $L_\odot$. Calculate the wavelength of peak emission for each of these dust temperatures. $L_\odot$=4.0x10^{26} W, 1 pc = 3.1x10^{16} m and Stefan's constant σ=5.8x10^{-8} $Wm^{-2}K^{-4}$.

2. Estimate the amount of gravitational potential energy released when a $10M_\odot$ star collapses to form a neutron star. Compare this to an estimate of the amount of energy emitted by a galaxy containing 10^{11} stars in a year.

3. By considering the change from kinetic to thermal energy of a particle estimate the temperature of the post-shock gas when a supernovae remnant shell travelling at 100 kms^{-1} is stopped by the interstellar medium.