GA 3

1. Briefly describe the three main *stellar* components of a spiral galaxy. Which component is the most massive in the Milky Way? [4 marks]

2. Dust particles obscure and redden the light of distant stars

   (a) Assume spherical dust particles with radius $a = 0.1\mu$m and number density $n_d = 3.3 \times 10^{-12}$ cm^{-3}. Follow the reasoning in the notes to show that such particles decrease the intensity of radiation over a distance dl by

   $$\frac{dI}{I} = -n_d\,(\pi\,a^2)\,dl$$

   . [2 marks]

   (b) Show that if n_d and a are constant, the intensity decreases by $\propto \exp((-n_d\,(\pi\,a^2)l)$ over a distance l. [2 marks]

   (c) Compare the wavelength of UV light ($\lambda = 300$ nm) with that of infra-red light ($\lambda = 1\mu$m). Which radiation will be affected most and why? [2 marks]