GA 2

1. Briefly describe what is the 'surface brightness' of a galaxy. Provide an equation for surface brightness and describe all factors that appear. Demonstrate that surface brightness is independent of distance. [4 marks]

2. Describe two effects that intervening dust can have on the flux detected from stars. How does the magnitude of these effects depend on (1) the amount of dust, (2) the size of the dust grains. [2 marks]

3. The Sun is on an a circular orbit with radius $R = 8.0$ kpc around the centre of the galaxy, moving at speed $v = 220$ km s^{-1}. Calculate the period of its orbit in years. [2 marks]
   To measure the speed of another galaxy relative to the Milky Way, observers need to take v and the direction of the Sun's motion into account. Compare v with the speed of Earth around the Sun: which one is bigger? Is the motion of the Sun rather than that of Earth around the Sun always the dominant factor to take into account? [2 marks]