Astronomy 1 fall 2009
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Solutions to Assignment 10

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1

a) For redshifts less than 1, we can use the formula z=v/c to find the speed of the galaxy. Plugging in z=0.1, we see that v=0.1c, or $3x10^4$ km/s.
b) Using the Hubble Law, $v= H_0d$, we can plug in our velocity and solve for d to find d=430 Mpc.
c) Now that we have a distance, we can use the small angle formula to calculate the size of the galaxy, $D=\alpha d/206{,}265$, which gives us $D=2x10^5$ lightyears. This is actually quite large (more on the scale of a large cluster of galaxies than a single galaxy).
d) The luminosity of the galaxy can be found via the inverse square law, solving for luminosity: $L=4\pi d^2 b$. This leaves us with a luminosity of $2x10^{36}$ W.

2

Please see section 26-4 in the text. Read the following three sections for more detail.