PHY3232 Astronomy Tutorial- 2

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1. The Sun orbits the Galaxy once every 240 million years.The radius of its orbit is about 26,000 light years. Estimate the mass of the galaxy that lies within the Sun's orbit.

2. Mention/Draw the Hubble classification of (Hubble Tuning Folk Diagram) galaxies and explain the distinguishing features of each classification.

3. Why did it take so long for the existence of other galaxies to be established?

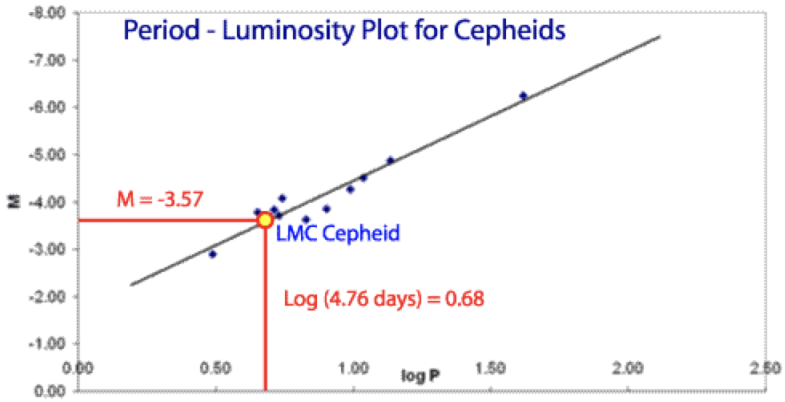
4. What are the two best ways to measure the distance to a nearby spiral galaxy, and how would it be measured?

5. Explain what the mass-to-light ratio is and why it is smaller in spiral galaxies with regions of star formation than in elliptical galaxies.

6. According to Hubble's law, what is the recessional velocity of a galaxy that is 10^8 light-years away from us? (Assume a Hubble constant of $70\,km/s/Mpc$.)

7. It is possible to derive the age of the universe given the value of the Hubble constant and the distance to a galaxy, with the assumption that the value of the Hubble constant has not changed since the Big Bang. Consider a galaxy at a distance of 400 million light-years receding from us at a velocity, v. If the Hubble constant is $70\,Km/s/Mpc$ find the age of the universe.

8. A cephid star in LMc (Large Magellanic Cloud) has and apparent magnitude $m = 15.56$ and the period of pulsation is 4.76 days. Use the graph in next page to find the distance to LMC.


Period - Luminosity Plot for Cepheids
M
log P
M = -3.57
LMC Cepheid
Log (4.76 days) = 0.68
-8.00
-7.00
-6.00
-5.00
-4.00
-3.00
-2.00
-1.00
0.00
0.00
0.50
1.00
1.50
2.00
2.50