

Astronomy 102: Assignment 2, stars and the ISM

1. What are the 3 types of nebulae? What are the characteristic colours associated with them and where do these colours come from? Which kind of nebula has the highest amount of dust in it? Describe what is meant by a dust 'extinction curve' (draw the Galactic extinction curve with axes labeled). [6]
2. What is the definition of 1 parsec? Copy and complete the following table

m_v	M_v	distance (pc)	parallax (arcseconds)	distance modulus
...	7	10	...	0
11	...	1000
...	-2	...	0.025	...
4	0.040	2

3. The star scorchio is three times as hot as the sun AND twice as large. How bright will it be compared with the sun? Why is absolute bolometric magnitude more useful than M_V (the absolute visual magnitude) for comparing the luminosities of different stars? The star coolio is 16 times less luminous than scorchio. If scorchio's absolute bolometric magnitude is -4.7 what is the absolute bolometric magnitude of coolio? [6]
4. Stars A and B are of the same spectral type and are at the same distance from Earth. However, star A is behind a dust cloud whereas star B is not. Give 2 ways that the stars A and B may appear to differ. You determine a magnitude difference between A and B of 5 magnitudes. How many times brighter is star B than A? [6]
5. Explain how 21 cm radiation is formed. Give 2 advantages of using the 21cm hydrogen line to trace the interstellar medium over ultra-violet lines. [6]

Total: 30.