ASTRO 1050 – Survey of Astronomy
October 24, 2008 Midterm Examination #2
Practice Quiz

Nature of Light

The following formula may be of use to you:

$$F = \frac{L}{4\pi r^2}, \tag{1}$$

where F is the flux, L is the luminosity, and r is distance.

1. What does a difference of 2.5 magnitudes correspond to in brightness?

   A. A factor of 2.5 in brightness
   B. A factor of 5 in brightness
   C. A factor of 10 in brightness
   D. A factor of 100 in brightness
   E. No change in brightness

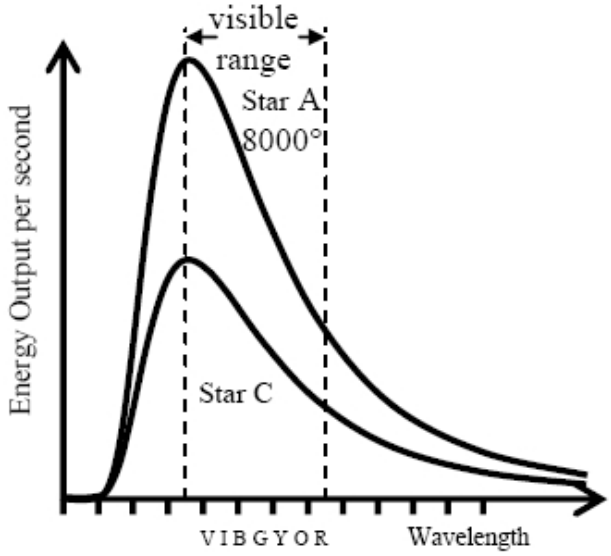
2. Which of the following correctly arranges different forms of light in order of increasing wavelength?

   A. Ultraviolet, Infrared, Gamma rays, Visible, Radio, X-rays
   B. Gamma rays, X-ray, Ultraviolet, Visible, Infrared, Radio
   C. Radio, Infrared, Visible, Ultraviolet, X-rays, Gamma rays
   D. Gamma rays, Infrared, Ultraviolet, Visible, Radio, X-rays
   E. Radio, X-rays, Visible, Infrared, Ultraviolet, Gamma Rays

3. Consider two edge-on binary systems, Alpha and Bravo. [A binary system is two stars orbiting each other due to their gravity.] Alpha has stars with masses 10 and 15. Bravo has stars with masses 1.5 and 2.0. The stars in both systems are separated by the same distance. Which will produce the smallest Doppler shifting of their spectral lines?

   A. Alpha
   B. Bravo
   C. Both will show the same amount of Doppler shifting.
   D. It cannot be determined from the information available.

Use the following figure to answer question 4. Note that there is no Doppler shift between the two spectra depicted.



4. Which of the two stars (A or C) is at a lower temperature?

   A. Star A

   B. Star C

   C. The two stars have the same temperature.

   D. It is not possible to infer this relationship.

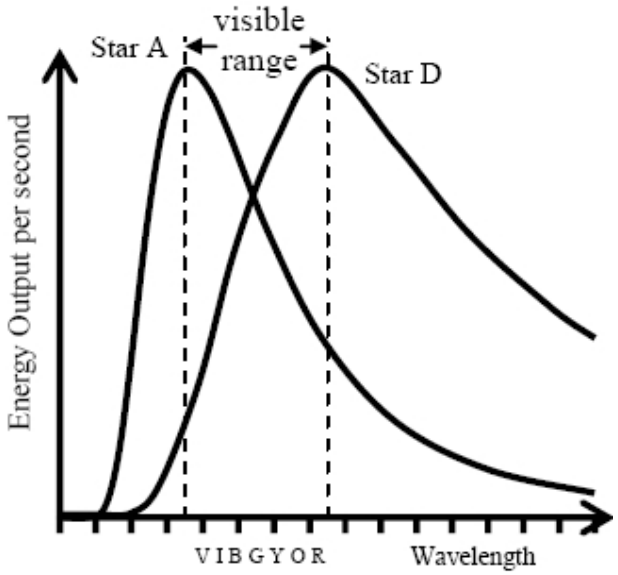
5. Which of the following is the type of spectrum we observe from a tube of hot, low density gas?

   A. Continuous spectrum

   B. Bright line emission spectrum

   C. Dark line absorption spectrum

Use the following figure to answer question 6. Note that there is no Doppler shift between the two spectra depicted.



6. Which of the two stars (A or D) is at a lower temperature?

   A. Star A

   B. Star D

   C. The two stars have the same temperature.

   D. It is not possible to infer this relationship.

7. If an electron in an atom moves from an energy level with energy 20 to an energy level of energy 5,

   A. a photon of energy 5 is emitted.

   B. a photon of energy 15 is emitted.

   C. a photon of energy 5 is absorbed.

   D. a photon of energy 15 is absorbed.

Solar System

8. A planet is moving with prograde motion. Over the course of the next several days, how will the planet appear to move relative to the background stars?

   A. East to west

   B. West to east

   C. It will not move at all, as planets do not move with respect to the stars.

   D. It will move randomly, as planets move differently than the stars.

9. Which one of the planets listed below initially formed at the innermost location where the temperature was low enough for water to freeze?

   A. Venus

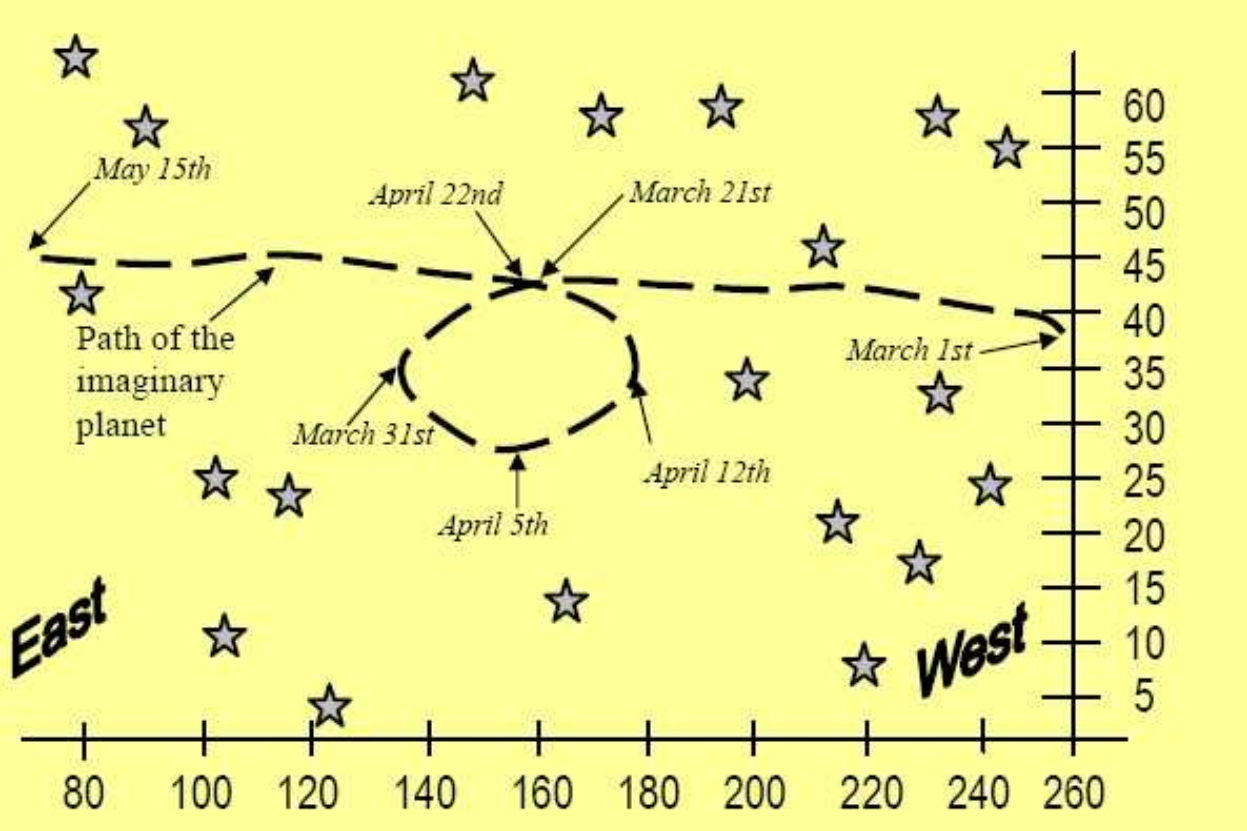
   B. Earth

   C. Mars

   D. Jupiter

   E. Saturn

Use the graph provided below, on which an imaginary planet's motion has been plotted over several months, to answer question 10.



10. If today is March 21st, after how many days would the planet appear to start moving with retrograde motion?

    A. 0 days

    B. 10 days

    C. 15 days

    D. 22 days

    E. The planet has already completed its retrograde motion.