1. **EM Spectrum Ranking Task**

   **Part A:** Rank the following types of electromagnetic radiation (EMR) in order of their relative energy, from greatest to least.

   A. Visible  
   B. Ultraviolet  
   C. Radio  
   D. Gamma Rays  
   E. Microwaves

   Greatest Energy 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ Least Energy

   Or, these types of electromagnetic radiation all have the same amount of energy: _____

   Carefully explain your reasoning for ranking this way:
   
   _________________________________________________________________
   _________________________________________________________________
   _________________________________________________________________

   **Part B:** Rank the following types of electromagnetic radiation (EMR) in order of their relative speed, from fastest to slowest.

   A. Visible  
   B. Ultraviolet  
   C. Radio  
   D. Gamma Rays  
   E. Microwaves

   Fastest Speed 1 ____ 2 ____ 3 ____ 4 ____ 5 ____ Lowest Speed

   Or, these types of electromagnetic radiation all travel at the same speed: _____

   Carefully explain your reasoning for ranking this way:
   
   _________________________________________________________________
   _________________________________________________________________
   _________________________________________________________________

2. **Why do nocturnal animals usually have large pupils in their eyes?** How is that related to astronomical telescopes?

3. **You have a choice of purchasing one of two telescopes for a project.** Telescope A can magnify up to 400 times and its objective lens has a diameter of about 5 cm. Telescope B can magnify up to 50 times and its objective lens has a diameter of 40 cm. For each project below, state which telescope you would choose and explain why you think it would be most appropriate for that project.

   a) Which telescope would you buy for a project to search for faint comets?
b) Which telescope would you buy for a project to study craters on the Moon?

4. Light and Atoms Review Question: Sketch an atom including a nucleus and five energy levels that electrons could occupy. Use two dots to represent two electrons at the lowest energy level. Now, using two arrows to represent their motion, sketch what you think would happen if one electron absorbed a red-colored photon and the other electron absorbed a blue-colored photon. Indicate which electron is absorbing the red photon and which is absorbing the blue photon, and explain your reasoning for drawing the arrows the way you did.

5. Each diagram below shows the spectra of two stars. For each pair of stars, compare their relative temperatures and total energy outputs, and explain your reasoning.

a.  

![Graph of Star A and Star C](image1)

b.  

![Graph of Star D](image2)