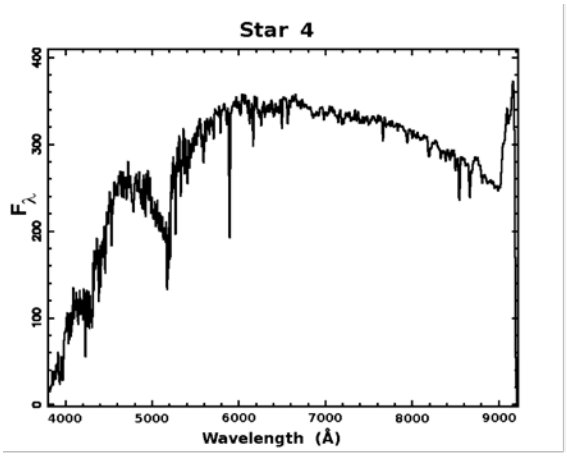
# Exam 1 Practice Questions

1. Kepler's 3rd Law is $P^2 = a^3/(M_1+M_2)$. Jupiter's moon Io orbits it at a distance of about 420,000 km, or 0.003 AU. Its orbital period about the planet is 16.7 days, or 0.005 years. Estimate the mass of Jupiter. (Assume that Io's mass is negligible compared with that of Jupiter. It may help to write these numbers as 3/1000 and 5/1000.) What units does this have? (Hint: It isn't kilograms)

2. To the right is a spectrum of a star. Label the three main types of spectral features. For each one, explain what might cause it. Is this a hot or a cool star? How do you know?




3. What two things do the diameter of a telescope affect that are important for astronomy? Explain why each is important.

4. What is the relationship between an observer's latitude and the altitude of Polaris?

5. What is the Zodiac? In other words, what is special about these particular constellations?

6. Explain the phases of the moon. It may be helpful to draw a diagram.

7. What is conservation of energy? Describe the energy transfers that occur in a meteorite hitting the earth.

8. Gravity only acts on an object when it is close to the surface of the Earth. (T/F)

9. Explain why we changed from the Ptolemeic model of epicycles to a heliocentric model of the solar system.

10. The force of gravity is $F = GmM/r^2$. Explain what happens to the force if I:
    a. double m;
    b. triple M;
    c. double r

11. Explain how conservation of momentum applies to solar system formation.

12. The Earth has water, but is inside the frost line. Where did that water come from?

13. Explain the differences in geologic processes for the terrestrial planets.

14. Why is the sunset red?

15. What are the important things that help a planet keep an atmosphere?

16. What are the processes of heating and cooling a planet?

17. What are the important geologic processes? Consider both interior and surface processes.

18. Explain the similarities and differences between the four Jovian planets.

19. Draw a diagram of the blackbody spectrum for two objects, one at a temperature around 152,000K and one around 6,000K (the sun). Put both on the same diagram. What are the two main differences between the two spectra?

20. Explain why Chandra X-ray observatory must be in space.