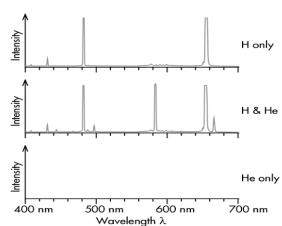
- (c) Rank the following spectra from having the least to the most number of absorption lines<sup>2</sup>; clearly indicate ties, if any. Then briefly explain the reasoning for your ranking.
  - (A) The sun, observed from a spacecraft in orbit around Earth.
  - (B) The sun, observed from a telescope at sea level.
  - (C) Light from an incandescent light bulb, across the room.

(least lines) (most lines)

Explanation:

Emission Spectra

- 3. The (simplified) intensity versus wavelength graph of a sample that contains only hydrogen (H) atoms is shown with the graph of a sample that contains both hydrogen and helium (He) atoms. Carefully note the wavelength values of the peaks in these graphs.
  - (a) Sketch in the peaks of a sample that contains *only* He atoms.



- (b) (Clearly circle your answer.)
  According to Kirchhoff's laws, these spectra are produced by
  a hot, dense object
  hot, diffuse gas atoms
  blackbody radiation passing through cool, diffuse gas atoms
- (c) Briefly explain your answer to (b).Explanation:

 $<sup>^2</sup> A dapted from Adams, Prather, and Slater, \textit{Lecture-Tutorials for Introductory Astronomy, 1/e}, Addison-Wesley, 2005, pp. 43-44.$