Questions 1-4 use this basic Hertzsprung Russell diagram; temperature increases toward the left, luminosity increases upwards

1. What region(s) would you find stars that are converting Hydrogen to Helium in their central core?

2. Which region(s) would you find stars that are converting Helium to Carbon in their central core?

3. What region contains the oldest stars?

4. Which region contains the youngest stars (on average)?
5. In about 5 billion years, our Sun's core will run out of hydrogen. What happens next? Circle the appropriate answer:

Gravity continues to squeeze the core and it contracts / expands. The core temperature therefore rises / falls. Hydrogen fuses into helium in a shell around the core and because of the higher / lower temperature, the energy generation rate is higher / lower. Therefore the luminosity of the star is higher / lower and the outer layers contract / expand, causing the surface temperature to rise / fall: the star moves to the upper right / lower left in the HR diagram and is known as a white dwarf / red giant / black hole.

6. What happens in the final stages of a massive star? Circle the appropriate answer:

As the massive's star massive gravity compresses the core, ever lighter / heavier elements undergo nuclear fusion / fission into lighter / heavier elements until iron / gold is created, at which point no more energy can be produced from nuclear reactions and the star undergoes catastrophic collapse. This results in a planetary nebula / supernova / horrendous space kablooie.

7. Mad Professor X wants to search for life around other stars. He plans to look at the most massive stars in the Galaxy since they are the brightest. Explain why this strategy is unlikely to succeed.