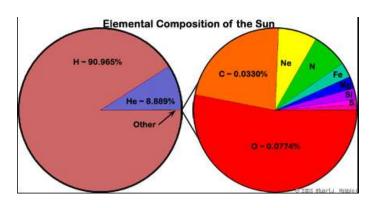


Astronomy Final Exam

Name: Hour Date: Score: /

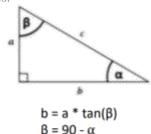
1. The image at the right indicates that the sun is roughly 91% hydrogen atoms, 9% helium, and a small percentage of heavier elements like oxygen, carbon, etc. The sun is about 93 million miles (150 million kilometers) from the earth – how could we possibly know this information? Include and underline the following: spectral signature; electron; photon.

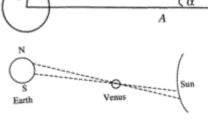


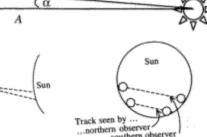
Score: _____ Comments:

2. Knowing the sun's distance from earth, the sun's size, and its temperature was critical for understanding how the sun functions. **How can the sun's a) distance, b) size, and c) temperature be determined without leaving the planet**? When possible, reference the image below in your explanation. Include and underline the following: *parallax*; *arcsecond*; *blackbody radiation*.

Score: _____ Comments:



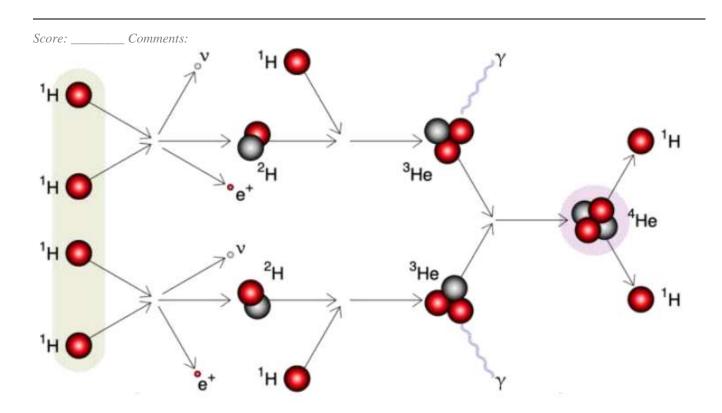




Source: https://www.maa.org/sites/default/files/pdf/pubs/mm_dec03-Venus.pdf

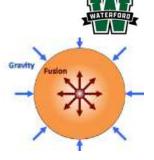


3. Early scientists, like Lord Kelvin, were puzzled how the sun could 'burn' for billions of years without running out of fuel. **Explain the processes that enables stars like our sun to release vast amounts of energy for billions of years.** When possible, reference the image below in your explanation. Include and <u>underline</u> the following: *Coulomb barrier, proton-proton chain, gamma radiation*.



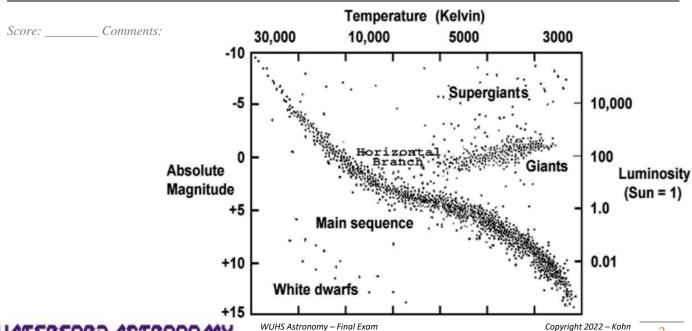


4. The relationship between gas pressure and temperature is a primary determinant of whether nuclear fusion can occur within a ball of gas. This also determines the lifespan of a star. In the space below, explain how gravitational pressure affects **nuclear fusion.** Include and underline the following: gas laws; Coulomb barrier; hydrostatic equilibrium;



Score: _____ Comments:

5. How can the H-R Diagram below be used to determine a star's internal structure, lifespan, and final stages? When possible, reference the image below in your explanation. Include and <u>underline</u> the following: main sequence; low-mass stars; giants; white dwarfs; high-mass stars; supergiants.





6. The life cycles of most stars ultimately end in three possible outcomes. **Briefly summarize each of these three outcomes and explain how each outcome occurs.** Include and <u>underline</u> the following: *planetary nebula; supernova*.

White Dwarf:

Neutron Star:

Black Hole:

Score: _____ Comments:

7. As high mass stars age, their cores eventually accumulate greater and greater proportions of iron. **Why does this limit the lifespan of stars**? When possible, reference the image below in your explanation. Include and <u>underline</u> the following: *mass-defect; binding energy; atomic stability*.

Score: Comments:

