

Astrophysics Fundamentals

Astrophysics · Answer Key · 10 Questions

1. What is the primary process that powers stars like our Sun?

- A) Gravitational collapse
- B) Nuclear fusion of hydrogen into helium**
- C) The annihilation of matter and antimatter
- D) Radioactive decay of heavy elements

2. Which astronomical phenomenon is characterized by the rapid spinning of a neutron star, emitting beams of electromagnetic radiation?

- A) Supernova remnant
- B) Accretion disk
- C) Pulsar**
- D) Quasar

3. According to the standard model of cosmology, what is the predominant form of matter in the universe, interacting only gravitationally?

- A) Baryonic matter (protons and neutrons)
- B) Dark energy
- C) Dark matter**
- D) Neutrinos

4. What is the name for a region of spacetime where gravity is so strong that nothing, not even light, can escape?

- A) Neutron star
- B) White dwarf
- C) Black hole**
- D) Red giant

5. Which telescope played a crucial role in discovering the accelerating expansion of the universe, leading to the concept of dark energy?

- A) Hubble Space Telescope**
- B) James Webb Space Telescope
- C) Chandra X-ray Observatory
- D) Spitzer Space Telescope

6. What is the process by which heavier elements, such as iron and gold, are formed within stars or during stellar explosions?

A) Nucleosynthesis

- B) Photoevaporation
- C) Compton scattering
- D) Zeeman splitting

7. The Cosmic Microwave Background (CMB) radiation is considered strong evidence for which cosmological theory?

- A) Steady State Theory
- B) Inflationary Cosmology

C) Big Bang Theory

- D) String Theory

8. Which of the following is the most massive type of star, typically ending its life in a Type II supernova?

- A) Red dwarf
- B) Brown dwarf

C) Massive star (greater than 8 solar masses)

- D) White dwarf

9. What phenomenon causes the apparent shift in frequency of electromagnetic waves (or sound waves) emitted by a source moving relative to an observer?

- A) Gravitational lensing

B) Doppler effect

- C) Compton scattering
- D) Redshift (gravitational)

10. What is the theoretical maximum mass for a neutron star before it collapses into a black hole, estimated to be around 2 to 3 solar masses?

- A) Chandrasekhar limit

B) Tolman-Oppenheimer-Volkoff limit

- C) Eddington limit
- D) Jeans mass