

Advanced Astronomical Knowledge

Astronomy · Answer Key · 20 Questions

1. Which celestial body marks the center of the Milky Way galaxy, currently understood by astronomers as a supermassive black hole?

A) Sagittarius A*

B) Cygnus X-1

C) Andromeda

D) Centaurus A

2. What is the specific classification of the Hertzsprung-Russell diagram sequence where 90% of stars, including the Sun, reside?

A) Giant branch

B) White dwarf sequence

C) Main sequence

D) Supergiant branch

3. The 'Chandrasekhar limit' defines the maximum mass that a stable white dwarf star can possess, approximately equal to how many solar masses?

A) 0.5

B) 1.4

C) 3.2

D) 5.0

4. Which astronomical phenomenon describes the apparent shift in the position of a nearby star against the background of distant objects due to Earth's orbit?

A) Precession

B) Stellar parallax

C) Aberration of light

D) Proper motion

5. What is the approximate age of the universe according to current cosmological models based on the cosmic microwave background radiation?

A) 4.5 billion years

B) 13.8 billion years

C) 20.5 billion years

D) 50 billion years

6. Which layer of the Sun is considered the visible surface, from which most of the light we observe originates?

- A) Corona
- B) Chromosphere
- C) Photosphere**
- D) Convection zone

7. In orbital mechanics, what does the 'Roche limit' define?

- A) The escape velocity of a planet
- B) The distance within which a celestial body will disintegrate due to tidal forces**
- C) The limit of light speed in a vacuum
- D) The boundary of a black hole's event horizon

8. Which chemical element is the primary product of stellar nucleosynthesis during the main sequence stage of a star's life?

- A) Carbon
- B) Helium**
- C) Iron
- D) Oxygen

9. What is the term for a massive, extremely luminous active galactic nucleus powered by a supermassive black hole at the center of a galaxy?

- A) Pulsar
- B) Quasar**
- C) Magnetar
- D) Protostar

10. What is the primary constituent of the gas giant planets Jupiter and Saturn?

- A) Oxygen and Nitrogen
- B) Hydrogen and Helium**
- C) Carbon dioxide and Methane
- D) Iron and Nickel

11. The 'Great Red Spot' on Jupiter is best described as which of the following?

- A) A massive volcanic eruption
- B) A long-lived high-pressure storm system**
- C) A solid surface feature
- D) An impact crater

12. What defines the 'Event Horizon' of a black hole?

A) The point where light can no longer escape

B) The physical surface of the singularity

C) The outer atmosphere of the black hole

D) The temperature of the accretion disk

13. Which moon of Saturn is famous for having a thick, nitrogen-rich atmosphere and liquid methane lakes?

A) Enceladus

B) Titan

C) Mimas

D) Iapetus

14. What is the speed of light in a vacuum, rounded to the nearest integer in meters per second?

A) 299,792,458

B) 150,000,000

C) 300,000,000

D) 250,000,000

15. What do astronomers call the hypothetical form of matter that does not emit, absorb, or reflect light, but exerts gravitational effects?

A) Antimatter

B) Dark matter

C) Baryonic matter

D) Degenerate matter

16. Which galaxy is the largest member of the 'Local Group' to which the Milky Way belongs?

A) Triangulum Galaxy

B) Andromeda Galaxy

C) Magellanic Cloud

D) Sombrero Galaxy

17. In the context of stellar evolution, what is the final state of a star with a mass similar to that of our Sun?

A) Supernova

B) Black hole

C) White dwarf

D) Neutron star

18. Which force is primarily responsible for the formation of stars and planets from interstellar clouds of gas and dust?

- A) Electromagnetism
- B) Strong nuclear force
- C) Gravity**
- D) Weak nuclear force

19. The cosmic microwave background radiation is considered the 'afterglow' of which event?

- A) The Big Bang**
- B) The formation of the first stars
- C) The collision of galaxies
- D) The supernova of a nearby star

20. What is the unit of distance equal to the distance light travels in one Julian year?

- A) Astronomical Unit
- B) Parsec
- C) Light-year**
- D) Angstrom