

Milestones in Astrophysics

Astrophysics · Answer Key · 25 Questions

1. Who published the first theoretical evidence that a black hole could be formed by the gravitational collapse of a massive star, specifically in 1939?

- A) Subrahmanyan Chandrasekhar
- B) Robert Oppenheimer and Hartland Snyder**
- C) Stephen Hawking and Roger Penrose
- D) Karl Schwarzschild

2. What was the first detected binary pulsar system, which provided the first indirect evidence for the existence of gravitational waves?

- A) PSR B1919+21
- B) PSR B1257+12
- C) PSR B1913+16**
- D) PSR J0737-3039

3. In 1967, which instrument was used by Jocelyn Bell Burnell to detect the first radio pulsar?

- A) Arecibo Observatory
- B) Interplanetary Scintillation Array**
- C) Green Bank Telescope
- D) Parkes Observatory

4. The 1930s theory of the 'Chandrasekhar Limit' identified that white dwarfs above this mass would inevitably collapse. What is that mass?

- A) 1.4 solar masses**
- B) 2.2 solar masses
- C) 0.7 solar masses
- D) 3.0 solar masses

5. Which space telescope was the first to provide direct evidence of dark energy by observing distant Type Ia supernovae?

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

6. What was the first molecule discovered in interstellar space via radio astronomy in 1963?

- A) Water
- B) Carbon Monoxide
- C) Hydroxyl radical (OH)**
- D) Formaldehyde

7. Who proposed the first solution to Einstein's field equations that describes the geometry of spacetime outside a spherical, non-rotating mass?

- A) Arthur Eddington
- B) Karl Schwarzschild**
- C) Hendrik Lorentz
- D) Georges Lemaître

8. What was the first X-ray source discovered outside our solar system in 1962?

- A) Cygnus X-1
- B) Scorpius X-1**
- C) Crab Nebula
- D) Centaurus A

9. The COBE satellite, launched in 1989, provided the first measurement of what phenomenon, confirming the Big Bang's thermal history?

- A) Cosmic microwave background anisotropy**
- B) The expansion rate of the universe
- C) Intergalactic dust density
- D) Dark matter halo distribution

10. What was the first exoplanet discovered orbiting a main-sequence star, found by Mayor and Queloz in 1995?

- A) HD 209458 b
- B) 51 Pegasi b**
- C) Proxima Centauri b
- D) Kepler-186f

11. Which observatory was the first to detect neutrinos from a supernova (SN 1987A)?

- A) Super-Kamiokande
- B) Kamiokande-II**
- C) SNO (Sudbury Neutrino Observatory)
- D) IceCube

12. What is the name of the first gravitational wave event ever detected by LIGO, occurring on September 14, 2015?

- A) GW170817
- B) GW150914**
- C) GW190412
- D) GW200105

13. In 1929, Edwin Hubble published the first observation suggesting the universe is expanding. What was the core of this discovery?

- A) Redshift-distance relation of galaxies**
- B) The existence of dark matter
- C) The rotation curve of spiral galaxies
- D) The luminosity of Cepheid variables

14. Which mission was the first to successfully land a probe on the surface of a comet (67P/Churyumov-Gerasimenko)?

- A) Deep Impact
- B) Stardust
- C) Rosetta/Philae**
- D) Hayabusa

15. What was the first object to be definitively identified as a black hole candidate via X-ray observations in 1971?

- A) Sagittarius A*
- B) Cygnus X-1**
- C) M87*
- D) V404 Cygni

16. The first direct image of a black hole's event horizon, released in 2019, was of a black hole in which galaxy?

- A) Andromeda
- B) Milky Way
- C) M87**
- D) Sombrero

17. Who was the first person to propose the 'Big Bang' theory, originally calling it the 'hypothesis of the primeval atom'?

- A) Edwin Hubble
- B) Georges Lemaître**
- C) Fred Hoyle
- D) George Gamow

18. What was the first successful space-based ultraviolet telescope, launched in 1968?

A) OAO-2

B) IUE

C) FUSE

D) GALEX

19. The first evidence of cosmic ray particles was discovered by Victor Hess in 1912 using what method?

A) Deep-sea submersible

B) High-altitude balloon flights

C) Mountain top observatories

D) Satellite sensors

20. Which telescope was the first to use the technique of 'adaptive optics' to correct for atmospheric turbulence in ground-based astronomy?

A) Keck Observatory

B) VLT (Very Large Telescope)

C) Hale Telescope

D) Subaru Telescope

21. What was the first galaxy confirmed to have a supermassive black hole at its center?

A) M31

B) M87

C) NGC 4151

D) Milky Way

22. In 1933, Fritz Zwicky used the virial theorem on the Coma Cluster to provide the first evidence for what?

A) Black holes

B) Dark matter

C) The accelerating expansion of the universe

D) Neutron stars

23. What was the first spacecraft to leave the heliosphere and enter interstellar space?

A) Voyager 2

B) Pioneer 10

C) Voyager 1

D) New Horizons

24. Which astronomical instrument was the first to utilize the principle of interferometry to measure the angular diameter of a star (Betelgeuse)?

A) Mount Wilson Interferometer

B) VLA

C) VLTI

D) ALMA

25. What was the first supernova observed with modern telescopes for which a progenitor star was identified in pre-explosion archival images?

A) SN 1987A

B) SN 1993J

C) SN 2014J

D) SN 1054