

Cosmic Criminal Justice: A Hard-Edged Inquiry

Criminal Justice · Answer Key · 14 Questions

1. Which celestial body's gravitational influence, though immense, is insufficient to clear its orbital neighborhood of other debris, mirroring the principle that sufficient power does not automatically equate to exclusive dominion in legal contexts?

- A) Jupiter
- B) Pluto**
- C) Saturn
- D) Neptune

2. The discovery of the Cosmic Microwave Background radiation, a remnant of the Big Bang, is analogous to uncovering foundational evidence in a complex case. This background radiation originates from an epoch approximately how many years after the Big Bang?

- A) 100 seconds
- B) 380,000 years**
- C) 1 million years
- D) 1 billion years

3. Similar to how jurisdiction is established, the habitable zone of a star, where liquid water could exist on a planet's surface, is determined by factors such as stellar luminosity and orbital distance. The star that hosts Earth, the Sun, is classified as which spectral type, influencing its habitable zone characteristics?

- A) M-type (Red Dwarf)
- B) K-type (Orange Dwarf)
- C) G-type (Yellow Dwarf)**
- D) F-type (Yellow-White Dwarf)

4. The concept of exoplanet detection methods, such as the transit method (observing dips in starlight), can be compared to inferring actions based on observable effects. The first confirmed exoplanet orbiting a Sun-like star was detected using what primary technique?

- A) Radial velocity**
- B) Direct imaging
- C) Gravitational lensing
- D) Transit photometry

5. The vast distances and extreme conditions in deep space necessitate specialized 'enforcement' mechanisms for spacecraft, akin to extraterritorial jurisdiction. The Voyager 1 probe, launched in 1977, has traveled beyond the heliosphere and is currently in what region of space?

- A) The Kuiper Belt
- B) The Oort Cloud
- C) Interstellar space**
- D) The asteroid belt

6. The rotation period of a celestial object, crucial for understanding phenomena like day-night cycles and magnetic field generation, can vary drastically. The planet Venus exhibits a retrograde rotation, meaning it spins in the opposite direction to most other planets. Approximately how long does a sidereal day on Venus last?

- A) 24 Earth hours
- B) 117 Earth days**
- C) 59 Earth days
- D) 1 Earth year

7. The existence of black holes, regions of spacetime where gravity is so strong that nothing, not even light, can escape, is a testament to extreme physical laws. The event horizon of a black hole represents the boundary beyond which escape is impossible, analogous to a point of no return in legal proceedings. What is the term for the radius of the event horizon of a non-rotating black hole?

- A) Schwarzschild radius**
- B) Hawking radius
- C) Chandrasekhar limit
- D) Roche limit

8. The study of pulsars, rapidly rotating neutron stars that emit beams of electromagnetic radiation, relies on precise timing of their signals, much like the evidentiary timelines in a criminal trial. The first pulsar was discovered in 1967 by Jocelyn Bell Burnell and Antony Hewish. What is the typical rotational period range for a pulsar?

- A) Seconds to minutes
- B) Milliseconds to seconds**
- C) Hours to days
- D) Years to decades

9. The concept of 'sentencing disparities' can be observed in the vastly different compositions and densities of celestial bodies. For example, the gas giants like Jupiter and Saturn are primarily composed of light elements like hydrogen and helium, while terrestrial planets like Earth and Mars are denser and rocky. The core of a gas giant, while not solid in the terrestrial sense, is theorized to be composed of what element under immense pressure?

- A) Iron
- B) Silicon
- C) Metallic hydrogen**
- D) Carbon

10. The expansion of the universe, a phenomenon supported by the redshift of distant galaxies, implies a continuous and accelerating process, much like the evolution of legal precedent. The rate at which the universe is expanding is known as the Hubble constant. The current accepted value of the Hubble constant is approximately how many kilometers per second per megaparsec?

- A) 1-10
- B) 10-30
- C) 70-75**
- D) 100-150

11. The investigation of celestial events like supernovae, the explosive death of stars, provides insight into the origins of elements, much like forensic investigations reveal the circumstances of a crime. The Crab Nebula, a famous supernova remnant, is the result of a supernova observed in what year AD?

- A) 1054**
- B) 1604
- C) 1781
- D) 1987

12. The concept of 'mens rea' (guilty mind) in criminal law can be conceptually related to the internal processes of a planetary body that lead to observable phenomena. For instance, the internal geodynamo of Earth is responsible for its magnetic field. Which planet in our solar system possesses the strongest magnetic field?

- A) Earth
- B) Jupiter**
- C) Saturn
- D) Neptune

13. The discovery of evidence for past liquid water on Mars, through geological formations and mineral deposits, is a form of exculpatory or mitigating evidence in the search for extraterrestrial life. What is the primary component of the polar ice caps on Mars?

A) Water ice

B) Carbon dioxide ice (dry ice)

C) Methane ice

D) Ammonia ice

14. The principle of 'innocent until proven guilty' finds a parallel in the scientific method, where hypotheses are tested and disproven. The planet Neptune was predicted mathematically based on anomalies in the orbit of Uranus before it was directly observed. What anomaly in Uranus's orbit led to the prediction of Neptune's existence?

A) It was moving too fast

B) It was slightly deviating from its predicted path

C) It was showing signs of precession

D) Its brightness was fluctuating unexpectedly