

Cosmic Number Theory

Number Theory · Answer Key · 18 Questions

1. The number of known dwarf planets in our solar system (as of 2023) is 5. If a celestial body orbits Jupiter with a period 'T' in years, and 'T' is the smallest integer such that $T \not\equiv 3 \pmod{5}$, what is the minimum orbital period in years?

- A) 3 years
- B) 7 years
- C) 8 years**
- D) 13 years

2. The approximate number of stars in the Milky Way galaxy is 10^{11} . The smallest prime number greater than $10^{11} - 100$ is used to represent a hypothetical galactic cluster size. What is this prime number?

- A) 100000000003
- B) 100000000007**
- C) 100000000009
- D) 100000000011

3. The number of major planets in our solar system is 8. If the number of moons of Saturn that have names is N, and $N \not\equiv 2^k \pmod{8}$ for the smallest positive integer k, what is the remainder when N is divided by 8?

- A) 1
- B) 2
- C) 4**
- D) 6

4. The speed of light is approximately 299,792,458 meters per second. Consider the sum of the digits of this number. If this sum is 'S', what is the remainder when S is divided by 9?

- A) 0**
- B) 1
- C) 7
- D) 8

5. The number of recognized constellations in the night sky is 88. If a hypothetical alien civilization has 'X' solar systems, where X is the smallest prime number that is a factor of 88, what is X?

- A) 2
- B) 4
- C) 11
- D) 22

6. The approximate number of days in a Venusian year is 225. If a cycle of a celestial phenomenon occurs every 'D' days, and $D \equiv 225 \pmod{17}$, what is the remainder when D is divided by 17?

- A) 2
- B) 4
- C) 6
- D) 8

7. The number of Jupiter's Galilean moons is 4. If the number of observable exoplanets in a distant star system is 'E', and $E \equiv 4^3 \pmod{11}$, what is the remainder when E is divided by 11?

- A) 1
- B) 3
- C) 7
- D) 9

8. The approximate number of Earth days in a Martian year is 669. Consider the number of Martian days in a specific period, 'M', where $M \equiv 669 \pmod{13}$. What is the remainder when M is divided by 13?

- A) 1
- B) 3
- C) 5
- D) 7

9. The number of aphelion points in the orbit of a celestial body is 1. If a certain cosmic event has a probability 'P' that can be represented by the smallest number of the form $2^n - 1$ that is a perfect square, what is P?

- A) 1
- B) 3
- C) 7
- D) 15

10. The approximate number of seconds in a day is 86,400. The sum of the prime factors of 864 is 'F'. What is the value of F?

A) $2 + 2 + 2 + 3 + 3 + 3 + 5 = 20$

B) $2 + 3 + 5 = 10$

C) $2 + 3 + 5 + 7 = 17$

D) $2 + 3 + 5 + 11 = 21$

11. The approximate number of known moons of Saturn is 146 (as of early 2024). If a celestial body orbits Saturn with a period 'P' in Saturnian days, and $P \equiv 146 \pmod{7}$, what is the remainder when P is divided by 7?

A) 1

B) 3

C) 5

D) 6

12. The approximate number of visible stars from Earth under ideal conditions is around 9000. If a telescope can resolve stars down to magnitude 'M', and $M \equiv 9000 \pmod{19}$, what is the remainder when M is divided by 19?

A) 1

B) 4

C) 10

D) 13

13. The number of dimensions in M-theory is 11. If a hypothetical structure has 'D' dimensions, and D is the smallest prime number greater than 10, what is D?

A) 11

B) 13

C) 17

D) 19

14. The approximate number of Earth years for Uranus to orbit the Sun is 84. If a phenomenon occurs every 'U' years, and $U \equiv 84 \pmod{11}$, what is the remainder when U is divided by 11?

A) 1

B) 5

C) 7

D) 9

15. The number of axes of rotation for a perfect sphere is infinite. If a mathematical property holds for the number of unique prime factors of a set of cosmic numbers, and the number of unique prime factors of 30 is 'P', what is P?

- A) 2
- B) 3**
- C) 4
- D) 5

16. The approximate number of Earth days in a Jupiter day (sidereal rotation period) is 0.41. If an event repeats every 'J' Jupiter days, and $J \equiv 0.41 \pmod{1}$, we consider J to be the smallest integer greater than 0.41. What is J?

- A) 0
- B) 1**
- C) 2
- D) 3

17. The Fibonacci sequence begins 0, 1, 1, 2, 3, 5, 8... The number of visible planets in our solar system is 8. What is the index (starting from 0) of the first occurrence of 8 in the Fibonacci sequence?

- A) 3
- B) 4
- C) 5**
- D) 6

18. The approximate number of light-years in a parsec is 3.26. If a distance is 'D' parsecs, and $D \equiv 3.26 \pmod{1}$, we consider D to be the smallest integer greater than 3.26. What is D?

- A) 3
- B) 4**
- C) 5
- D) 6