

Organic Chemistry in the Cosmos

Organic Chemistry · Answer Key · 15 Questions

1. Which simple organic compound, a major component of natural gas on Earth, makes up the vast majority of Titan's atmosphere?

- A) Ethane
- B) Methane**
- C) Propane
- D) Acetylene

2. What complex organic molecules, often found in interstellar dust clouds, are considered potential precursors to life?

- A) Polycyclic Aromatic Hydrocarbons**
- B) Polytetrafluoroethylene
- C) Polyvinyl chloride
- D) Polystyrene

3. The Murchison meteorite, which fell in Australia in 1969, is famous for containing which organic building blocks essential to life?

- A) Nucleic acids
- B) Amino acids**
- C) Simple sugars
- D) Lipids

4. Which organic compound is believed to be the primary cause of the reddish-brown haze observed in the atmosphere of Saturn's moon, Titan?

- A) Tholins**
- B) Fullerenes
- C) Glycine
- D) Benzene

5. Spectroscopic analysis of the interstellar medium has confirmed the presence of which basic organic molecule, a precursor to many others?

- A) Formaldehyde**
- B) Glucose
- C) Citric acid
- D) Urea

6. Which planet in our solar system shows high concentrations of methane, which is thought to be replenished by either volcanic or biological processes?

- A) Venus
- B) Mars**
- C) Mercury
- D) Neptune

7. What is the most abundant organic molecule detected in the gas clouds surrounding newborn stars?

- A) Methanol**
- B) Acetic acid
- C) Ethanol
- D) Formic acid

8. Organic molecules known as carbonaceous chondrites are classified as what type of celestial object?

- A) Comets
- B) Asteroids**
- C) Nebulae
- D) Galaxies

9. Which carbon-based molecule, found in cometary tails, is often used by astronomers to identify organic content in space?

- A) Cyanogen**
- B) Neon
- C) Argon
- D) Xenon

10. What are the 'building blocks' of proteins that have been detected in various interstellar molecular clouds?

- A) Peptides
- B) Amino acids**
- C) Fatty acids
- D) Monosaccharides

11. The dark, reddish material covering parts of the surface of Pluto is thought to be composed of what complex organic mixtures?

- A) Tholins**
- B) Silicates
- C) Iron oxides
- D) Sulfates

12. Which simple organic molecule has been detected in the atmosphere of Venus, potentially hinting at non-biological chemical processes?

- A) Phosphine**
- B) Methane
- C) Formaldehyde
- D) Ethane

13. What organic process occurs in space where small molecules like methanol are synthesized on the surfaces of interstellar dust grains?

- A) Surface-catalyzed grain chemistry**
- B) Photosynthesis
- C) Nuclear fusion
- D) Cracking

14. Which organic molecule, often associated with the smell of rotten eggs, has been identified in the atmosphere of various icy moons?

- A) Hydrogen sulfide**
- B) Methane
- C) Acetone
- D) Methanol

15. Which type of carbon allotrope, consisting of spheres of carbon atoms, has been detected in the interstellar medium?

- A) Fullerenes**
- B) Graphite
- C) Diamond
- D) Graphene