

AI in Space Exploration

Artificial Intelligence In Space · Answer Key · 25 Questions

1. Which NASA mission used the AEGIS (Autonomous Exploration for Gathering Increased Science) AI software to autonomously select rock targets for laser analysis on Mars?

A) Curiosity Rover

- B) Perseverance Rover
- C) Viking 1
- D) Pathfinder

2. What is the primary function of the AI-based 'Earth Observing-1' (EO-1) spacecraft's Autonomous Sciencecraft Experiment?

A) To build a space station

B) To detect volcanic eruptions and floods without waiting for human commands

- C) To track human satellite debris
- D) To refuel other satellites

3. How does AI assist the Kepler Space Telescope in its search for exoplanets?

- A) By physically moving the telescope
- B) By cleaning the telescope lens

C) By processing light curves to identify dips caused by transiting planets

- D) By cooling the camera sensors

4. What specific task does the 'AI-driven' software on the James Webb Space Telescope perform to ensure high-quality imaging?

A) Controlling the secondary mirror alignment

- B) Managing oxygen levels
- C) Refueling solar panels
- D) Predicting alien life forms

5. Which algorithm model is frequently used to process massive amounts of radio telescope data to identify potential signals from space?

A) Linear regression

B) Neural networks for pattern recognition

- C) Decision trees for weather
- D) K-means for physical soil testing

6. The ESA's 'PHI' (Proba-3) mission utilizes AI for what purpose in its formation-flying experiment?

A) To prevent space junk collisions

B) To manage the precise relative positioning of two satellites

C) To send encrypted messages

D) To heat the spacecraft cabin

7. AI on the International Space Station (ISS) known as 'CIMON' is primarily used to perform which function?

A) Docking the station

B) Assisting astronauts with hands-free tasks and procedures

C) Stabilizing the station's orbit

D) Cooking food for the crew

8. In astronomical data analysis, what role do 'Convolutional Neural Networks' (CNNs) play regarding galaxy images?

A) Classifying galaxy shapes like spiral or elliptical

B) Calculating the exact distance to the sun

C) Refueling spacecraft

D) Measuring oxygen levels on Mars

9. What is the main challenge AI helps overcome when navigating autonomous spacecraft in the asteroid belt?

A) The lack of solar power

B) Communication latency with Earth making real-time control impossible

C) The freezing temperatures of space

D) The lack of oxygen

10. The 'AutoNav' system on the Perseverance rover is designed to perform what critical task?

A) Autonomous path planning to avoid hazards like rocks and sand

B) Calculating the orbit of Earth

C) Determining the chemical composition of stars

D) Sending data back to the Moon

11. AI systems used by astronomers to sort 'light curves' are particularly effective at finding what type of astronomical event?

A) Supernova explosions

B) Solar flares

C) Comet tails

D) Moon eclipses

12. In the context of the 'Deep Space Network', how is AI utilized to optimize communication?

A) By predicting and scheduling antenna time slots for various missions

- B) By manually rotating antennas
- C) By painting the antennas white
- D) By cleaning the antenna surfaces

13. What allows AI to distinguish between real exoplanet signals and 'instrumental noise' in telescope data?

A) Deep learning models trained on labeled datasets of light signatures

- B) Human manual observation only
- C) Physical cleaning of the telescope
- D) The temperature of the telescope

14. How does AI help in the 'Space Debris' tracking initiatives?

A) By calculating collision probabilities for thousands of tracked objects

- B) By physically capturing debris
- C) By sending debris to the sun
- D) By ignoring debris

15. The Mars helicopter 'Ingenuity' used what type of AI-related logic to maintain its flight stability?

A) Simple mechanical springs

B) Advanced visual odometry and flight control algorithms

- C) Human remote control every millisecond
- D) Nothing, it was purely mechanical

16. AI is used to scan images from the 'Hubble Space Telescope' to automatically identify what?

A) Gravitational lenses

- B) Human satellites
- C) Atmospheric clouds on Earth
- D) Space junk on Mars

17. Which agency uses the 'AI-driven' software 'TESS' (Transiting Exoplanet Survey Satellite) data to identify potential worlds?

A) NASA

- B) SpaceX
- C) Blue Origin
- D) ESA

18. What is the benefit of using AI for 'on-board' satellite data processing?

A) It reduces the amount of raw data that must be sent back to Earth

B) It increases the size of the satellite

C) It makes the satellite heavier

D) It requires more fuel

19. AI models for planetary mapping use satellite imagery to identify geological features such as:

A) Impact craters

B) Subway stations

C) Ocean liners

D) Mountain ski resorts

20. The 'Voyager' probes do not use modern AI, yet they are famous for:

A) Navigating the outer solar system and into interstellar space

B) Returning to Earth safely

C) Landing on Saturn

D) Orbiting the Sun

21. Why are 'Genetic Algorithms' sometimes used in designing satellite antenna arrays?

A) To evolve the most efficient geometry for signal reception

B) To make the antennas look better

C) To reduce the weight to zero

D) To provide heat to the satellite

22. What does AI help 'Solar Dynamics Observatory' (SDO) scientists do regarding the Sun?

A) Analyze solar flare activity and magnetic field evolution

B) Predict the Earth's weather

C) Measure the temperature of Pluto

D) Clean the Sun's surface

23. In the search for 'Technosignatures', what role does AI play?

A) Analyzing massive datasets for non-random, potentially artificial signal patterns

B) Building radio telescopes

C) Physically visiting other stars

D) Looking through a standard telescope

24. AI systems are currently trained to detect 'Lunar transient phenomena' which are defined as:

A) Short-lived changes in the appearance of the Moon's surface

B) Moon eclipses

C) The phases of the Moon

D) The movement of the Moon

25. The 'ESA' uses AI for 'Mars Express' data to improve the quality of what?

A) Topographic maps of the Martian surface

B) The internet on Earth

C) The oxygen supply

D) The speed of the rocket