



1. What is the primary advantage of using robots for exploration in dangerous or inaccessible places?

- A. They have superior physical strength compared to humans.
- B. They are equipped with advanced computer brains.
- C. They can communicate with other robots wirelessly.
- D. They are immune to radiation.

2. What is the purpose of Rosie, a robot built by a team at Carnegie Mellon University?

- A. Handling live bombs for law enforcement.
- B. Exploring active volcanoes.
- C. Conducting underwater research.
- D. Collecting soil samples on Mars.

3. Why did scientists team up with Carnegie Mellon University and the Alaska Volcano Observatory to send a robot to explore an active volcano?

- A. To extract precious minerals from the volcano.
- B. To study the behavior of volcanoes and predict eruptions.
- C. To test the durability of the robot in extreme conditions.
- D. To search for signs of ancient civilizations inside the volcano.

4. **What was the specific task assigned to the robot named Dante II in Alaska's Mount Spurr?**

- A. To climb the mountain and measure its height.
- B. To explore the surrounding forest for wildlife.
- C. To collect gas and soil samples from the crater floor.
- D. To search for lost hikers on the mountain trails.

735

5. **What technology did Dante have to help it navigate the challenging terrain of the volcano?**

- A. GPS navigation systems
- B. Servomotors and sensors in its footpads and legs
- C. Hydraulic propulsion systems
- D. Sonar imaging technology

6. **How did Dante's main computer ensure its safety during the exploration of the volcano?**

- A. By relying on its advanced artificial intelligence to make decisions independently.
- B. By connecting to a human team via satellite and the Internet, with the team analyzing every step before allowing Dante to proceed.
- C. By deploying drones to scout ahead and assess potential hazards.
- D. By utilizing advanced weather forecasting algorithms to predict dangerous conditions.

736

7. **What were the primary objectives of the twin Rover robots, Spirit and Opportunity, upon their landing on Mars in 2004?**

- A. To study the atmospheric conditions of Mars and search for signs of life.
- B. To collect soil and rock samples, take pictures, and explore the planet.
- C. To establish a permanent base for human colonization.
- D. To study the geological formations and seismic activity of Mars.

8. **How do the Rovers, Spirit and Opportunity, handle communication with NASA scientists on Earth given the vast distance between Mars and Earth?**

- A. Communication signals are transmitted through a network of satellites orbiting Mars.
- B. Communication signals travel directly from the Rovers to antennas on Earth, bypassing any intermediary devices.
- C. Messages are sent through orbiting spacecraft and antennas on Earth, resulting in several minutes of delay.
- D. The Rovers utilize advanced AI algorithms to independently analyze and respond to their surroundings without the need for communication with Earth.

737

9. **What is the purpose of the tiny snake-bot being developed by scientists at the California Institute of Technology?**

- A. To perform surgery on patients' gastrointestinal systems.
- B. To assist doctors in diagnosing diseases by capturing images and gathering medical information from inside the human body.
- C. To provide therapy to patients with gastrointestinal disorders.

D. To navigate through the bloodstream and remove plaque.

10. How are the Swedish micro-bots designed to operate, and what is their intended use in the future?

- A. They are designed to operate in all kinds of fluids and are intended to be injected into the human bloodstream to clean up plaque, remove blood clots, and potentially fix disease-causing cells.
- B. They are designed to operate on solid surfaces and are intended to assist in surgeries by providing microscopic precision.
- C. They are designed to navigate through the human respiratory system and are intended to help in diagnosing respiratory diseases.
- D. They are designed to operate underwater and are intended to assist in underwater exploration and research.

11. How does the concept of micro-bots injected into the bloodstream for medical purposes resemble a scenario from the old sci-fi movie *Fantastic Voyage*?

- A. In the movie, scientists shrink themselves and their submarine to microscopic size and are injected into a fellow scientist's bloodstream to remove plaque.
- B. In the movie, scientists shrink themselves and their submarine to microscopic size and travel inside a patient's gastrointestinal system to diagnose diseases.
- C. In the movie, scientists use micro-bots to perform surgery on a patient's brain to remove a blood clot.
- D. In the movie, scientists inject micro-bots into a patient's bloodstream to assist in cleaning up plaque and removing blood clots.

738

12. What is the main purpose of the QRIO robot created by the Sony Corporation?

- A. To play soccer in international tournaments.
- B. To conduct orchestras and control its motions.
- C. To clean and maintain musical instruments.
- D. To assist in medical surgeries.

13. What was the initial challenge faced by robots participating in the RoboCup soccer tournament?

- A. Recognizing their teammates.
- B. Finding the ball.
- C. Determining the size of the playing field.
- D. Identifying the position of the goals.

739

14. What is the main focus of Allison Bruce's research at Carnegie Mellon University's Robotics Institute?

- A. Developing robots that can cook meals.
- B. Enhancing interaction between humans and robots.
- C. Creating robots with advanced physical strength.
- D. Studying the behavior of animals in response to robots.

15. What did Allison Bruce's experiment with the laptop-connected robot in the college classroom building reveal about human interaction with robots?

- A. Human emotions have little impact on interaction with robots.
- B. Students were more likely to respond to the robot when it displayed a face.
- C. The robot's questions were not relevant to the students' interests.
- D. Students were generally unwilling to stop and talk to the robot.

740

16. What distinguishes Kismet from other robots built at MIT's Artificial Intelligence Laboratory?

- A. Kismet can display emotions through facial expressions.
- B. Kismet is equipped with advanced voice recognition technology.
- C. Kismet has superior physical strength compared to other robots.
- D. Kismet is capable of performing complex mathematical calculations.

741

17. What distinguishes K-bot, created by David Hanson, from other robots?

- a) It can perform complex mathematical calculations.
- b) It has high cheekbones and blue eyes.
- c) It is controlled by a laptop computer.
- d) It has 24 servomotors under its skin that allow it to mimic human facial expressions.

742

18. What did Masahiro Mori's research in the late 1970s reveal about people's perceptions of robots?

- a) People prefer robots that look exactly like humans.
- b) People feel uncomfortable with robots that look too much like humans.
- c) People are indifferent to the appearance of robots.
- d) People are fascinated by robotic heads but not by full-body robots.

743

19. How do the insect-bots learn about their environment and improve their capabilities?

- a) They are preprogrammed with specific data about their environment.
- b) They rely on their instincts and senses to navigate their environment.
- c) They communicate with each other to share information about their environment.
- d) They are equipped with separate "layers of behavior" that help them learn and adapt to their environment over time.

744

20. What capabilities does the robot ISAC developed by the Center for Intelligent Systems (CIS) at Vanderbilt University have?

- a) Short-term and long-term memory, and the ability to express emotion.
- b) Advanced physical strength and agility, with high-speed processing capabilities.
- c) Ability to communicate with other robots and humans using natural language.
- d) Highly advanced problem-solving abilities and self-repair mechanisms.

755

21. According to the Three Laws of Robotics proposed by Isaac Asimov, what is the primary concern in ensuring the safety of humanity when designing robots?

- a) Ensuring robots have advanced problem-solving abilities.
- b) Programming robots to prioritize their own survival.
- c) Preventing robots from causing harm to humans.
- d) Allowing robots to make their own decisions without human intervention.