

AI and Machine Learning:

1. Define artificial intelligence (AI). (1)
2. What is the primary goal of artificial intelligence (AI)? (1)
 - A) To replace human intelligence entirely
 - B) To simulate intelligent behaviour in machines
 - C) To create robots that can perform any task
 - D) To automate repetitive tasks
3. Which subset of AI refers to artificial intelligence systems that are designed and trained for a **specific task** or a limited range of tasks.
 - A) Strong AI
 - B) Narrow AI
 - C) Machine Learning
 - D) Expert Systems
4. What type of AI uses labelled data to train the system?
 - A) Machine learning
 - B) Narrow AI
 - C) Reinforcement learning
 - D) Deep learning
5. Explain the difference between a robot and AI. (2)
6. What are the potential benefits and risks of using AI in various applications (e.g., healthcare, transportation)? **NOTE: in an exam the question would focus on only 1 industry or be a broader question about advantages and disadvantages.** (6)

ANSWERS

1. AI refers to the ability of a machine or software to simulate intelligent, human-like behaviour, learn from data, and make decisions based on that data.
2. A To simulate intelligent behaviour in machines
3. B Narrow AI. An example of narrow AI would be image recognition, digital assistant, chatbot, chess-playing software. Almost ALL current AI systems are narrow AI.
4. A Machine learning. Machine learning involves computers being given labelled data. Remember the 'Is it a fish?' activity. Computers learn from the examples and adapt their behaviour without explicit programming.
5. A robot is a physical machine or device that can perform tasks autonomously or semi-autonomously. They interact with their environment through sensors and actuators/motors, and mechanical components and are designed to perform specific tasks. AI refers to the ability of a machine or software to simulate intelligent behaviour, learn from data, and make decisions. AI can be embedded in robots, but it also exists independently in software applications. Some robots include AI but not all robots are intelligent.
6. Below are some points that you could make in this kind of extended answer.

Benefits:

- **Diagnosis and Treatment:** AI algorithms can analyze medical images (such as X-rays and MRIs) faster and more accurately than humans. Early detection of diseases like cancer improves patient outcomes.
- **Personalized Medicine:** AI tailors treatment plans based on an individual's genetic makeup, medical history, and lifestyle.
- **Virtual Health Assistants:** Chatbots and virtual nurses provide 24/7 support, answer queries, and schedule appointments.

Risks:

- **Bias:** Biased training data can lead to discriminatory outcomes, especially for underrepresented groups.
- **Privacy Concerns:** AI systems handle sensitive patient data. Ensuring privacy and security is essential.
- **Lack of Human Judgment:** Relying solely on AI may overlook critical nuances that human doctors consider.
- **Ethical Dilemmas:** Who is responsible if an AI system makes a life-or-death decision?

Transportation:

Benefits:

- **Self-Driving Cars:** AI enables autonomous vehicles, reducing accidents caused by human error.
- **Traffic Management:** AI optimizes traffic flow, reduces congestion, and enhances safety.
- **Route Optimization:** AI recommends efficient routes for delivery trucks and public transport.

Risks:

- **Safety Concerns:** Self-driving cars must handle unpredictable scenarios, and any failure can be fatal.
- **Ethical Decisions:** AI may need to choose between minimizing harm to passengers or pedestrians.
- **Job Disruption:** Automation affects lorry drivers, taxi drivers, and other transportation-related jobs.