1. What is Artificial Intelligence (AI)?

Artificial Intelligence (AI) is a branch of computer science that aims to create machines and software capable of performing tasks that normally require **human intelligence**. These tasks include **thinking, learning, reasoning, problem-solving, decision-making, understanding language, recognizing images, and adapting to new situations**.

AI works by combining:

- **Data** (information from the real world),
- **Algorithms** (step-by-step procedures),
- **Computing power** (hardware to process data).

Key abilities of AI:

- **Learning** – improving performance over time
- **Reasoning** – making logical decisions
- **Perception** – understanding images, audio, and text
- **Natural Language Understanding** – communicating in human language
- **Problem Solving** – finding optimal solutions

Types of AI:

1. **Narrow AI (Weak AI)**
    - Designed for a specific task
    - Example: Chatbots, face recognition, recommendation systems
2. **General AI (Strong AI)**
    - Can perform any intellectual task a human can
    - Still theoretical (not achieved yet)
3. **Super AI**
    - Intelligence beyond humans
    - Exists only in research and science fiction

Future Scope of AI

- Artificial General Intelligence
- Human–AI collaboration
- Explainable AI
- AI in space exploration
- AI-driven education

Advantages

- Automation
- Speed & accuracy
- 24/7 availability
- Data-driven decisions

Difference Between AI, ML, DL

No.	Basis	Artificial Intelligence (AI)	Machine Learning (ML)	Deep Learning (DL)
1	Meaning	Broad concept of making machines intelligent	Subset of AI that enables learning from data	Subset of ML using deep neural networks
2	Scope	Very wide	Limited compared to AI	Narrowest
3	Dependency	Can work with rules or data	Completely data-driven	Requires huge amounts of data
4	Learning	Learning may or may not exist	Learning is mandatory	Learning is automatic & deep
5	Human Intervention	High (rule-based systems)	Medium (feature selection)	Very low (features learned automatically)
6	Complexity	Low to high	Medium	Very high
7	Algorithms Used	Rule-based, logic, search	Regression, decision trees, SVM	CNN, RNN, Transformers
8	Hardware Requirement	Normal systems	Moderate computing	High-performance GPUs/TPUs
9	Accuracy	Depends on rules	Good accuracy	Very high accuracy
10	Examples	Expert systems, chess programs	Spam filtering, recommendation systems	Face recognition, self-driving cars

Three Real-Life Applications of AI

1. **Virtual Assistants (Siri, Alexa, Google Assistant)**
   AI-powered virtual assistants understand voice commands, answer questions, set reminders, and control smart devices. They use AI techniques like natural language processing and machine learning.
2. **Recommendation Systems (Netflix, YouTube, Amazon)**
   AI analyses user behaviour such as searches, likes, and watch history to recommend movies, videos, or products. This improves user experience and saves time.
3. **Healthcare (Disease Detection and Diagnosis)**
   AI is used to analyze medical images, predict diseases, and assist doctors in diagnosis. For example, AI can help detect cancer or heart diseases at an early stage with high accuracy.