**Q-1 what is deep learning ?**

​**Ans**-Deep learning is a specialized branch of machine learning and artificial intelligence (AI) that employs multi-layered artificial neural networks to analyze and learn from vast amounts of data. These networks are inspired by the structure and function of the human brain, enabling computers to recognize intricate patterns and make decisions with minimal human intervention.

**Key Applications**

Deep learning has revolutionized various industries by powering applications like:​

**Computer Vision**: Object detection, facial recognition, and medical image analysis.

**Natural Language Processing**: Language translation, sentiment analysis, and chatbots.

**Speech Recognition**: Voice assistants and transcription services.

**Autonomous Systems**: Self-driving cars and robotics.​

Its ability to process and learn from unstructured data makes it invaluable for tasks that were previously challenging for traditional algorithms.

**Q-2 ​what is CNN in simple words?**

ANS- ​**A Convolutional Neural Network (CNN)** is a type of artificial intelligence model designed to process and analyze visual data, such as images and videos. It's inspired by the way the human brain interprets visual information.

**Q-3** what is Neural network and it’s type?

**ANS**- ​A neural network, or artificial neural network (ANN), is a computational model inspired by the human brain's structure and function. It consists of interconnected nodes, or "neurons," organized into layers: an input layer, one or more hidden layers, and an output layer. Each neuron processes input data, applies a weight, passes it through an activation function, and transmits the result to the next layer. This architecture enables neural networks to learn patterns from data and make decisions or predictions based on that learning.

**Types of Neural Networks**

Neural networks come in various architectures, each suited to specific tasks and data types:​

1. **Feedforward Neural Network (FNN)**

**Structure**: Data flows in one direction—from input to output—without cycles.

**Use Cases**: Basic pattern recognition and classification tasks.

**Example**: Predicting housing prices based on features like size and location.​

1. **Convolutional Neural Network (CNN)**

**Structure**: Incorporates convolutional layers that automatically and adaptively learn spatial hierarchies of features.

**Use Cases**: Image and video recognition, object detection.

**Example**: Facial recognition systems.​

1. **Recurrent Neural Network (RNN)**

**Structure**: Features loops allowing information to persist, making them suitable for sequential data.

**Use Cases**: Time series analysis, natural language processing.

**Example**: Predicting stock prices based on historical data.

1. **Long Short-Term Memory (LSTM)**

**Structure**: A type of RNN capable of learning long-term dependencies.

**Use Cases**: Speech recognition, language modeling.

**Structure**: A feedforward network that uses statistical algorithms for classification.

**Use Cases**: Pattern recognition, classification problems.

**Example**: Medical diagnosis systems.

1. **Time Delay Neural Network (TDNN)**

**Structure**: A feedforward network that handles sequential data by incorporating time delays.

**Use Cases**: Speech recognition, time series prediction.

**Example**: Recognizing spoken words in audio recordings.

1. **Physics-Informed Neural Network (PINN)**

**Structure**: Integrates physical laws into the training process to solve differential equations.

**Use Case:** Modeling physical systems, solving partial differential equations.

**Example**: Simulting fluid dynamics.