1.D) All of the above

2.C) Fraud Detection

3. C) i – v – iv – iii – ii

4.A) Recurrent Neural Network

5.A) input pattern keeps on changing

6.C) dynamic inputs & categorization can’t be handled

7.B) Statement 2 is true while statement 1 is false

8.A) Recurrent Neural network

9.A) Learning Rate is low & B) Regularisation parameter is high & D) Stuck at local minima

10.B) Rectified Linear Unit & D) Sigmoid Function

**ANS.11.Deep Learning is a subfield of machine learning concerned with algorithms inspired by the structure and function of the brain called artificial neural networks**.It mirrors the functioning of our brains.Deep Learning models are simpler to how nervous system is structured where each neuron is connected to each other & passing hierarchical layers,pass of information from layer to layer..Deep learning has gained a lot of popularity in recent times,this is because **deep learning models can perform well with huge amounts of data contrary to machine learning models**.

**Deep learning excels on problem domains where the inputs (and even output) are analog**. Meaning, they are not a few quantities in a tabular format but instead are **images of pixel data, documents of text data or files of audio data**.

**ANS.12** **Reinforcement Learning is a part of the deep learning method that helps you to maximize some portion of the cumulative reward**. Reinforcement Learning is learning what to do and how to map situations to actions.**The end result is to maximize the numerical reward signal,The learner is not told which action to take but instead must discover which action will yield the maximum reward.**It is based on reward /penalty mechanism. Agent, State, Reward, Environment, Value function Model of the environment, Model based methods, are some important terms using in RL learning method. Reinforcement Learning method works on interacting with the environment, whereas the supervised learning method works on given sample data or example.**Application or reinforcement learning methods are: Robotics for industrial automation and business strategy planning.**

**ANS.13**. 1.**Functioning**:**Deep learning is a subset of machine learning that takes data as an input and makes intuitive and intelligent decisions using an artificial neural network stacked layer-wise.** On the other hand, **machine learning being a super-set of deep learning takes data as an input, parses that data, tries to make sense of it (decisions) based on what it has learned while being trained.**

2. **Feature Extractor: Deep learning is considered to be a suitable method for extracting meaningful features from the raw data.** It does not depend on hand-crafted features like local binary patterns, a histogram of gradients, etc., and most importantly it performs a hierarchical feature extraction. On the other hand**, machine learning is not a good method for extracting meaningful features from the data**. It relies on hand-crafted features as an input to perform well.

3**. Data Dependency**: **Machine learning algorithms often work well even if the dataset is small**, but **deep learning is Data Hungry** the more data you have, the better it is likely to perform.

**4. Computation Power**: **deep learning networks are data dependent, they need more than what a CPU can offer**. For the deep learning network training, you **need a graphical processing unit (GPU)** which have thousands of cores compared to a CPU. On the other hand**, a traditional machine learning algorithm can be implemented on a CPU with fairly decent specifications.**

5. **Training and Inference Time**:  **The training time of a deep learning network can range from anywhere between a few hours to months**, Not only training but very deep neural networks can also take a lot of inference time since the input test data will pass through all the layers in your network, a lot of multiplication will take place which will consume a considerable amount of time. **Whereas traditional machine learning algorithms often train very fast ranging from few minutes to a couple of hours**, but during the test time, some algorithms can also take quite a bit of time.

**6. Output**: **The output of a traditional machine learning is usually a numerical value like a score or a classification**. Whereas, **the output of a deep learning method can be a score, an element, text, speech, etc**.

**ANS.14.** **A perceptron is a neural network unit (an artificial neuron) that does certain computations to detect features or business intelligence in the input data**. A Perceptron is an algorithm for supervised learning of binary classifiers. This algorithm enables neurons to learn and processes elements in the training set one at a time. There are two types of Perceptrons: Single layer and Multilayer.

Single layer Perceptrons can learn only linearly separable patterns.

Multilayer Perceptrons or feedforward neural networks with two or more layers have the greater processing power.

The Perceptron algorithm learns the weights for the input signals in order to draw a linear decision boundary.

This enables you to distinguish between the two linearly separable classes +1 and -1

**ANS.15**. 1. **Artificial intelligence is a technology which enables a machine to simulate human behavior**. **Machine learning is a subset of AI which allows a machine to automatically learn from past data without programming explicitly**

2. **The goal of AI is to make a smart computer system like humans to solve complex problems**. The **goal of ML is to allow machines to learn from data** so that they can give accurate output

3. **In AI, we make intelligent systems to perform any task like a human.** **In ML, we teach machines with data to perform a particular task** and give an accurate result.

4. **Machine learning and deep learning are the two main subsets of AI**. **Deep learning is a main subset of machine learning**

5**. AI has a very wide range of scope. Machine learning** **has** a **limited scope**.

6. **The main applications of AI are Siri, customer support using catboats, Expert System, Online game playing**, intelligent humanoid robot, etc. **The main applications of machine learning are Online recommender system, Google search algorithms, Facebook auto friend tagging suggestions, etc**