1. Explain the term machine learning, and how does it work? Explain two machine learning applications in the business world. What are some of the ethical concerns that machine learning applications could raise?

   Machine Learning is termed as build a model for a real world problem by collecting the dataset and algorithmically trained statistical model based on the past dataset. It is exploring the given data and identify the correct pattern.

   Application used in the Telecom sector to predict the customer churn analysis and Fraud detection.

   Moreover it is useful in Sales and stakeholder even it predicts the stock marketing analysis.

   Ethical Concerns are solving the issues without the humans and AI is impact of loss of job in future.

2. Describe the process of human learning:

   i. Under the supervision of experts: Supervised learning.

   With the observation of expects, we can do the task regularly without fail and doesn't cheating the while they in observation and easy to clarify their doubt day by day.

   ii. With the assistance of experts in an indirect manner: Unsupervised learning

   By Indirect assistant, the people who made the task regularly and if they have any doubt on the subject only they can arise the comment or mail it take time to clear the doubts.

   iii. Self-education: Reinforcement learning

   With the Self education, he understand what he could in take itself. They make the correct online resources and give more practice and ask on the forum and try to solve it.

3. Provide a few examples of various types of machine learning.

   Supervised Machine Learning,→ Classification problem and regression problem ,heart disease, diabetes etc.

   Unsupervised Machine Learning,→ email prediction whether spam or not spam.

   Reinforcement Learning,→ gaming prediction

   Transfer Learning.

4. Examine the various forms of machine learning.

   Learning Problems

   1. Supervised Learning
   2. Unsupervised Learning
   3. Reinforcement Learning

   Hybrid Learning Problems

   4. Semi-Supervised Learning
   5. Self-Supervised Learning

6. Multi-Instance Learning

Statistical Inference

7. Inductive Learning

8. Deductive Inference

9. Transductive Learning

Learning Techniques

10. Multi-Task Learning

11. Active Learning

12. Online Learning

13. Transfer Learning

14. Ensemble Learning

5. Can you explain what a well-posed learning problem is? Explain the main characteristics that must be present to identify a learning problem properly.

A computer program is said to learn from experience E in context to some task T and some performance measure P, if its performance on T, as was measured by P, upgrades with experience E.

Three types:

Task

Performance Measure

Experience

6. Is machine learning capable of solving all problems? Give a detailed explanation of your answer.

ML may solve human's problem, it has given enough data, and machine learning algorithms can solve all of humanity's problems. There are some of limitation which machine learning doesn't support. When new object aren't similar enough to any of the examples that machine learning fails to 'generalize'

7. What are the various methods and technologies for solving machine learning problems? Any two of them should be defined in detail.

Supervised Learning:

It describes a class of problem that involves using a model to learn a mapping between input variables and the target variable.

Regression.

Classification.

Unsupervised Learning:

In unsupervised learning, there is no instructor or teacher, and the algorithm must learn to make sense of the data without this guide.

Clustering.

Reinforcement Learning.

Dimensionality Reduction.

Deep Learning.

Transfer Learning

Ensemble Methods.

8. Can you explain the various forms of supervised learning? Explain each one with an example application.

Classification and regression are the two forms of supervised learning.

Classification: Classification problem deals with problem that predicting the class whereas

Regression: Supervised learning problem that involves predicting a numerical label.

Both classification and regression problems may have one and more input variables and input variables may be any data type, such as numerical or categorical.

Example of a classification problem would be the **MNIST handwritten digits** dataset where the inputs are images of handwritten digits (pixel data) and the output is a class label for what digit the image represents (numbers 0 to 9).

Example of a regression problem would be the Boston house prices dataset where the inputs are variables that describe a neighborhood and the output is a house price in dollars

9. What is the difference between supervised and unsupervised learning? With a sample application in each region, explain the differences.

Parameters	Supervised	Unsupervised learning
Input Data	Uses Known and Labeled Data as input	Uses Unknown Data as input
Complexity	Very Complex	Less Computational Complexity
Real Time	Uses off-line analysis	Uses Real Time Analysis of Data
Number of Classes	Number of Classes are known	Number of Classes are not known
Accuracy of Results	Accurate and Reliable Results	Moderate Accurate and Reliable Results

Supervised learning is the learning model where the input variable x and output variable and algorithm to map the input to the output.

The process of learning can be thought of as teacher who is supervising the entire learning process and the Learning algorithm makes predictions.

10. Describe the machine learning process in depth.

Machine Learning is termed as build a model for a real world problem by collecting the dataset and algorithmically trained statistical model based on the past dataset. It is exploring the given data and identify the correct pattern

a. Make brief notes on any two of the following:

i. MATLAB is one of the most widely used programming languages.

ii. Deep learning applications in healthcare

Drug Discovery, Medical Imaging, Insurance Fraud, Genome

iii. Study of the market basket

Market Basket Analysis is a technique which identifies the strength of association between pairs of products purchased together and identify patterns of co-occurrence. A co-occurrence is when two or more things take place together.

Market Basket Analysis creates If-Then scenario rules, for example, if item A is purchased then item B is likely to be purchased. The rules are probabilistic in nature or, in other words, they are derived from the frequencies of co-occurrence in the observations. Frequency is the proportion of baskets that contain the items of interest. The rules can be used in pricing strategies, product placement, and various types of cross-selling strategies

iv. Linear regression (simple):
Linear regression is the finding the best fit line of X variable and Y variables which is predicted .
In this method to predict the dependent feature(Y) with the independent feature(X).
In this algorithms we are trying to minimize the error with best line fit
Y=mx+C

11. Make a comparison between:-

1. Generalization and abstraction

2. Learning that is guided and unsupervised

3. Regression and classification