[Q1] What is Machine Learning & its different types?

Answer 1 : Machine Learning is the field of study that gives computers the capability to learn without being explicitly programmed.

Types Of Machine Learning.
- **Supervised Learning**

    The Computer is presented with example inputs and their desired outputs.

    Image Classification, Market Prediction.

- **Unsupervised Learning**

    No labels are given to the learning algorithm, leaving it on its own to find structure in its input.

    Clustering

- **Reinforcement Learning**

    A computer program interacts with a dynamic environment in which it must perform a certain goal (such as driving a vehicle or playing a game against an opponent). The program is provided feedback in terms of rewards and punishments as it navigates its problem space.

[Q2] Differentiate between Supervised & Unsupervised Machine Learning.

Answer 2:

1. **Supervised learning** algorithms are trained using labeled data. **Unsupervised learning** algorithms are trained using unlabeled data.
2. **Supervised learning** model takes direct feedback to check if it is predicting correct output or not.**Unsupervised learning** model does not take any feedback
3. **Supervised learning** model predicts the output.**Unsupervised learning** model finds the hidden patterns in data.
4. In **supervised learnin**g, input data is provided to the model along with the output.In **unsupervised learning**, only input data is provided to the model.
5. The goal of **supervised learning** is to train the model so that it can predict the output when it is given new data.The goal of **unsupervised learning** is to find the hidden patterns and useful insights from the unknown dataset.
6. **Supervised learning** needs supervision to train the model.**Unsupervised learning** does not need any supervision to train the model.

7. **Supervised learning** can be categorized in **Classification** and **Regression** problems.**Unsupervised Learning** can be classified in **Clustering** and **Associations** problems.
8. **Supervised learning** model produces an accurate result.**Unsupervised learning** model may give less accurate result as compared to supervised learning.
9. **Supervised learning** is not close to true Artificial intelligence as in this, we first train the model for each data, and then only it can predict the correct output.**Unsupervised learning** is more close to the true Artificial Intelligence as it learns similarly as a child learns daily routine things by his experiences.
10. **Supervised learning** includes various algorithms such as Linear Regression, Logistic Regression, Support Vector Machine, Multi-class Classification, Decision tree, Bayesian Logic, etc.**Unsupervised learning** includes various algorithms such as Clustering, KNN, and Apriori algorithm.

[Q3] Differentiate between Regression & Classification Problems.

Answer 3: Classification is the task of predicting a discrete class label.
      Regression is the task of predicting a continuous quantity.

[Q4] Differentiate between Nominal & Ordinal Attributes.

Answer 4: Nominal data is classified without a natural order or rank, whereas ordinal data has a predetermined or **natural order.**

[Q5] Consider the following scenarios and decide whether they can be treated as classification or regression problems:

● **You are working on weather prediction and use a learning algorithm to predict tomorrow's temperature.**

 ● **You are working on stock market prediction. You would like to predict the number of company shares that will be traded tomorrow.**

Answer 5: In first Scenario Where working on weather prediction and use a learning algorithm to predict tomorrow's temperature. I would use **Classification**.And another scenario where working on stock market prediction i would use **Regression**.

[Q6] Fill in the blanks:

Answer 6:

James is given a task of making a system that recommends products to users based on their activity on Facebook. He realises that user-interests could be highly variable. Hence he decides to first cluster the users into communities of like-minded people and then train separate models for each community to predict which product category (e.g. electronic gadgets, cosmetics, etc.) would be the most relevant to that community. The first task is a/an **Reinforcement Learning** learning problem while the second is a/an **Unsupervised Learning(Clustering)** problem.

[Q7] Describe the Machine Learning Work-Flow.

Answer 7 :

Here is the Workflow of Machine Learning :

- **Get Data :** Data Mining is the first process of a Machine Learning Algorithm.
- **Clean, Prepare & Manipulate Data** : After getting data we need to clean the data for the next step.
- **Train Mode :** Model training is the next step for Machine Learning.
- **Test Data** : after training we need to test data.is prediction makes sense or not.
- **Improve :** then Improvement is very important .

[Q8] What are Outliers?

Answer 8 : Outliers are data objects with characteristics that are considerably different than most of the other data objects in the data set.

[Q9] Define following terms: (i) Median (ii) Mode (iii) Covariance (iv) Correlation

Answer 9 :

- **Median :** The median is the middle number in a sorted, ascending or descending, list of numbers and can be more descriptive of that data set than the average.
- **Mode :** Mode is the most frequent value in a data set.
- **Covariance :** Covariance is a statistical tool that is used to determine the relationship between the movements of two random variables.
- **Correlation :** Correlation is a statistical term describing the degree to which two variables move in coordination with one another. If the two variables move in the same direction, then those variables are said to have a positive correlation. If they move in opposite directions, then they have a negative correlation.

[Q10] use the given dataset and solve the ques in google colab file.

Answer 10 :

Solved Collab File :

1. : https://colab.research.google.com/drive/1wCozKD7OVBJ6l-gLCCay9AL9_0bru1th
2. https://colab.research.google.com/drive/1QwTrtVmnARiqPmkbq08L8tHfRT36Gnf1