1. What is the concept of human learning? Please give two examples.

Ans:

**Many examples of this case are found in case of human learning. Learning to drive a motor-car, typewriting, singing or memorizing a poem or a mathematical table, and music etc. need exercise and repetition of various movements and actions many times.**

1. What different forms of human learning are there? Are there any machine learning equivalents?

Ans: **types of human learning**

* **Learning through association - Classical Conditioning.**
* **Learning through consequences – Operant Conditioning.**
* **Learning through observation – Modeling/Observational Learning.**

**Supervised Machine learning takes place by learning from the old/historic data**

3. What is machine learning, and how does it work? What are the key responsibilities of machine learning?

Ans: **ML is used for prediction and classification. There are several ML algorithms which are used for prediction and classification. In supervised we train the labelled data, build a model through several iterations in the training data and then evaluate the performance through the test data. In unsupervised learning, we create groups of data points based on their similarities and differences. Again the key responsibilities of ML is to predict outcome, classify data and find the strength of relationship between dependent and independent variables.**

4. Define the terms "penalty" and "reward" in the context of reinforcement learning.

Ans:

**Reinforcement learning is all about gamifying the learning process. This type of machine learning uses a reward-penalty method to teach an AI system. If it makes the right move, it gets rewarded. If it makes a mistake, it receives a penalty.**

5. Explain the term "learning as a search"?

Ans:

**Concept learning can be viewed as the task of searching through a large space of. hypotheses implicitly defined by the hypothesis representation. The goal of this. search is to find the hypothesis that best fits the training examples.**

6. What are the various goals of machine learning? What is the relationship between these and human learning?

Ans: **the goal of machine learning model is to predict or classify data. Humans acquire knowledge through experience either directly or shared by others. Machines acquire knowledge through experience shared in the form of past data.**

7. Illustrate the various elements of machine learning using a real-life illustration.

Ans: **Supervised machine learning is used to predict a value or classify data. For example, predicting tomorrow’s weather or classifying whether a person has diabetes or not are the examples of supervised machine learning. On the contrary, unsupervised machine learning is used for creating groups based on similarities in data points. Examples could be creating groups of customers based on their spending and earning so each group can be targeted differently for promotions.**

8. Provide an example of the abstraction method.

Ans: **Abstraction means displaying only essential information and hiding the details. Data abstraction refers to providing only essential information about the data to the outside world, hiding the background details or implementation. Your car is a great example of abstraction. You can start a car by turning the key or pressing the start button. You don't need to know how the engine is getting started, what all components your car has**

9. What is the concept of generalization? What function does it play in the machine learning process?

Ans: **Generalization shows how well a model can adapt to a new dataset or unseen dataset. The more generalised model we have, the better predictions it would give. Therefore, the aim of building a machine learning model is to create as much generalized as possible.**

10. What is classification, exactly? What are the main distinctions between classification and regression?

Ans: **Classification algorithms are used to classify data into different groups like satisfied or unsatisfied is a binary classification. The main difference between regression and classification is regression algorithms are employed to predict a continuous variable, but classification algorithms are used to classify data into different categories.**

**For example, predicting a weather temp is a regression problem and predicting the type of weather like sunny or cloudy is a classification problem.**

11. What is regression, and how does it work? Give an example of a real-world problem that was solved using regression.

Ans: **regression in machine learning is used to find relationships between dependent and independent variables. One of the regressions algorithms is linear regression which falls under supervised learning where we have labelled data and we train the model using linear regression algorithm and build a model to predict a continuous value of the target variable provided that the relationship between variables is linear. For instance, finding the price of a house based on its size is a simple linear regression problem and finding a house price based on its size and location is an example of multiple linear regression problem.**

12. Describe the clustering mechanism in detail.

Ans: **clustering mechanism falls under the supervised algorithms where the grouping is carried out based on similarities of data points. One cluster consists of similar type of data points. Different algorithms such as K-means, Heirarchical-means, DBScan Clustering are employed for clustering. Silhoutte scoring is used to validate the model.**

13. Make brief observations on two of the following topics:

i. Machine learning algorithms are used

Ans: **machine learning algorithms are used to prediction or classification or to find the magnitude of the relationship between dependent and independent variables. There are different types of ML algorithms and they are used in different conditions.**

ii. Studying under supervision

Ans: **training a model under supervision is called supervised model. It means we have a labelled data or we know the outcome and then we train the model to find the relationship between the outcome and its dependent variable so the future value can be predicted through the model. Examples are, linear regression, Ridge and Lasso regression, ElasticNet regression etc.**

iii. Studying without supervision

Ans: **studying without supervision comes under unsupervised learning where we don’t have labelled data therefore, we can’t supervise the algorithm and we attempt to cluster the datapoints based on its similarity and difference. That is called clustering.**

iv. Reinforcement learning is a form of learning based on positive reinforcement.