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

The process of changing in a behaviour which is impacted from previous behaviour that change to knowledge or some event. Such as burning or falling from high level which learning happen suddenly or learning language which is a long process.

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

Learning through association, Consequences, Observation are three main type of learning.

The reinforcement method is also used in machine leaning which is based on award and punishment which is kind of consequence learning.

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

Machine Learning is one of the subsets of AI, which focuses on the use of data and algorithms to imitate the way that humans learn and improve accuracy during learning. It enables computers to learn automatically from history of data and find the patterns and relations between them to predict new data. The main feature of machine learning is predictive modelling, automation, scalability, generalization, adaptiveness

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

In reinforcement learning, there is an agent that learns from environment and do some action then if the action is correct get reward else get punishment or penalty which shows wrong action and through these two processes try to improve itself and future actions.

5. Explain the term ‘learning as a search’?

It is a kind of learning that can be done through the space of all sentences in a concept description language for a sentence that best describes the data. On the other way, it can be viewed as a search through all hypotheses in a hypothesis space and a generality relation usually determines the structure of the search space.

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

The goal of ML is so close to the goal of AI. ML is used to make the computers smarter, more intelligent, to develop systems for specific practical learning tasks in application domains. Second one is to develop computational models of human learning process and perform computer simulations and the third one is to explore new learning methods and develop general learning algorithms independent of applications. These goals help ML to understand the nature of human and other forms of learning, and to build learning capability in computers.

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

There are three main elements in every ML algorithm which are:

* Representation: what the model looks like; how knowledge is represented
* Evaluation: how good models are differentiated; how programs are evaluated
* Optimization: the process for finding good models; how programs are generated

8. Provide an example of the abstraction method.

Abstraction is a simplification of the representation of a problem which enables that problem to be solved more efficiently with using less memory. Some examples of data abstraction are: reducing spatial/temporal resolution, discretise continuous variables into important goal-oriented ranges, classify patterns by discrete labels and reduce dimensionality by projection onto a subspace. Also, there is also a type of ‘algorithmic abstraction’ by which a slow, accurate algorithm is replaced by a faster, approximate algorithm which gives results that are ‘good enough’ for the target problem.

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

Generalization happened when a ML algorithm is used past learning in current situations to predict variables based on the data which has similar behaviour. Generalization is the ability of model to adapt properly to new, previously unseen data which have same distribution as the one used to train the model.

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

The process of arranging things into specific groups based on their characteristics means classification, for this we need to specify those specific characters which help us to grouping items. In classification, the target is categorical and we have to arranging them into groups while in regression, the continues value should predicted such as price or temperature.

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

A regression is a statistical technique that relates a dependent variable to one or more independent (explanatory) variables. A regression model is able to show whether changes observed in the dependent variable are associated with changes in one or more of the explanatory variables, for example, predicting price of home.

12. Describe the clustering mechanism in detail.

Clustering is the task of dividing the unlabelled data or data points into different clusters based on the similarity between them which help to segregate groups with similar traits and assign them into clusters

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

i. Machine learning algorithms are used

ii. Studying under supervision

this type of problems, the past data are labelled and the ML algorithm by learning the patterns and relation between independent data and labelled of them thy to predict situation of current data. For example we have cancer images which divided into to class normal and cancerous, now we can train our model based on these images them model can differentiate between images of these to class and if it get new image, it can predict what will be its class.

iii. Studying without supervision

In unsupervised problems the labels of groups are not clear, then the algorithm should try to find similarity between data and divide them into different sections, for example, if we want to segregate our customers for promotional plan this solution can help to categorise them based on different chrematistics such as, the product they bought before, what was their idea, how much they sped money, in which place they live and so on.

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