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

Answers: Learning is a key process in human behaviour. Skills, knowledge, habits, attitudes, interests, and other personality characteristics are all the result of learning. Learning is defined as “any relatively permanent change in behaviour that occurs as a result of practice and experience”.

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

Answers: Artificial Intelligence, Learning Theories, Machine Learning, Reinforcement Learning,

Supervised Learning, Unsupervised Learning. Yes, they are equivalent to machine learning.

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

Answers: Machine learning is a form of artificial intelligence (AI) that teaches computers to think in a similar way to how humans do: Learning and improving upon past experiences. It works by exploring data and identifying patterns and involves minimal human intervention. To study and convert data science prototypes. To design and develop Machine Learning systems and schemes. To perform statistical analysis and fine-tune models using test results. To find available datasets online for training purposes.

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

Answers:

Reward: An immediate return given to an agent when he or she performs specific action or task.

Rewarding desired behaviors and/or punishing undesired ones. Agent receives rewards by performing correctly and penalties for performing incorrectly.

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

Answers: The application of machine learning is best thought of as search problem for the best mapping of inputs to outputs given the knowledge and resources available to you for a given project

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

Answers: Its goal and usage is to build new and/or leverage existing algorithms to learn from data, in order to build generalizable models that give accurate predictions, or to find patterns, particularly with new and unseen similar data.

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

Answers: Image recognition is one of the most common uses of machine learning. There are many situations where you can classify the object as a digital image. For example, in the case of a black and white image, the intensity of each pixel is served as one of the measurements. In colored images, each pixel provides 3 measurements of intensities in three different colors – red, green and blue (RGB).

8. Provide an example of the abstraction method.

Answers: abstraction displays only the relevant attributes of objects and hides the unnecessary details. For example, when we are driving a car, we are only concerned about driving the car like start/stop the car, accelerate/ break, etc.

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

Answers: Generalization refers to your model's ability to adapt properly to new, previously unseen data, drawn from the same distribution as the one used to create the model. Develop intuition about overfitting. Determine whether a model is good or not. Divide a data set into a training set and a test set.

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

Answers: The main difference between Regression and Classification algorithms that Regression algorithms are used to predict the continuous values such as price, salary, age, etc. and Classification algorithms are used to predict/Classify the discrete values such as Male or Female, True or False, Spam or Not Spam, etc.

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

Answers: Regression is the task of predicting a continuous quantity. Regression predictions can be evaluated using root mean squared error. Medical researchers often use linear regression to understand the relationship between drug dosage and blood pressure of patients. A simple linear regression real life example could mean you finding a relationship between the revenue and temperature, with a sample size for revenue as the dependent variable.

12. Describe the clustering mechanism in detail.

Answers: Cluster is a group of objects that belongs to the same class. In other words, similar objects are grouped in one cluster and dissimilar objects are grouped in another cluster. Clustering is the process of making a group of abstract objects into classes of similar objects. A cluster of data objects can be treated as one group. While doing cluster analysis, we first partition the set of data into groups based on data similarity and then assign the labels to the groups. The main advantage of clustering over classification is that, it is adaptable to changes and helps single out useful features that distinguish different groups.

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

i. Machine learning algorithms are used

ii. Studying under supervision

iii. Studying without supervision

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

Answers:

1. Machine learning algorithms are used in a wide variety of applications, such as in medicine, [email filtering](https://en.wikipedia.org/wiki/Email_filtering), [speech recognition](https://en.wikipedia.org/wiki/Speech_recognition), and [computer vision](https://en.wikipedia.org/wiki/Computer_vision), where it is difficult or unfeasible to develop conventional algorithms to perform the needed tasks.
2. Supervised learning can be used to build highly accurate machine learning models.
3. Unsupervised learning is a machine learning technique, where you do not need to supervise the model. Instead, you need to allow the model to work on its own to discover information. It mainly deals with the unlabelled data.
4. Reinforcement learning is a machine learning training method based on rewarding desired behaviors and/or punishing undesired ones. In general, a reinforcement learning agent is able to perceive and interpret its environment, take actions and learn through trial and error.