1. What is the concept of human learning? Please give two examples.  
Human learning is the form of learning which requires higher order mental processes like thinking, reasoning, intelligence, etc.We learn different concepts from childhood. For example:

1. Learning through Association - Classical Conditioning.
2. Learning through consequences – Operant Conditioning.
3. Learning through observation – Modeling/Observational Learning.

2. What different forms of human learning are there? Are there any machine learning equivalents?  
Reinforcement learning is the closest machine learning type to how humans learn. The algorithm or agent used learns by interacting with its environment and getting a positive or negative reward. Common algorithms include temporal difference, deep adversarial networks, and Q-learning

3. What is machine learning, and how does it work? What are the key responsibilities of machine learning?  
 Machine learning is a branch of Artificial intelligence (AI) that teaches computers on how to think in a similar way to how humans do, like by Learning and improving upon past experiences.

* It works by exploring data and identifying patterns, and involves minimal human intervention.

Roles and responsibilities of a machine learning engineer are:

* Designing ML systems.
* Researching and implementing ML algorithms and tools. Selecting appropriate data sets.
* Picking appropriate data representation methods. Identifying differences in data distribution that affects model performance. Verifying data quality.

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

Reinforcement 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. In other words, reinforcement learning forces a system to learn and adapt quickly, or it otherwise loses serious numerical rewards.

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

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?

The Goal of machine learning, closely coupled with the goal of AI, is to achieve a through understanding about the nature of learning process (both human learning and other forms of learning), about the computational aspects of learning behaviors, and to implant the learning capability in computer systems.

Humans have the ability to learn, however with the progress in artificial intelligence, machine learning has become a resource which can augment or even replace human learning. Learning does not happen all at once, but it builds upon and is shaped by previous knowledge.

7. Illustrate the various elements of machine learning using a real-life illustration.  
There are three main elements to every machine learning algorithm, and they include: 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.

In Machine Learning, Abstraction is supported primarily at the level of modules. This can be justified in two ways: first, Data abstraction is mostly a question of program interfaces and therefore it arises naturally at the point where we have to consider program composition and modules.

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

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.

In machine learning, generalization is a definition to demonstrate how well is a trained model to classify or forecast unseen data. This issue can result to classify an actual dog image as a cat from the unseen dataset. Therefore, data diversity is very important factor in order to make a good prediction.

10. What is classification, exactly? What are the main distinctions between classification and regression?  
In Machine Learning, Classification refers to a predictive modeling problem where a class label is predicted for a given example of input data.Classification is the task of predicting a discrete class label. Whereas Regression is the task of predicting a continuous quantity.

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

Regression is a Supervised Machine Learning technique which is used to predict continuous values. The ultimate goal of a regression algorithm is to plot a best-fit line or a curve between the data.

For example, it can be used to predict the relationship between reckless driving and the total number of road accidents caused by a driver, or, to use a business example, the effect on sales and spending a certain amount of money on advertising.

12. Describe the clustering mechanism in detail.

Clustering is the task of dividing the population or data points into a number of groups such that data points in the same groups are more similar to other data points in the same group than those in other groups. In simple words, the aim is 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 : Machine Learning uses programmed algorithms that receive and analyse input data to predict output values within an acceptable range. As new data is fed to these algorithms, they learn and optimise their operations to improve performance, developing intelligence over time.

ii. Studying under supervision: Supervised learning, an algorithm learns from a training dataset. We know the correct answers or desired output, the algorithm makes predictions using the given dataset and is corrected by the “supervisor”

iii. Studying without supervision: Unsupervised learning uses machine learning algorithms to analyse and cluster unlabelled datasets. These algorithms discover hidden patterns or data groupings without the need for human intervention.

iv. Reinforcement learning is a form of learning based on positive reinforcement: Reinforcement learning is the closest machine learning type to how humans learn. The algorithm or agent used learns by interacting with its environment and getting a positive or negative reward. Common algorithms include temporal difference, deep adversarial networks, and Q-learning