**Q.1.The following questions are to enhance your understanding of basic concepts and definitions. You are expected to answer these questions on your own without referring to internet.**

**a. State any four business applications of machine learning.**

**Answer :**

1. Product recommendations in online shopping sites – ML is used to analyse a person’s previous product purchase and to recommend similar or relevant products when the user comes back.
2. Weather forecasting – ML is used to analyse the previous weather samples and predict the weather in the upcoming days.
3. Spam email detection – ML is used to analyse various samples of spam emails and it decides whether the given email is spam or not based on the email address or body or some other information in the email.
4. Stock markets trading – ML is used to analyse the previous ups and downs of shares and it helps to predict on how the stock market trends will look like in the future.

**b. Explain the difference between supervised learning and unsupervised learning with example.**

**Answer :**

|  |  |
| --- | --- |
| **Supervised learning** | **Unsupervised learning** |
| It is trained on labelled data, which means for all the input data there is an output data. | It is trained on unlabelled data, which that the input data does not have any output data mapped. The machine learns to find patterns and relationship in the data. |
| It is mostly used for tasks such as regression and classification | It is mostly used for clustering, anomaly detection etc. |
| Example :  1. It can be used to decide whether a person will get job or not based on his qualification, work experience etc.  2. It can be used to find the relationship between sales and the amount spent on advertising. | Example :  1. Product recommendations – It can be used to learn the past purchases of a customer and recommend some similar products. |

**c. Provide differences between regression, classification and clustering problems. Give an example where each of these models could be used.**

**Answer :**

|  |  |  |
| --- | --- | --- |
| **Regression** | **Classification** | **Clustering** |
| This is an example of supervised learning. It is used to predict real values based on the features in the training data. | This is an example of supervised learning. It is used to assign data points into predefined classes. | This is an example of unsupervised learning. It is used to group data based on the similarity of their features. |
| Example : Estimating the sales of a company based on the amount send on advertising. | Example : Decide whether a job can be offered or not based on the work experience and other features. (Here the model assign the data points to two predefined classes “Yes” and “No”) | Example : Social network analysis – Clustering is used here to understand the user’s browsing data and other data to provide product, friend or content suggestions. |