1. Explain convolutional neural network, and how does it work?

**Ans : A Convolutional Neural Network (ConvNet/CNN) is a Deep Learning algorithm which can take in an input image, assign importance (learnable weights and biases) to various aspects/objects in the image and be able to differentiate one from the other.**

2. How does refactoring parts of your neural network definition favor you?

**Ans : A neural network is a series of algorithms that endeavors to recognize underlying relationships in a set of data through a process that mimics the way the human brain operates. In this sense, neural networks refer to systems of neurons, either organic or artificial in nature. Neural networks can adapt to changing input; so the network generates the best possible result without needing to redesign the output criteria. The concept of neural networks, which has its roots in artificial intelligence, is swiftly gaining popularity in the development of trading systems.**

3. What does it mean to flatten? Is it necessary to include it in the MNIST CNN? What is the reason for this?

**Ans : Flattening is converting the data into a 1-dimensional array for inputting it to the next layer. We flatten the output of the convolutional layers to create a single long feature vector. And it is connected to the final classification model, which is called a fully-connected layer.**

4. What exactly does NCHW stand for?

**Ans : "NCHW" means a data whose layout is (batch\_size, channel, height, width)**

5. Why are there 7\*7\*(1168-16) multiplications in the MNIST CNN's third layer?

**Ans : There is one bias for each channel. (Sometimes channels are called features or filters when they are not input channels.) The output shape is 64x4x14x14, and this will therefore become the input shape to the next layer. The next layer, according to summary, has 296 parameters. Let’s ignore the batch axis to keep things simple. So for each of 14\*14=196 locations we are multiplying 296-8=288 weights (ignoring the bias for simplicity), so that’s 196\*288=56\_448 multiplications at this layer. The next layer will have 7\*7\*(1168-16)=56\_448 multiplications.**

6.Explain definition of receptive field?

**Ans : Receptive fields are defined portion of space or spatial construct containing units that provide input to a set of units within a corresponding layer. The receptive field is defined by the filter size of a layer within a convolution neural network.**

7. What is the scale of an activation's receptive field after two stride-2 convolutions? What is the reason for this?

**Ans : The receptive field in Convolutional Neural Networks (CNN) is the region of the input space that affects a particular unit of the network. The numbers inside the pixels on the left image represent how many times this pixel was part of a convolution step (each sliding step of the filter).**

8. What is the tensor representation of a colour image?

**Ans : In the case of the image, each vector would represent either a row or a column. These matrices are tensors of order two and since they have all the same number of rows and columns, the tensor of order three is actually like cuboid of numbers and we can find numbers by going along any of the three axis.**

9. How does a color input interact with a convolution?

**Ans : It converted a color input image into a binarized image to extract the outline**