Q1. An ANN is a layered graphical model containing neurons and weighted connections, resembling the excitatory properties of the human brain. Weights of the ANN are changed after presenting it training examples from an environment, where weights are changed based on the training procedure used. Artificial neurons also are biased, just like real ones, adding a constant level of activation before being activated by a (nonlinear) activation function. Depending on the training procedure, both weights, topology or even activation functions may be learned.

Q2. A neuron is an information processing unit. It consits of: inputs associated with weights, sum of inputs and an acitvation function

Q3. apply input data to input layer and initialize small values weights minimize error according to difference between desired signal and output signal assign the test vector the class that has smallest error

Q4. SOM is refered to as Self organized maps which is an unsupervised training algorithm for finding spatial pattern in data without using any external help.The process in SOM is explained below: -Initialization: Initialize random weights wj for input patterns - Sampling: Take nth random sample from the input (say x) - similarity matching :for the input x, find the best match in the weight vector. $i(x) = argmin(x - w)$ - update: the next step is to update the weights $w(n+1) = w(n) + eta*hji(x)*i(x)$ - continuation : continue from sampling until there is no significant change in the feature map

Q5. In multi layer ff networks the error is only available in the last layer. Therefore the error is propagated back through the network using the backpropagtion algorithm. In order to do so the local gradient has to be calculated. Update of the weight: w+1 = w + n * x * gradient where the iput x is the output of the previous layer. The local

gradient is calculated diffrently depending if the neuron is in the output layer or in the hidden layer. Output layer: $ gradient = phi`(x) * (y -d) $ Hidden Layer: $ gradient = phij`(x) * SUM(wi * local gradienti) $