Ques3:

PCA is a technique which involves a procedure which mathematically transforms number of probably related parameters into smaller number of parameters whose values don’t change called principal components. The primary principal component accounts for much variability in the data, and each succeeding component accounts for much of the remaining variability. DCT expresses a series of finitely many data points in terms of a sum of cosine functions oscillating at different frequencies. For the given datasets from the results we can say that PCA is much efficient in feature extraction as the time consumption is far less whereas in DTC the time taken to do the cosine transformation is way high to increase the dimensionality. But the feature extraction in DTC is much more effective when we need to clear the noise. The results are shown in the graphs present in the pdf files.

Que4:

Principal Component Analysis (PCA) is a classical technique in statistical data analysis, feature extraction and data reduction, aiming at explaining observed signals as a linear combination of orthogonal principal components. Independent Component Analysis (ICA) is a technique of array processing and data analysis, aiming at recovering unobserved signals or 'sources' from observed mixtures, exploiting only the assumption of mutual independence between the signals. The separation of the sources by ICA has great potential in applications such as the separation of sound signals, in telecommunication or in the treatment of medical signals. However, ICA is not yet often used by statisticians. PCA is an useful tool for finding patterns in high-dimensional data when the data lies on or close to a d-dimensional linear sub-space. PCA prioritizes dimensionality (by dropping low-variance dimensions in addition to centering, rotating and scaling data) that aids in improving neural network’s convergence speed and the overall quality of results. The results comparing PCA and ICA are shown in the graphs present in the pdf files.