Date: 29-12-22 **Signals and Systems Lab Assignment -08 Fast Fourier Transform** **(02+08 = 10 marks)**

Instructions:

**** Execute the below programs in Python.***

**** Save Screenshots of the outputs.***

**** Explain each step of the program.***

****Save File in format : ROLL_NO_LAB_03.pdf (upload pdf file).***

Q1) Generation of a Noisy Signal. Explain how the signal was generated. **(2 marks)**

```
import numpy as np
import matplotlib.pyplot as plt
plt.rcParams['figure.figsize'] = [16, 20]
plt.rcParams.update({'font.size':18})

#Create a simple signal with two frequencies

dt = 0.001
t = np.arange(0,1,dt)
f = np.sin(2*np.pi*50*t) + np.sin(2*np.pi*120*t)  #Sum of 2 frequencies
f_clean = f
f = f + 2.5*np.random.randn(len(t)) # Add some noise

plt.plot(t,f,color='c', LineWidth=1.5, label='Noisy')
plt.plot(t,f_clean,color='k',LineWidth=2,label='Clean')
plt.xlim(t[0],t[-1])
plt.legend()
```

Q2) Use the same signal generated above to retrieve of Clean signal from the Noisy signal using FFT. Explain the steps and the code used in order to generate the signal. **(8 marks)**