Assignment 1

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Q. Design measurement and the adequate isolated analog interface to measure 3.3KV 3phase AC Voltage and current of 100 A simultaneously feeding to 6.6KV large induction motor with 10MW Drive. and with 3 currents and voltage with proper isolation.

Code for Data Analysis & Fourier Transform:

```
from scipy import signal, io
from scipy.fft import fft, fftfreq
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
from sklearn import preprocessing
```

{Show Time domain plot}

```
with open('1SecNL.txt') as f:
    lines = f.readlines()
b=[]
for i in lines:
    b.append(int(i))

arr=np.array(b)
plt.plot(arr)
plt.xlabel('Time')
plt.ylabel('Current')
plt.title('Motor readings')
plt.grid()
plt.show()
```

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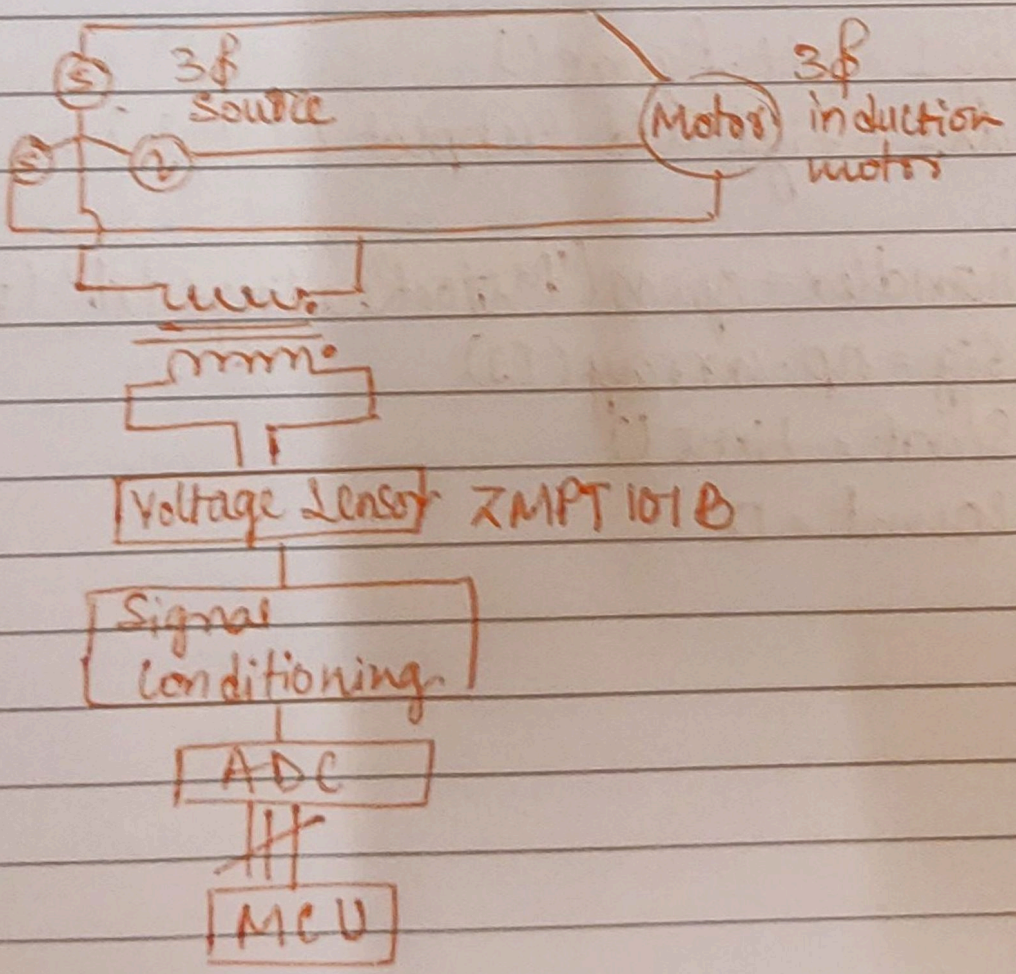
```
normalizedy = preprocessing.normalize([ydr])
T = 1.0/len(b)
N = len(normalizedy)
yf = fft(normalizedy)
xf = fftfreq(N,T)[:N//2]

plt.plot(xf, 2.0/N * np.abs(yf[0:N//2]))
plt.xlim([0,100])
plt.xlabel('frequency[Hz]')
plt.ylabel('FFT')
plt.grid()
plt.savefig('b.png',dpi=1000)
plt.show()
```

Circuit Diagram:



Raspberry Pi Code:

```
import Adafruit_ADS1x15
import numpy as np
import matplotlib.pyplot as plt
import requests
import os
import RPi.GPIO as GPIO
from time import time, sleep
from datetime import datetime

adc = Adafruit_ADS1x15.ADS1015()
adc.mode = 1
GAIN = 1

plt.ion()
fig1 = plt.figure()
ax1 = fig1.add_subplot(1,1,1)

handler = open('MotorReadings.txt', 'w+')
sig = np.array([])
start = time()
count = 0
```

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```
while count<1250:
        st=time()
        value=adc.read_adc(0,gain=GAIN,
                           data_rate=3300)
        sig=np.append(sig,value)
        count+=1
        ed=time()
        sleep(0.0207(ed.st))

handler.close()
ax1.clear()
ax1.plot(sig)
fig1.canvas.draw()

print('Sampling frequency=',len(sig))
max1=max(sig)
print('max=',max1)
sleep(1)
```