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Digital Assignment

Obtain the Spectrum

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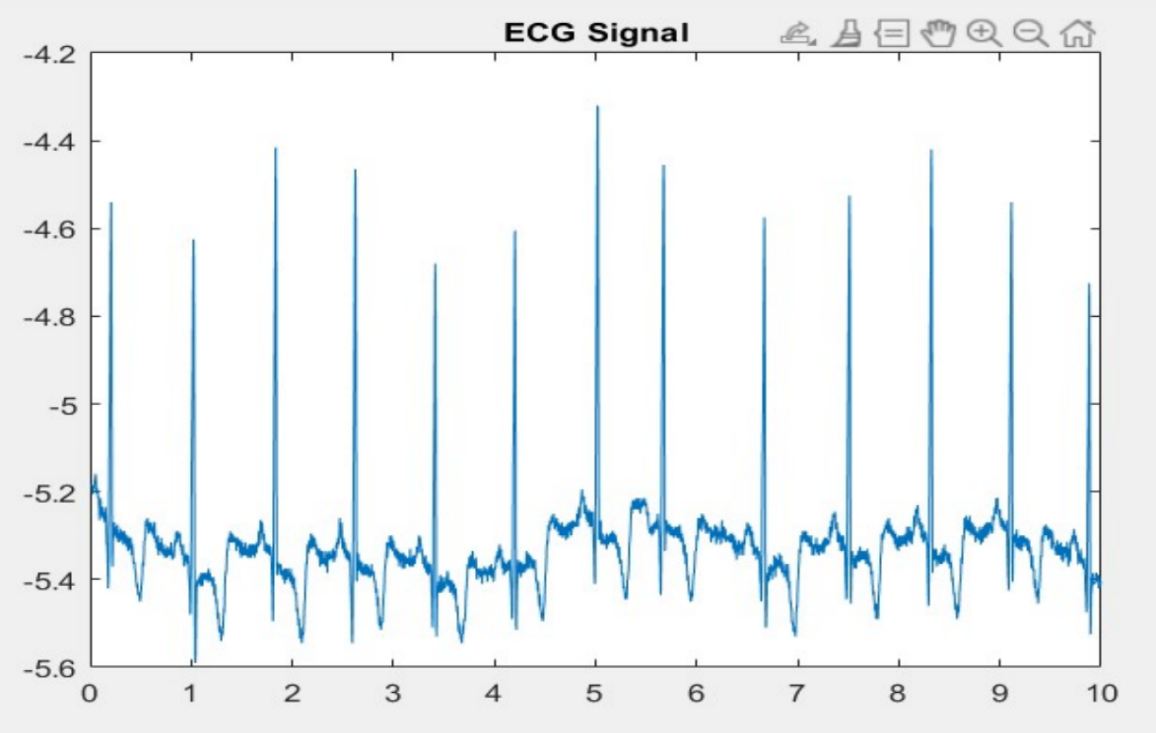
Question 1:
Obtain the spectrum of the signal.

Matlab Code:
Abnormal Signal

```
clc
load ('100m.mat ')
ECGsignal = (val-1024)/200;
Fs = 360;
t = (0:length(ECGsignal)-1)/Fs;
plot(t , ECGsignal)
title("ECG Signal");
```

Output:

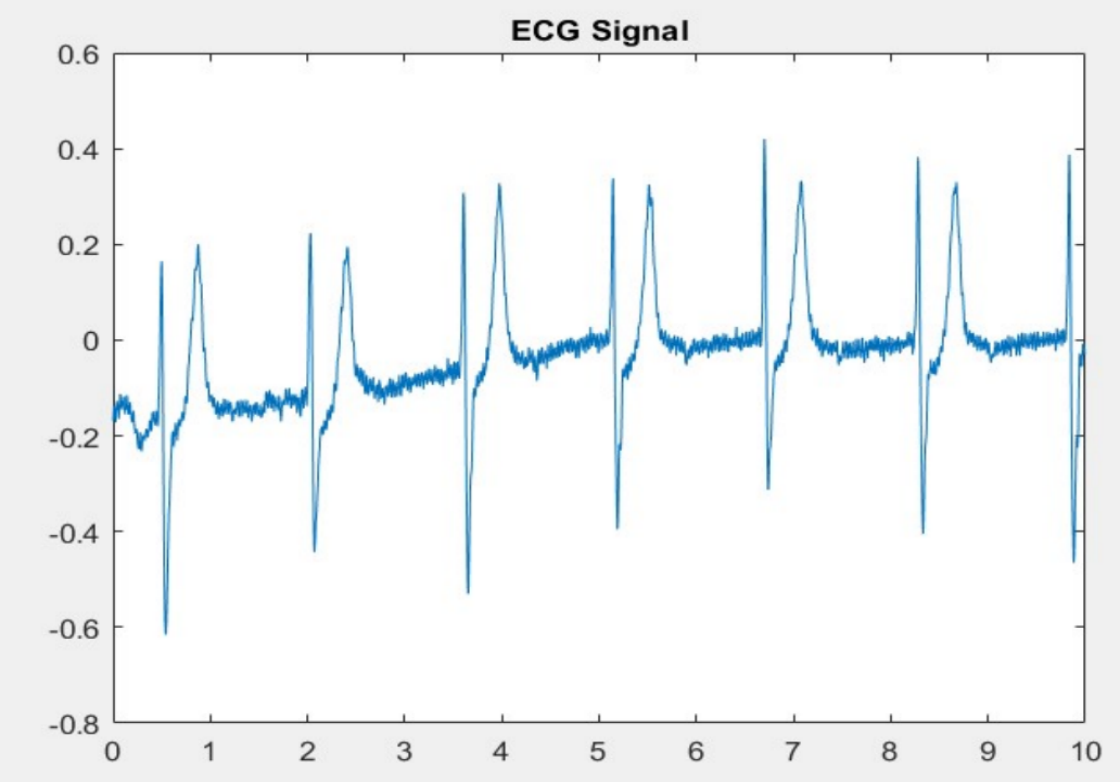


Normal signal:

```
clc
load ('08730 _01m.mat ')
ECGsignal = (val-0)/200;
Fs = 500;
t = (0:length(ECGsignal)-1)/Fs;
plot(t , ECGsignal)
title("ECG Signal");

```

Output:



QUESTION-2:

Also obtain the statistical parameters such as mean, standard deviation and average power of the signal.
Matlab Code:

Abnormal signal-

```
clc
clear all
load ("100 m . mat ") ;
ECGsignal =( val -1024) /200;
Fs =360 ;
t =(0: length ( ECGsignal ) -1) / Fs ;
plot (t , ECGsignal )
title (" ECG Signal ") ;
xlabel ('No. Of. Samples ') ;
ylabel ('Amplitude ') ;
title ('Normal ECG Signal ') ;
Mean = mean ( ECGsignal )
Standard_Deviation = std ( ECGsignal )
Power = bandpower ( ECGsignal )
```

Output:

```
Command Window
>> untitcscled4

mean =

   -5.3232


standard_Deviation =

    0.1225


Power =

   28.3512
```

Normal signal:

```
clc
clear all
load ('08730 _01m .mat ')
ECGsignal =( val -0) /200;
Fs =500 ;
t =(0: length ( ECGsignal ) -1) / Fs ;
plot (t , ECGsignal )
title (" ECG Signal ") ;
xlabel ('No. Of. Samples ') ;
ylabel ('Amplitude ') ;
title ('Normal ECG Signal ') ;
Mean = mean ( ECGsignal )
Standard_Deviation = std ( ECGsignal )
Power = bandpower ( ECGsignal )
```

Output:

```
Command Window

>> untitcscled4

mean =

   -0.0786


standard_Deviation =

    0.2419


Power =

    0.0647

fx >>
```

Question 3:
Interpret the results obtained from (i) and (ii)
Ans.

Also known as an electrocardiogram, an ECG is a test that detects and records the strength and timing of the electrical activity in your heart. This information is recorded on a graph that shows each phase of the electrical signal as it travels through your heart.

From the output, we can conclude that for normal signal, the graph beats in a sequential order, whereas of an abnormal signal, beats are not sequential.
In graph (i) the amount of abnormality and the maximum amplitude goes to -4.4 whereas in the graph (ii) the waveform is almost equal and even wrt to x axis and also the frequency is even.