Answer the following questions

Ques.1:

a) Derive the three-sample algorithm used for estimating the frequency of AC signal.

b) What is the importance of system frequency estimation?

c) Considering a signal sampled at 800 Hz where the samples are listed in the following table:

Sample no.	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
Value	45	71. 40	86. 93	89. 23	77. 94	54. 7	23. 20	11. 74	45. 00	86. 80	89. 23	77. 23	54. 94	23. 78	29	11. 74

Find:

- I-   The frequency of this signal.
- II-   The phasor of this signal using both the three sample, recursive DFT, and non-recursive DFT algorithms.
- III- Drawing the computed phasor in the time domain.
- IV-   Does the given signal contain harmonic component? Why?

Ques. 2:

Illustrate how least square method obtain the fundamental phasor component overcoming on the decaying of DC component.

Ques.3:

Illustrate a method to obtain the resistance and reactance from the measuring point till the fault point using only online samples (doesn't need phasor estimation).

Good Luck .... **Dr. Mahmoud Elsadd (01063718439 & 01201910926)**