Expt. No. 06

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# CHARACTERISTICS OF LVDT [LINEAR VARIABLE DIFFERENTIAL TRANSFORMER]

## AIM:

To understand and stimulate the relation between core displacement and output voltage

## APPARATUS REQUIRED:

Laptop with internet connection.



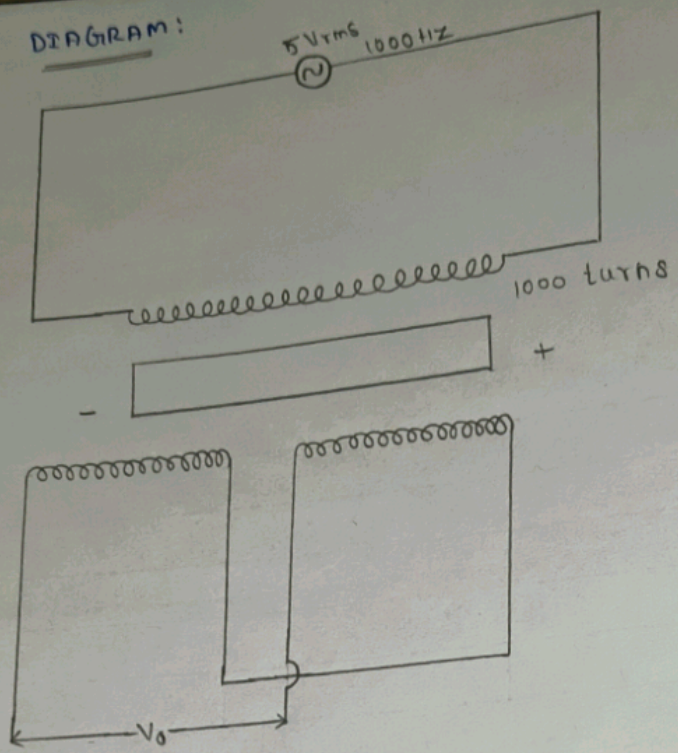
## THEORY:

LVDT is an inductive transducer that converts linear displacement into a electrical signal. It consist of a transformer having primary winding and two secondary windings wound on a core. As the primary is connected to an AC source. The AC current and the voltage are produced in the secondary of the LVDT.

When the core is at the center, the flux linking with both the secondary winding are equal. So, the emf induced in both the windings are equal. this means there is no displacement.

When the core is at the right, the flux linking with the secondary winding s is more so, the emf induced in s, is more than $S_2$, So, the net emf is positive.

CIRCUIT DIAGRAM:




TABULATION:

| | Input voltage($V_m$) | Output voltage | Frequency (Hz) | Time = 1/f (ms) |
|---|---|---|---|---|
| Positive displacement | 7 | 2.2 | 1000 | 1 |
| Negative displacement | 7 | 2.2 | 1000 | 1 |

CALCULATION:

$V_m = V_{rms} \times \sqrt{2} = 5 \times \sqrt{2} = 7V$

4SD = 7V

1SD = $\frac{7}{4}$ V

1.25SD = $\frac{7}{4} \times 1.25 = 2.2V$

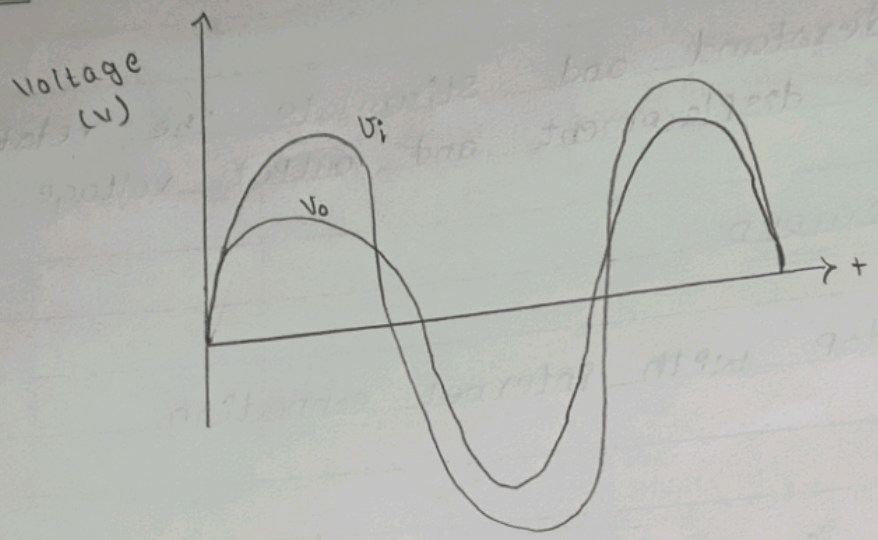
f = 1000 Hz

$T = \frac{1}{f} = \frac{1}{1000}$

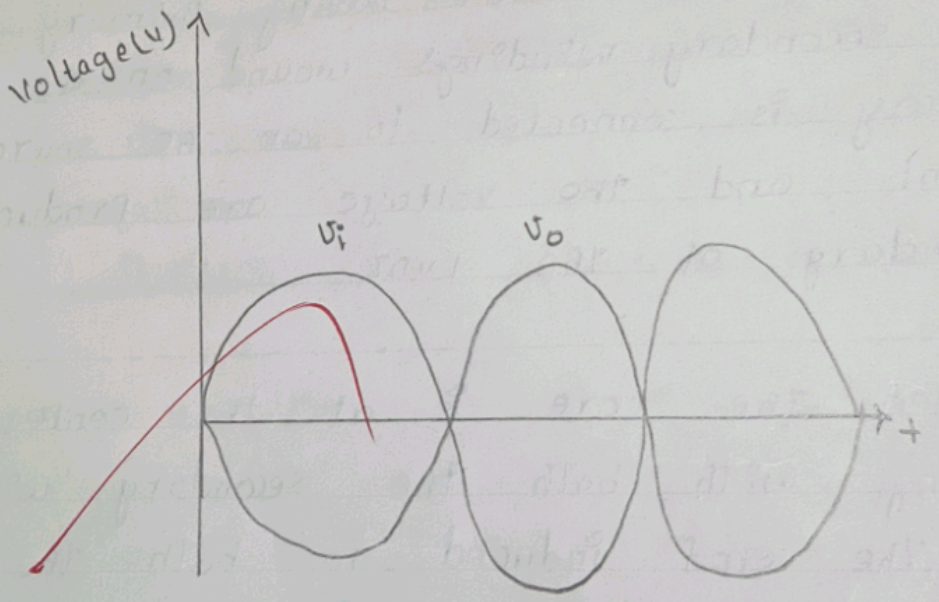
T = 1ms

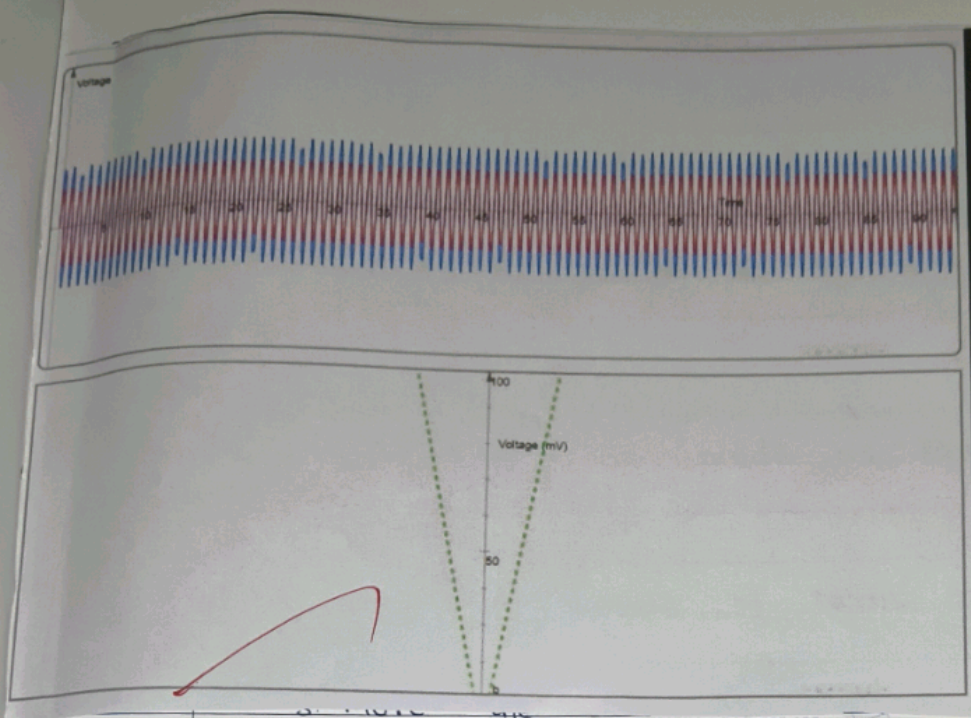
MODEL GRAPH:

Positive displacement:

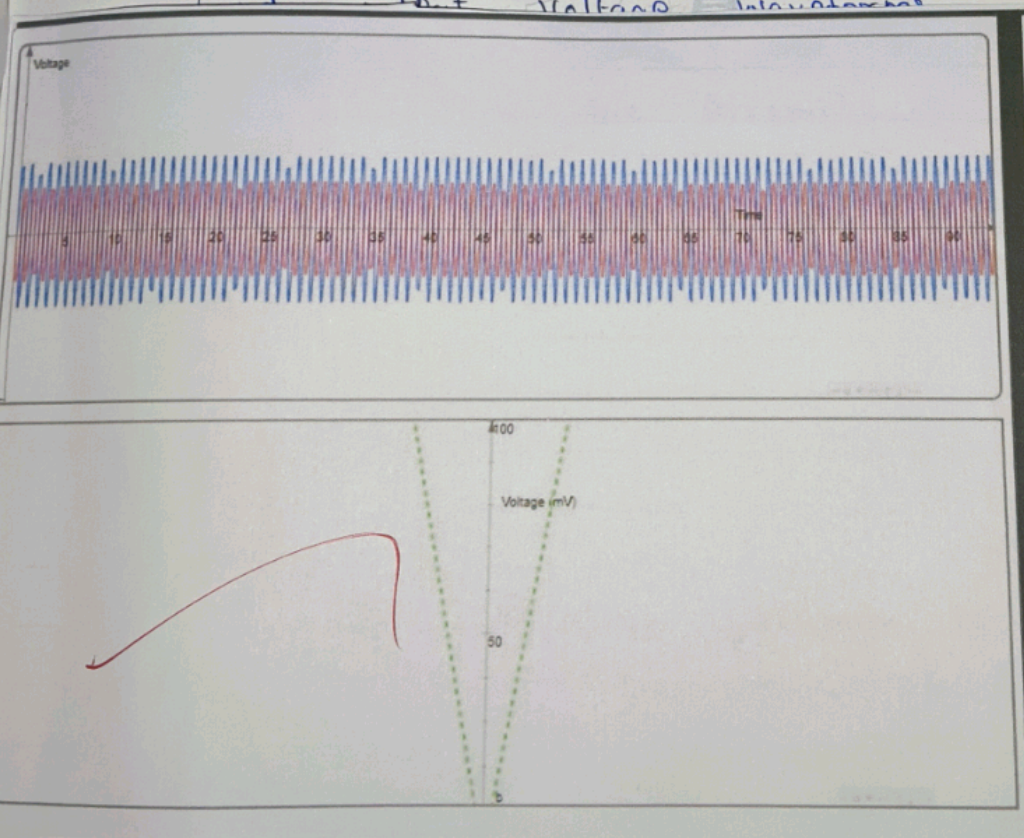



Negative displacement:






the negative side, and observe the input voltage



When the core is at the left, the flux linking and the emf in $S_2$ is more than $S_1$. So, the net emf is negative

PROCEDURE:

1. connections are made as per the circuit diagram

2. set the number of turns, supplied voltage

3. more the core to positive side and the negative side, and observe the input voltage and output voltage waveforms.

4. configure the parameter

5. Plot the graph between input and output voltage.

RESULT:

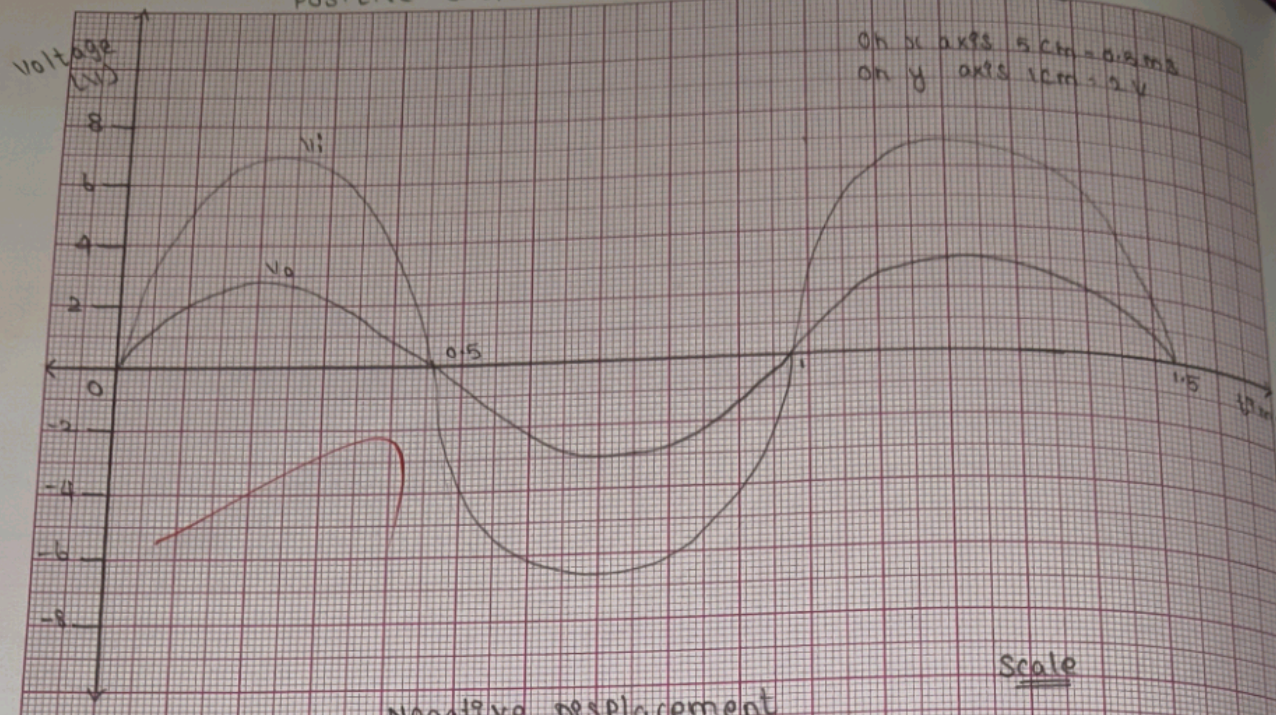
The relation between core displacement and output voltage is stimulated successfully.

Positive displacement

Scale

On x axis 5 cm = 0.5 ms

On y axis 1 cm = 2 V




Negative displacement

Scale

On x axis 5 cm = 0.5 ms

On y axis 1 cm = 2 V