EXPERIMENT NO.8

Experiment: To study the induced *e.m.f.* as a function of velocity of the magnet

Apparatus: Apparatus for the study of electromagnetic induction, a small strong permanent magnet, a stop-watch, circuit arrangement for measuring the peak value of induced *e.m.f.* etc.

Procedure:

1. Mount the small permanent magnet at the middle point of the semi-circular arc from its center so that the whole frame can oscillate freely through the coil. Level, if necessary.
2. Adjust the position of the two weights on the diameter of the arc to have minimum time period.
3. Connect the terminals of the coil to the diode circuit to note the peak voltage generated.
4. Take the magnet carrying arc to one side so that amplitude of vibration is about 20cm. And release the arm. Note the time of 20 oscillations.
5. Repeat thrice keeping the amplitude same and find the time period. Also note the peak voltage after 20 oscillations, every time.
6. Repeat the experiment after changing the amplitude and take at least 8 readings.
7. Now change the time period by adjusting the position of the weights on the diameter arm. Take at least three readings for each position keeping amplitude constant.
8. To plot the graph between linear velocity *v* of the magnet and maximum induced *e.m.f* e take v along the X-axis and e along Y-axis for all the values of e. and v in table A and B. the graph is a straight line.

   This shows that the induced *e.m.f* is proportional to the linear velocity of the magnet.

Take at least 8 observations by changing the time period by adjusting the position of weights but keeping the amplitude same for all the sets of observations.

A. Time period constant, amplitude variable.

Mean position of the center of the magnet =

Radius of the semi-circular arc R_0 = cm.

Serial no.	Amplitude $a=R_0\theta_0$	Time for 20 oscillations	Mean time period	e_0	$\frac{e_0}{a}=\frac{e_0}{R\theta_0}$	Linear velocity $v=\frac{2\pi}{T}R_0\theta_0$

Conclusion: When the time period is kept constant

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