Index

Index

Expt. No. First   Page. No. 01   Date 10/09/18

Melde's Experiment

Object :- To determine the frequency of an electrically maintained tuning fork by Melde experiment using:

(i) Transverse arrangement
(ii) Longitudinal arrangement

Apparatus used :- Electrically maintain tuning fork, Key, accumulator, frictionless Pulley, thread, Scale Pan, meter Scale and chemical banace with a set of weights.

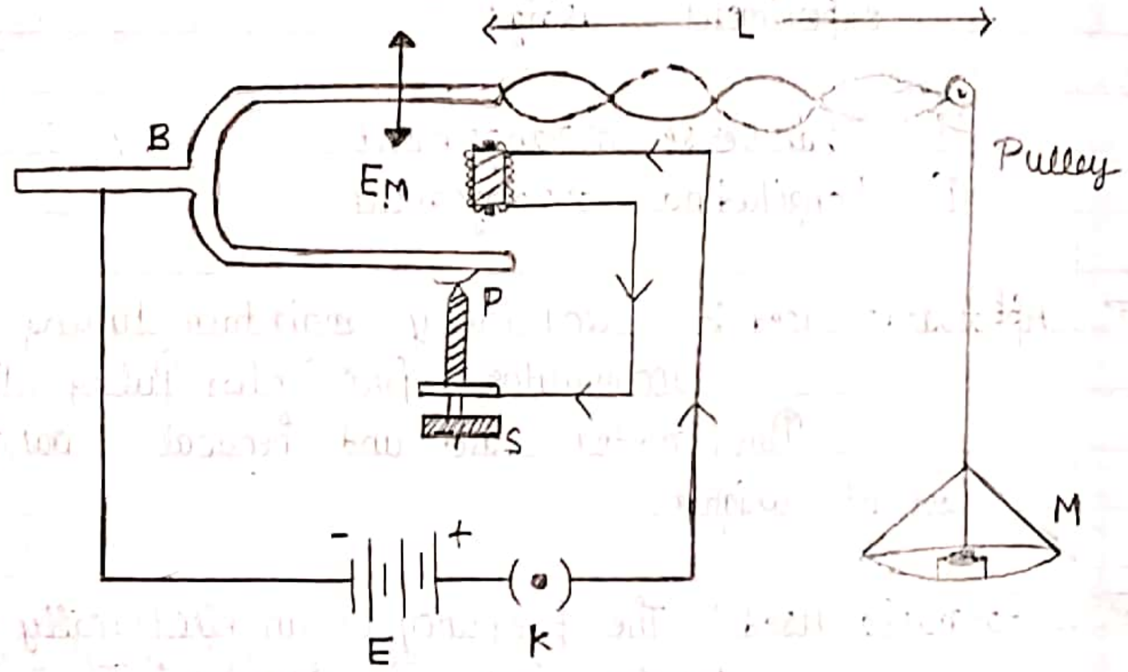
Formula used : The frequency of an electrically maintained tunning fork is given by :

(i) $$n = \frac{p}{2L}\sqrt{\frac{T}{m}} = \frac{1}{2l}\sqrt{\frac{Mg}{m}}$$

For transverse Arrange ment

(ii) $$n = \frac{p}{L}\sqrt{\frac{T}{m}} = \frac{1}{l}\sqrt{\frac{Mg}{m}}$$

Teacher's Signature ____________



Expt. No. ______ Page. No. ____ Date ______

* observation :–

[A] mass of the thread = 1.4160 gm

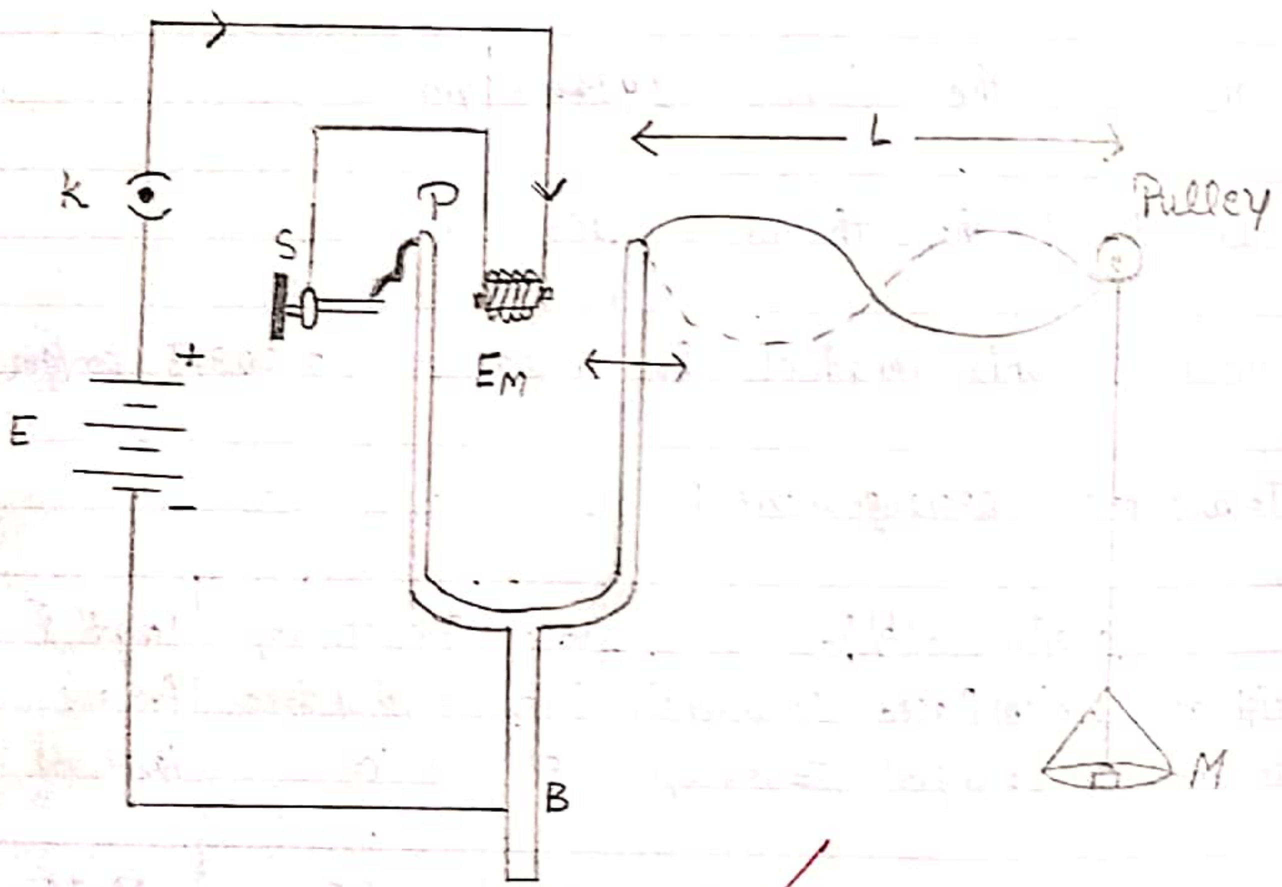
Length of the thread = 160 cm.

Mass Per unit length of the thread = 0.00875 cm/gm

[B] Transverse arrangement :

S.No	Tension Applied			No. of loops	Corresponding length of thread	Length l for one loop	Mean l cm.
	Weigh of Pan (gm)	Weight Placed in Pan (gm)	Total tension T=(Mg) (gm)	(p)	L (cm)	(cm)	
1.	200	50	1470	04	55	13.75	
2.	150	50	980	05	56.2	11.24	41.98 / 4
3.	100	50	490	06	56.8	9.46	= 10.49
4.	50	50	00	08	60.3	7.53	

Teacher's Signature ______



* Calculations

[A] For transverse arrangement

By putting the values of l, M, g and m from the observations in the formula i.e.,

$$n = \frac{1}{2l}\sqrt{\frac{Mg}{m}}$$

$$= 27.63 \text{ cm/sec}$$

[B] For longitudinal arrangement

Again, by putting the values of l, M, m and g from the observations in the formula i.e.,

$$n = \frac{1}{l}\sqrt{\frac{Mg}{m}}$$

$$= 43.75 \text{ cm/sec}$$

For each set n is calculated and mean value is determined.

Result :-

Expt. No.________ Page. No.____ Date ________

The frequency "n" of electrically maintained tunning fork using

(i) Transverse arrangement = 27.63 c/sec

(ii) Longitudinal arrangement = 43.75 c/sec

Precautions and sources of error

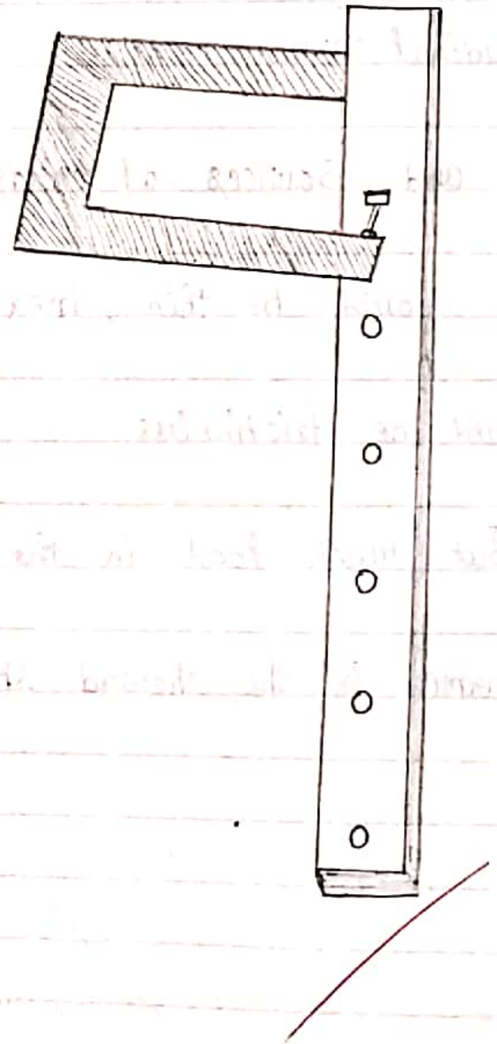
1. The thread should be thin, inextensible and uniform.

2. Pulley should be frictionless.

3. Do not put much load in the Pan

4. The loops formed in the thread should appear stationary.

A Tyagi



Expt. No. Second   Page. No. 05 Date 19/09/18

Object :- To determine the value of acceleration due to gravity "g" in the laboratory with the help of a bar pendulum.

Apparatus used :- A rectangular bar pendulum, knife edge, stop watch and meter scale.

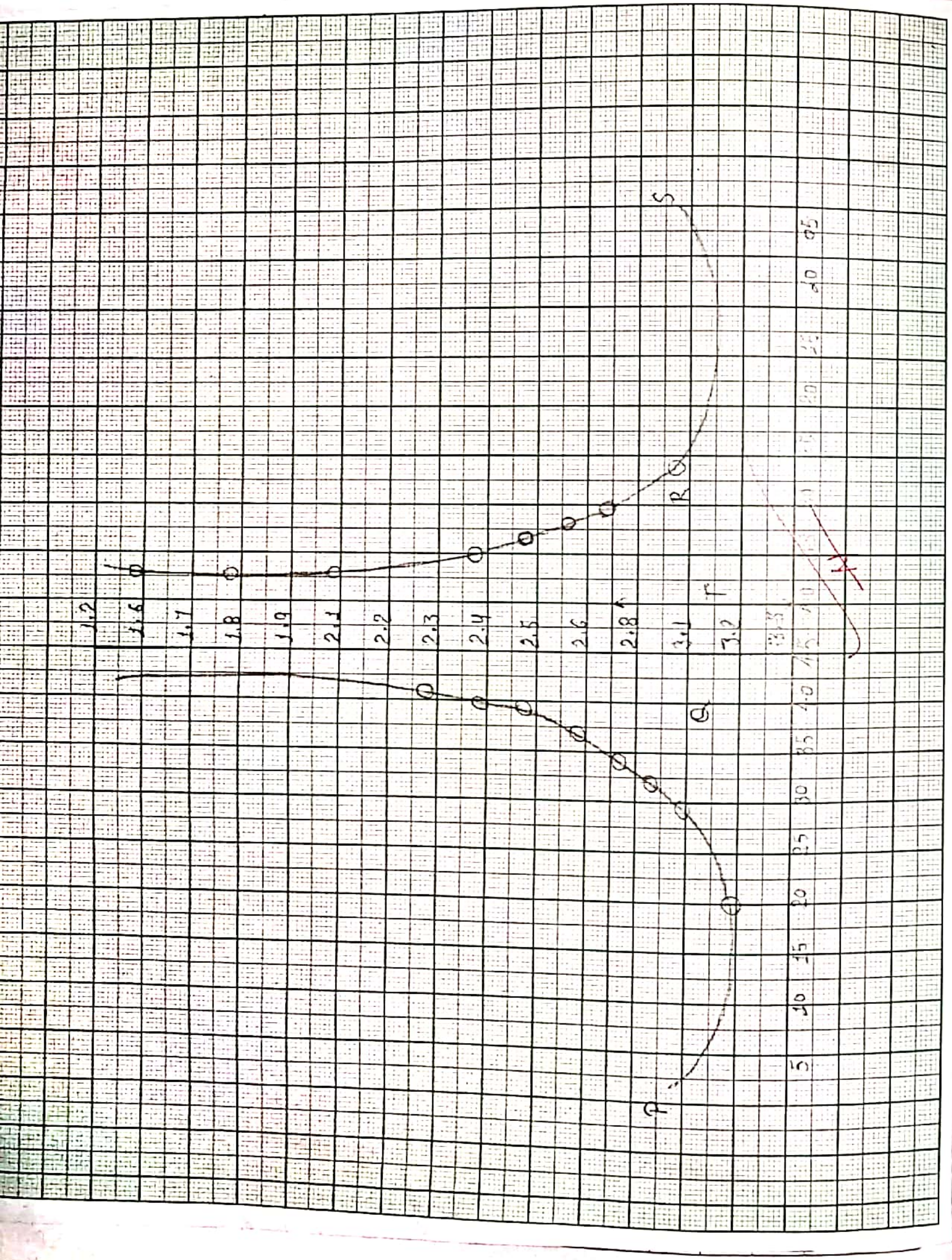
Formula used :- Acceleration due to gravity "g" is given by

$$T = 2\pi \sqrt{\frac{L}{g}} \quad \text{or} \quad g = \frac{4\pi^2 L}{T^2}$$

Observations :- Table for the measurement of l and T, If distance of the hole measured from C.G. of the bar.

No. of H.	Distance of the hole from C.G. (Cm)	No. of oscillations	Time taken Min.	Sec.	Total (Sec)	Time period
1.	45	20	00	32	32	1.6
2.	40	20	00	37	37	1.85
3.	35	20	00	42	42	2.1
4.	30	20	00	48	48	2.4
5.	25	20	00	51	51	2.55
6.	20	20	00	52	52	2.6
7.	15	20	00	55	55	2.75
8.	10	20	00	59	59	2.95
9.	05	20	01	03	63	3.15

Teacher's Signature



Expt. No.________ Page. No.____ Date ______

After inverting bar, for the holes below C.G.

No. of H.	Distance of the hole from (C.G.) (cm)	No. of oscillations	Time taken Min.	sec.	Total	Time period
1.	45	20	00	47	47	2.35
2.	40	20	00	48	48	2.4
3.	35	20	00	51	51	2.55
4.	30	20	00	54	54	2.7
5.	25	20	00	56	56	2.8
6.	20	20	00	58	58	2.9
7.	15	20	00	59	59	2.95
8.	10	20	01	03	63	3.15
9.	05	20	01	07	67	3.35

Calculations :-

$$L = \frac{PR + QS}{2}$$

$$= \frac{90 + 120}{2}$$

$$L = 165 \text{ cm}$$

$$T = 2.7$$

Putting the value of L and T in the formula i.e.

$$g = \frac{4\pi^2 L}{T^2} \quad m/sec^2$$

Teacher's Signature ________

Expt. No. ______ Page. No. ______ Date ______

$$= \frac{4 \times 3.14 \times 3.14 \times 165}{(2.7)^2 \times 100}$$

$$= \frac{6507.34}{7.29 \times 100}$$

$$= 8.92 \ m/sec^2$$

☞ Result :- The value of acceleration due to gravity "g" at 8.92 m/sec^2

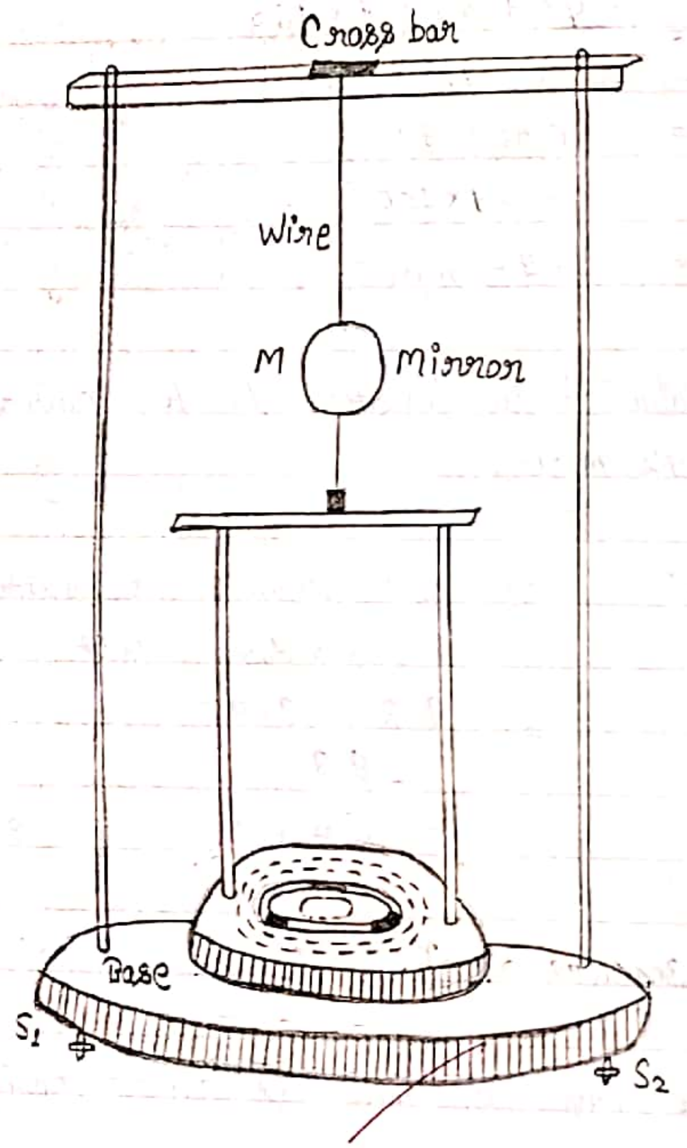
☞ Percentage error :- $\frac{\text{Standard result} \sim \text{Calculated result}}{\text{standard result}} \times 100$

$$= \frac{9.8 - 8.92}{9.8} = \frac{0.88}{9.8} \times 100$$

$$= 0.0898 \times 100 = 8.98\%$$

☞ Precautions and sources of Error :-

1. Place the knife edge such that its remain horizontal and bar remains vertical.
2. Axis of knife edge should be very sharp.
3. The amplitude of oscillations should be small.
4. The oscillations should be in a vertical plane.



Expt. No. Third   Page. No. 08   Date 03/10/18

Object :- To determine the moment of inertia of an irregular body about an axis passing through its centre to gravity and perpendicular to its plane with the help of torsinal pendulum (dynamical method.)

Apparatus used :- Inertia table, irregular body, regular body, Stop watch, spirit level, Vernice callipers, Physical balance and weight box.

Formula used :- The moment of inertia of an irregular body is given by,

$$I = \frac{T_2^2 - T_0^2}{T_1^2 - T_0^2} \times I_1$$

observations :-

A. Mass of the regular body M = 548

B. Table for radius of regular body

Least count of Vernier callipers = Value of one division of main scale in cm. / total number of divisons on Vernier Scale

= cm

Zero error of Vernier Callipers = ± cm

Teacher's Signature ________

S.No	No. of oscillations	Inertia table alone				Inertia table + regular body				Inertia + irregular body			
		Min	Sec	Total Time	Time Period	Min	Sec	Total Time	Time period	Min	Sec	Time period	total time
1.	10	01	02	62	6.2	00	56	56	5.6	00	57	57	5.7
2.	10	02	05	125	6.25	02	04	124	6.2	01	59	119	5.95
3.	10	03	09	189	6.3	03	06	126	6.2	02	40	160	5.33
4.	10	04	01	241	6.02	04	17	257	6.42	03	07	187	4.67
	Mean		24.	77			24.	42			21	.65	

☞ Calculations:- Putting the values of M, R and T_0, T_1, T_2 from the observation table in i.e.

$$I = \frac{T_2^2 - T_0^2}{T_1^2 - T_0^2} \times I_1$$

$$= 42.634 \ gm/cm^2$$

☞ Result:- Moment of inertia of an irregular body about the axis of rotation = 42.634 gm/cm^3

☞ Precautions and Sources of Error:-

1. The wires which hangs inertia table should be fairly long, stout and free from kinks.
2. The inertia table must be horizontal for all the observations.
3. Table should be rotated horizontaly ~~through~~ through a small angle only.

Expt. No. Fourth   Page. No. 10   Date 10/10/18

Object :- To determine the moment of inertia of a flywheel about its own axis of rotation.

Apparatus used :- Flywheel, thread, stop watch, meter scale, Vernier callipers, set of weights.

Formula used :- The moment of inertia of a flywheel is given by

$$I = \frac{mr\left(\frac{gt^2 n_1}{4\pi n_2^2} - r\right)}{\left(1 + \frac{n_1}{n_2}\right)}$$

Calculations :- Putting the values of m, r, g, n_1, n_2 and t from the observation tables in the formula, i.e.,

$$I_1 = \frac{100 \times 1.95\left(\frac{980 \times 65 \times 65 \times 10}{4 \times 3.14 \times 36 \times 36} - 1.95\right)}{1 + \frac{10}{36}}$$

$$=$$

$$I_2 = \frac{150 \times 1.95\left(\frac{980 \times 45 \times 45 \times 10}{4 \times 3.14 \times 35 \times 35} - 1.95\right)}{1 + \frac{10}{35}}$$

$$I_3 = \frac{200 \times 1.95\left(\frac{980 \times 40 \times 40 \times 10}{4 \times 3.14 \times 34 \times 34} - 1.95\right)}{1 + \frac{10}{34}}$$

Teacher's Signature ____________

S No	Total load applied	No of revolution of flywheel before the mass detached	No. of revolutions of flywheel to come to rest after mass detached	Time for n_1 revolutions	Mean	Mean
1.	100	10	(i) 11	18	36	65
			(ii) 12	22		
			(iii) 13	25		
2.	150	10	(i) 13	13	35	45
			(ii) 12	14		
			(iii) 10	18		
3.	200	10	(i) 11	13	34	40
			(ii) 11	12		
			(iii) 12	15		

Expt. No. ________ Page. No. ____ Date ______

$$I = \frac{I_1 + I_2 + I_3}{3}$$

$$= \frac{3584.154 + 2947.568 + 3289.632}{3}$$

$$= \frac{9821.3544}{3}$$

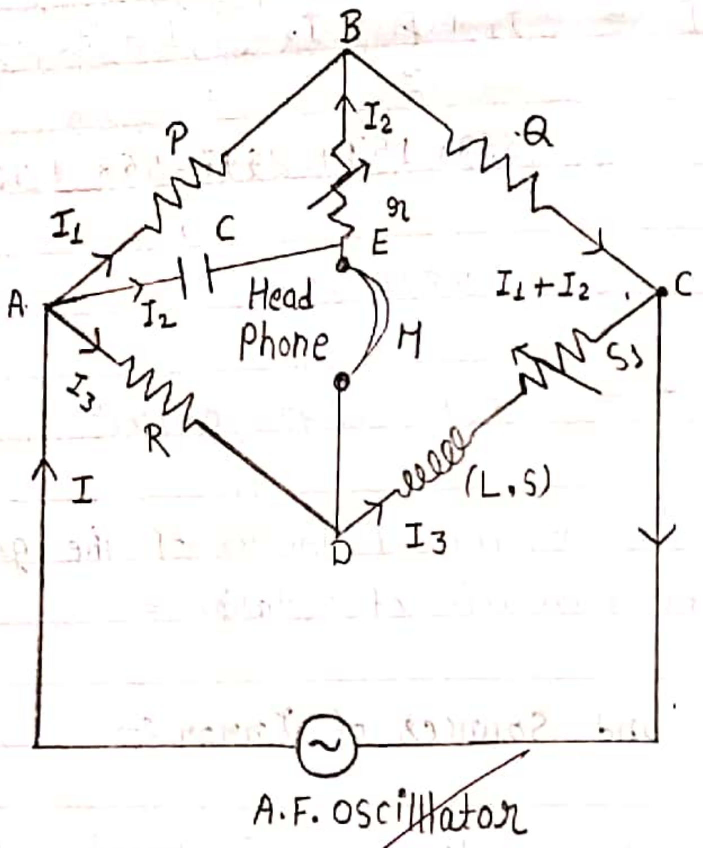
$$I = 3273.7848 \ gm/cm^2$$

Result :- The moment of inertia of the given flywheel about its own axis of rotation =

Precautions and Sources of Error :-

1. Friction between axle and ball bearing should be small using oil etc.
2. The mass must be allowed to descend quite freely and gently without any push.
3. The loop of thread must be attached with Peg P very loosely so that it offers no resistance when mass is detached from the axle.

Tyagi



Expt. No. Fifth Page. No. 12 Date

Object :- To determine the self inductance of a soil by Anderson's method.

Apparatus used :- Post office box, a small variable resistance, galvanometer, Oscillator, head phones, battery, plug keys, inductance box and connection wires.

Formula used :- (i) When the bridge is balanced for D.C.,

$$S = \frac{RQ}{P}$$

(ii) When the bridge is balanced for A.C.

$$L = C\,[RQ + r(R+S)] \text{ henry}$$

Observation :-

Table for d.c. resistance, S, of the inductance coil

SNO	P	Q	R	S = RQ/P ohm
1.	10	10	x	x
2.	100	10	x	x
3.	1000	10	x	x

Teacher's Signature ____________

Result :- The self inductance of given coil = 112.392 mH

Table for inductance L :

S.No.	P [ohm]	Q [ohm]	R [ohm]	r [ohm]	L [Henry]	Mean L [milli henry]
1.	1000	1000	156	2870	105.144	
2.	1000	1000	122	3780	104.432	249.176
3.	1000	1000	110	2200	118.800	

* Calculations :- $L_1 = CR(2r + Q)$

$= 0.1 \times 156 (2 \times 2870 + 1000)$

$= 105.144\ mH$

$L_2 = 0.1 \times 122 (2 \times 3780 + 1000)$

$= 12.2 \times 8560$

$= 104.432\ mH$

$L_3 = 0.2 \times 110 (2 \times 2200 + 1000)$

$= 22 \times 5400$

$= 118800\ mH$

$L = \frac{L_1 + L_2 + L_3}{3} = 112.392\ mH$

* Precautions and Sources of error :-

1. While obtaining D.C. balance, the galvanometer key should be pressed after battery key.
The capacitor should be of small capacity.

Teacher's Signature

Expt. No. Sixth Page. No. 14 Date 22/10/18

☞ Object :- To the determine the young modulus "y" of the material of a given rectangular beam supported on two knife edges and loaded at its middle point by using spherometer arrangement.

☞ Apparatus used :- An uniform rectangular metallic beam, two sharp edges, a hanger, set of slotted half kg weights, a Leclanche or dry cell, Plug key, a shunted galvanometer, Vernier Callipers, meter scale, screw gauge and connecting wires.

☞ Formula used :- The young modulus "Y" of the material of a given rectangular beam is given by,

$$Y = \frac{mgl^3}{4bd^3S}$$

☞ Observations :-

A. For dimensions of the beam.

(i) Length of the beam between the two knife edges l = 90 cm.

(ii) Measurement of breadth (b) of the beam = 2.9 cm.

(iii) Measurement of thickness (d) of the beam = 5.6 cm.

Teacher's Signature ____________

Expt. No. Seventh

B. Table for the measurement of depression δ of the beam.

S.No.	Load in the hanger	Spherometer reading: load increasing M.S. Read.	C.S. Read	Total (a)	load decreasing M.S. Read	C.S. Read	Total (b)	Mean depression $\delta = (a+b)/2$	Depression δ cm for 1500 gm	Mean δ cm for 1500
1.	0	1	42	1.42	1	71	1.71	2.27	1.99	
2.	500	2	31	2.31	2	8	2.8	3.71	4.02	7.545
3.	1000	3	90	3.90	3	81	3.81	5.76	1.535	
4.	1500	4	23	4.23	4	29	4.29			
5.	2000	5	18	5.18	5	11	5.11			
6.	2500	5	69	5.69	8	92	8.92			

☞ Calculations :- The young Modulus $Y = \frac{Mgl^3}{4bd^3\delta}$

$$= \frac{1500 \times 980 \times 90 \times 90 \times 90}{4 \times 2.9 \times (5.6)^3 \times 7.545}$$

$$= 6.97 \times 10^7 \text{ dynes/cm}^2.$$

☞ Result :- The value of young's Modulus "Y" of the Material of the beam is 6.97×10^7 dynes/cm².

☞ Precautions and Sources of error :-

1. Breadth and thickness of the beam Should be uniform throughout and noted very carefully.
2. The beam must be placed symmetrically on the knifes edges.

6/11/18

Teacher's Signature

Expt. No. Seventh Page. No. 16. Date

Object :- To determine the elastic constants "Young's Modulus, Y, modulus of rigidity η and poission ratio σ" of the material of a given wire by Searle method.

Apparatus used :- Two identical bars, Short and thick experimental wire, Cotton thread, Candle, Match box, screw gauge, meter Scale, Stop watch, Physical balance, weight box.

Formula used :- The elastic constant "Young Modulus Y, modulus of rigidity η, poission ratio σ" of the material of the wire are given by,

$$Y = \frac{8\pi I l}{T_1^2 r^4} \quad \text{--- (i)}$$

$$\eta = \frac{8\pi I l}{T_2^2 r^4} \quad \text{--- (ii)}$$

$$\sigma = \frac{T_2^2}{2T_1^2} - 1 \quad \text{--- (iii)}$$

Observation :-

A. The average length of bar, L = 30 cm.

B. The average length of experimental wire, l = 31 cm.

C. The average mass of the bar, M = 299.7 gm.

Teacher's Signature ____________

D. The average breadth of bar, b = 2 cm.

E. The radius of the bar = 1.5

F. Table for the period T_1 and T_2.

SR NO	No. of oscillations	Time T_1 Min	Sec	Total	Time Period T_1	Mean T_1	Time T_2 Min	Sec	Total	Time Period T_2	Mean T_2
1.	10	0	5	5	$\frac{1}{2}$		0	5	5	$\frac{5}{10}$	
2.	15	0	11	11	$\frac{11}{15}$		0	9	9	$\frac{3}{5}$	
3.	20	0	16	16	$\frac{4}{5}$	16.2	0	15	15	$\frac{3}{4}$	14.2
4.	25	0	21	21	$\frac{21}{25}$		0	19	19	$\frac{19}{25}$	
5.	30	0	28	28	$\frac{14}{15}$		0	23	23	$\frac{23}{30}$	

☞ Calculations :– Putting the values of l, I, r, T_1 and T_2 from the observation tables in the formula i.e.,

young modulus $Y = \frac{8\pi l I}{T_1^2 r^4}$

$= \frac{8 \times 3.14 \times 31 \times 22664.831}{(16.2)^2 \times (1.5)^4}$

Teacher's Signature ____

$$Y = 1.32 \times 10^8 \text{ dynes/cm}^2$$

The modulus of rigidity $= \eta = \dfrac{8\pi l I}{T_2^2 r^4}$

$$= \frac{8 \times 3.14 \times 31 \times 2.26 \times 10^{-4}}{(14.2)^2 \times (1.5)^4}$$

$$\eta = 1.72 \times 10^8 \text{ dynes/cm}^2$$

Poission ratio $\sigma = \dfrac{T_2^2}{2T_1^2} - 1$

$$= \frac{(14.2)^2}{2 \times (16.2)^2} - 1$$

$$\sigma = -6.15 \times 10^{-1}$$

Result :- The value of various elastic constants of the material of the given wire,

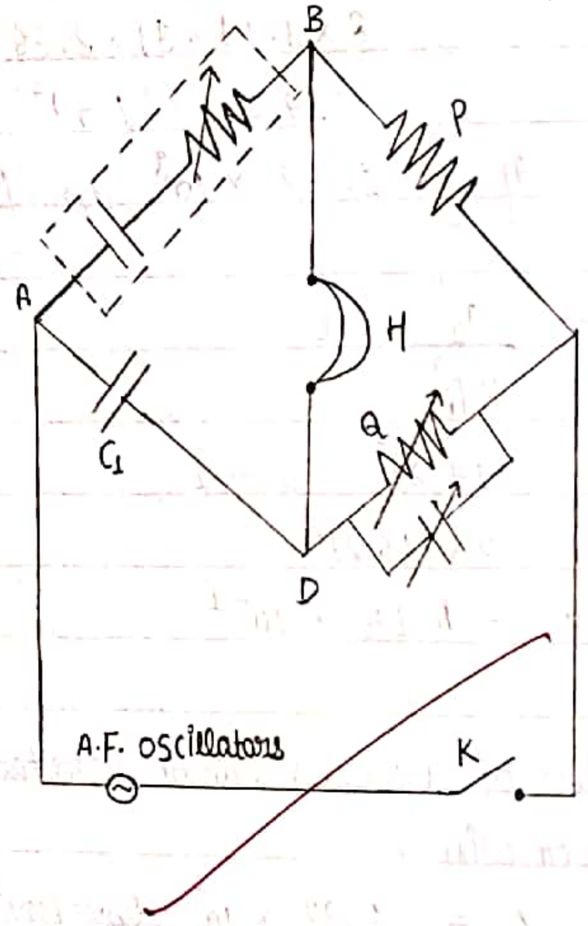
$$Y = 1.32 \times 10^8 \text{ dynes/cm}^2$$

$$\eta = 1.72 \times 10^8 \text{ dynes/cm}^2$$

$$\sigma = -6.15 \times 10^{-1}$$

Precautions and Sources of error :-

1. Both bars should be identical.
2. Lengths of two threads should be the same.
3. Bars should oscillate in the horizontal plane only.
4. The amplitude of oscillations should be small.



☞ Object :- To determine the capacitance and Power factor of a Capacitor by Schering bridge.

☞ Apparatus :- Experimental Capacitor, Standard Capacitor, Variable air Capacitor, resitance boxes, audio frequency oscillator, Head Phone and connection wires.

☞ Formula used :- The Capacity of a capacitor is give by

$$C = \frac{C_1 Q}{P}$$

☞ Observation :-

Table for resitance of Capacitor (r) :-

SNO	P	C_1 (uF)	C_2	r ohm	Mean (r ohm)
	1000	0.1 uF	0.040	250 Ω	
	100	0.1 uF	0.011	196.7 Ω	151.25
	1000	0.1 uF	0.061	7.69 Ω	

Table for the Unknown Capacitance C.

SNO	P	C_1 (uF)	Q	C	mean C
	1000	0.01	4310	0.0431	
	100	0.01	310	0.031	0.045
	1000	0.01	6210	0.062	

* Frequency of A.C. Mains = 50 Hz.

☞ Power factor of C

Power factor $= 2\pi f C r$

$= 2 \times 3.14 \times 50 \times 151.25 \times 0.045$

$= 2136.7386 \ \mu F \ ohm \ sec^{-1}$

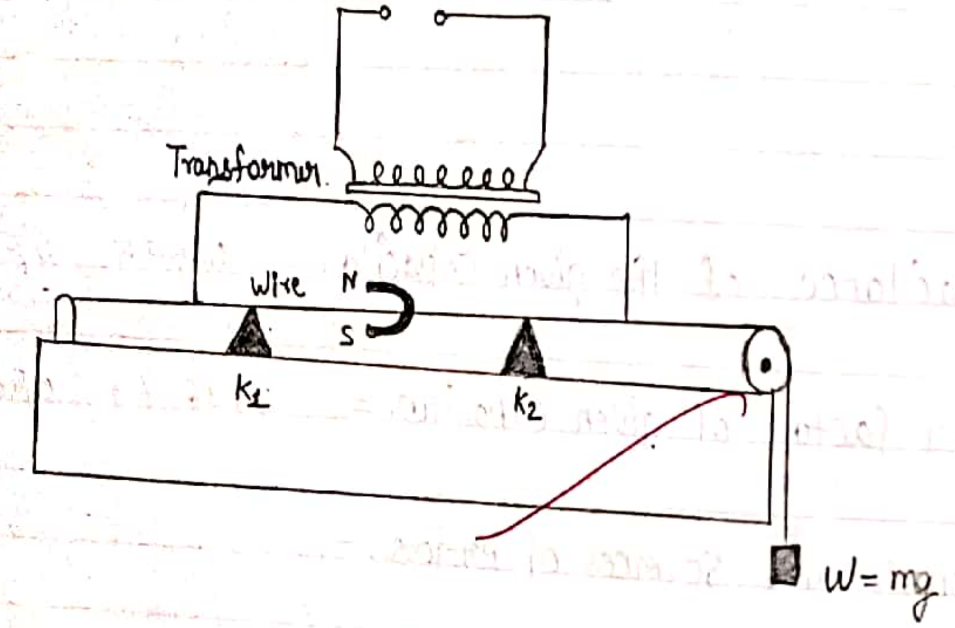
☞ Result :-

The Capacitance of the given Capacitor = 0.045 μF

The Power factor of given capacitor = 2136.73 $\mu F \ ohm \ sec^{-1}$

☞ Precautions and Sources of error :-

1. The experimental Capacitor Should be of low value as this method is most suitable for low capacitance.
2. The variable resitance should include a decade Subdivided ohm.
3. The Variation of Capacitance should be smooth.



Object :- To determine the frequency of A.C. Mains with the help of a Sonometer.

Apparatus used :- A.C. Mains, Sonometer with non magnatic wire, a step down transformer of 6-9 Volts, horse Shoe magnet, a set of half kg weights with hanger, screw gauge and meter scale.

Formula used :- The frequency of A.C. mains is given by

$$f = \frac{1}{2lr}\sqrt{\frac{Mg}{\pi P}}$$

Observation :-

Table for M and l.

S.No	Mass in hanger	Mass Increasing: Knife edge (K_1)	K_2	$l_1 = K_2 - K_1$	Mass decreasing: Knife edge (K_1)	K_2	$l_2 = K_2 - K_1$	Mean $l = \frac{l_1 + l_2}{2}$
1.	50	44	56	12	44	36	12	12
2.	100	42	57	15	42	57	15	15
3.	150	41	60	19	41	60	19	19
4.	200	39	59	20	39	59.	20	20

Teacher's Signature

Scanned by CamScanner

* **Calculations :-** Putting the value of M, g, P, r and l form the observation tables in the formula i.e.

$$F = \frac{1}{2lr}\sqrt{\frac{Mg}{\pi P}}$$

$$F_1 = \frac{1}{2 \times 12 \times 0.02}\sqrt{\frac{50 \times 980}{3.14 \times 8.89}}$$

$$= \frac{1}{0.48} \times \frac{70}{5.28} = 27.61$$

$$F_2 = \frac{1}{2 \times 15 \times 0.02}\sqrt{\frac{100 \times 980}{3.14 \times 8.89}}$$

$$= \frac{1}{0.6} \times \frac{313.049}{5.28} = 98.81$$

$$F_3 = \frac{1}{2 \times 19 \times 0.02}\sqrt{\frac{150 \times 980}{3.14 \times 8.89}}$$

$$= \frac{1}{076} \times \frac{383.405}{27.91} = 18.075$$

Result :- The frequency of A.C. Mains = 48.163 cm/sec.

Prcentage and Sources of error:-

(i) The wire should be of an non magnetic substance. It should be of uniform cross section and free of kinks.

Object :- To determine the modulus of rigidity of the material of a given wire by Statical method using Barton's Vertical apparatus.

Apparatus used :- Barton's Vertical apparatus, half kilogram weights, Screw gauge, Callipers and meter scale.

Formula used :- $\frac{360\, M g D (l_1 - l_2)}{\pi^2 r^4 (\theta_1 - \theta_2)}$

observation :-

SR NO.	Load Placed in each of Pans (Kg).	one end (a)	Mean	one end (c)	one end (a')	one end (c')	$\frac{a+a'+c+c'}{4}$	Mean
1.	0.5	0.3	10		0.7	20		
2.	1.0	0.7	0.7	7.1	10.4	10.5	16.8	19.7
3.	1.5	10	0.3		20	0.7		
4.	2.0	10.2	00		20.5	00		

(i) Distance of the first Pointer P_1 from the fixed end
$l_1 = 32.5$ cm.

(ii) Distance of the Second Pointer P_2 from the fixed end
$l_2 = 80$ cm.

(iii) Distance between the two pointer $(l_1 - l_2) = 47.5$

Calculations :- Putting the values of $M, g, D, r, (l_1 - l_2)$ and $(\theta_1 - \theta_2)$ from the observation table in the given formula i.e.

$$\eta = \frac{360\, MgD\,(l_1 - l_2)}{\pi^2 r^4\,(\theta_1 - \theta_2)} \quad \text{dynes/cm}^2$$

The value of $M\ (\theta_1 - \theta_2)$ can be taken from the graph to calculate η.

$$\eta_1 = \frac{360 \times 500 \times 9.8 \times 0.255 \times 47.5 \times 5.20}{(3.14)^2 \times 6.25 \times 10^{-12} \times 9.7}$$

$$\eta_2 = \frac{360 \times 1000 \times 9.8 \times 0.255 \times 47.5}{(3.14)^2 \times 625 \times 10^{-12} \times 9.7}$$

$$\eta_3 = \frac{360 \times 1500 \times 9.8 \times 0.2555 \times 47.5 \times 10^{12}}{59773.825}$$

$$\eta_4 = \frac{360 \times 2000 \times 9.8 \times 0.255 \times 47.5 \times 10^{12}}{59773.825}$$

$$\eta = \frac{\eta_1 + \eta_2 + \eta_3 + \eta_4}{4}$$

Result:— The modulus of rigidity of the material of the given where root $\eta = 8.93$ dynes/cm^2.

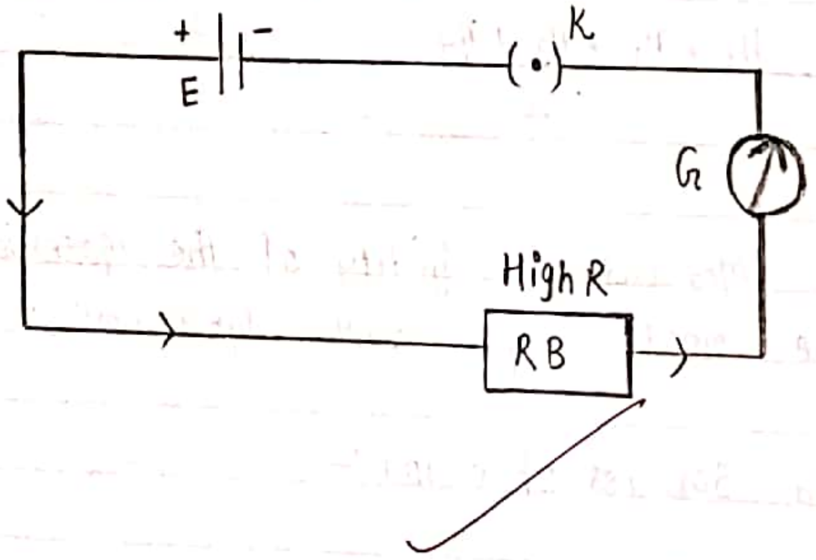
Precautions and Sources of error:—

[i] The base of the instrument should be levelling screws with the base.

[ii] The Pulley should be frictionless.

[iii] The thread wound round the cylinder should be flexble thin and strong.

[iv] Load should be increased or decreased gradually and gently.



Expt. No. Eleventh. Page. No. 26 Date

☞ Object :- To convert a western galvanometer into a voltmeter of given range and then to cabibrate it.

☞ Apparatus used :- A western galvanometer on battery of known e.m.f. high resistance box, voltmeter of the same range as given for conversion, plug key, connection wire and apparatus for determining the galvanometer resistance by Kelvin method.

☞ Formula used :- The convert the galvanometer into voltmeter the series resistance R is required and given is by

$$R = \frac{V}{I_g} - G$$

$$C_s = \frac{F}{n(R+G)}$$

☞ Observation :-

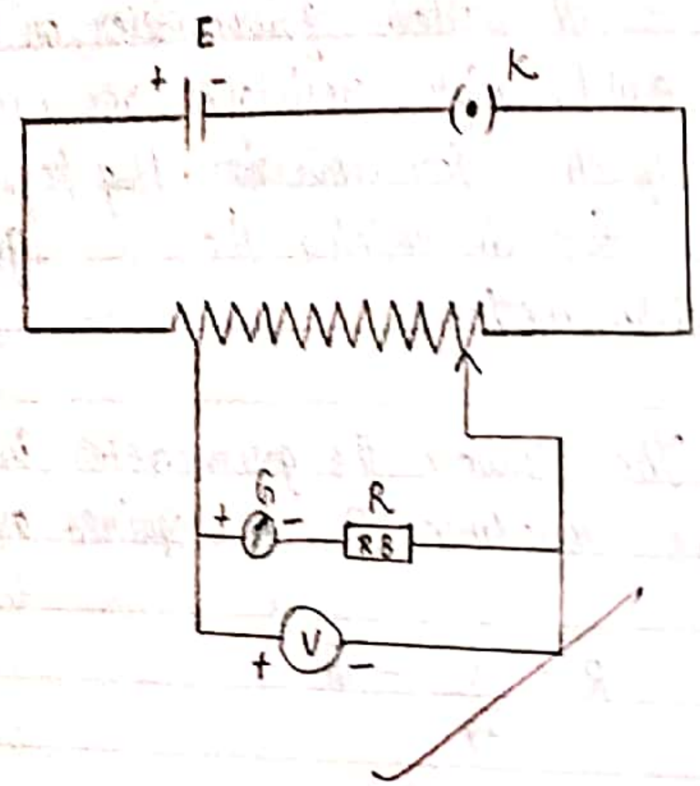
[a] Determine of galvanometer resistance :

Galvanometer resistance G = 90 ohm.

[b] For the determination of figure of merit (Cs) and I_g of the galvanometer

Teacher's Signature

Expt. No. ______ Page. No. ____ Date ______



SR NO.	Resistance introduced in the resistance box (R) ohm.	No. of divisions of deflection in galvanometer 'n'.	Figure of merit $Cs = \frac{E}{n(R+G)}$	Mean Cs ohm/div.	Current produce full deflection $Ig = Cs \times N$.
1.	5000	30	0.0000196		
2.	7000	22	0.0000192	0.000019	0.00057
3.	9000	18	0.0000183		

[C] Determination of series resistance :-

The resistance R is calculated putting the value of G, Ig and V in the formula i.e.

$$R = \frac{V}{I_g} - G$$

[D] Table for Calibration of Converted Galvanometer

SR NO.	Scale	Reading of the Converted Galvanometer $V_1 = \frac{n \times V}{N}$ volt	Voltmeter Reading V_2 volt.	Mean
1.	06	0.6	0.13	0.47
2.	08	0.8	0.18	0.62
3.	10	0.10	0.23	0.77

Teacher's Signature

Calculation:– The current required for full scale deflection

$$I_g = 0.00057 \text{ amp.}$$

Series resistance $R = \frac{V}{I_g} - G$

$$R = \frac{3}{0.00059} - 90$$

$$= 5263.1579 - 90$$

$$R = 5173.15 \text{ ohm.}$$

Result:–

[i] The series resistance required to convert the given galvanometer into voltmeter of Range Volts

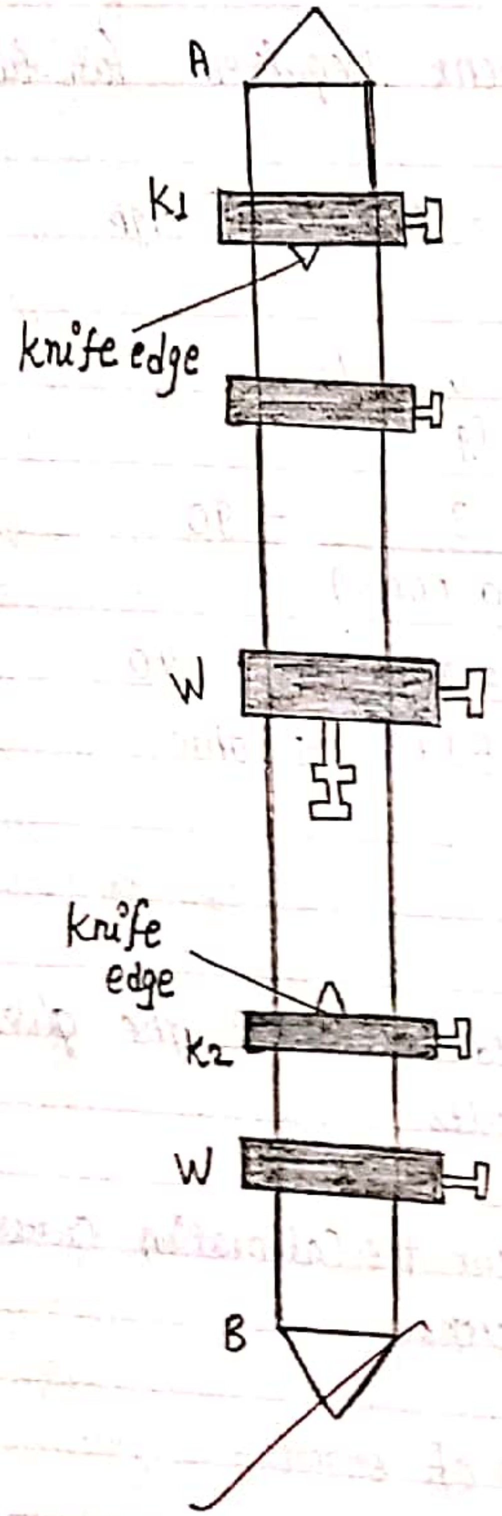
[ii] The attached graph represent the calibration curve of the converted galvanometer into voltmeter.

Precautions and sources of error:–

[i] The battery should be fully charged.

[ii] The galvanometer and voltmeter reading should initialy be at zero mark.

1/1/19



Expt. No. Twelth.

Object :- To determine the value of acceleration due to gravity "g" in laboratory with the help of keter pendulam.

Apparatus used :- Kater's pendulum, Sharp knife edge, Stop watch and meter Scale.

Formula used :- The acceleration due to gravity "g" is given by

$$g = \frac{8\pi^2(l_1+l_2)}{T_1^2 + T_2^2} \quad cm/sec^2$$

Observation :-

Table for determination of T_1 and T_2 and (l_1+l_2).

SR No.	Distance between knifeedge.	No. of oscillations	Time taken about the knife edge.	Time Period T_1	Mean	Time taken about the knife edge.	Time Period T_2	Mean
1.		10	17	1.7		13	1.7	
2.	88	20	34	1.7	1.7	34	1.7	1.7
3.		30	51	1.7		52	1.7	
4.		40	68	1.7		69	1.7	

Teacher's Signature

Calculations :– Putting the value of T_1, T_2 and $(l_1 + l_2)$ form the Observation table in the formula i.e.

$$g = \frac{8 \times 3.14 \times 3.14 \times 88}{(1.7)^2 \times (1.7)^2}$$

$$= \frac{6941.1584}{5.78}$$

$$= 1200.8925 \ cm/sec^2$$

$$= 12 \ m/sec^2.$$

Standard Result :– The standard value of g at 9.8 mt/sec^2.

$$\text{Percentage error} = \frac{\text{Standard result} \sim \text{Calculated result}}{\text{Standard result}}$$

$$= \frac{9.8 \sim 12}{9.8 \times 100}$$

$$= 22 \%.$$