EXPT.NO:

SOLAR CELL-CHARACTERISTICS

AIM: To study the V-I and V-P characteristics of solar cell and to determine the fill factor.

APPARATUS: solar cell, volt meter, ammeter, light source, load resistance and connecting wires.

FORMULA: Fill factor= $\frac{V_{mp}\times I_{mp}}{V_{oc}\times I_{sc}}$

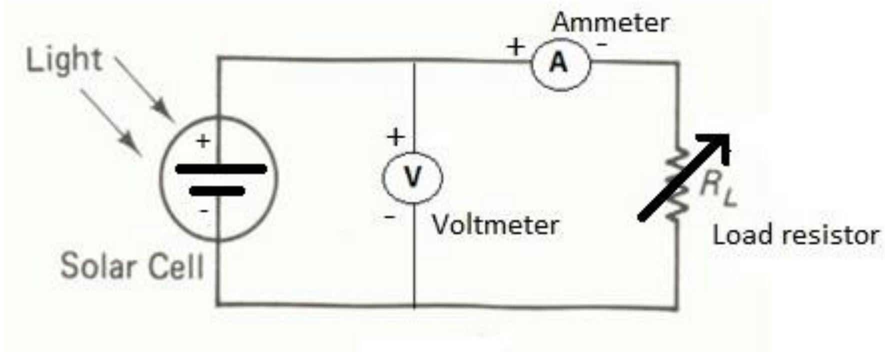
Where V_{mp} → maximum power voltage =………………… Volts

I_{mp} → maximum power current = …………………..Amp

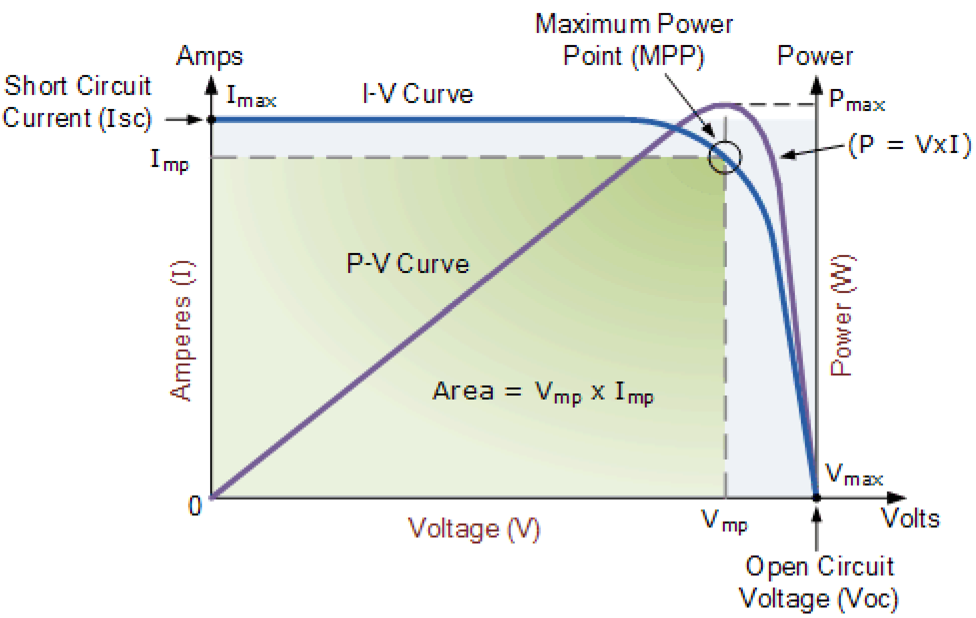
V_{oc} → open circuit voltage =………………… Volts

I_{sc} → short circuit current = …………………..Amp

CIRCUIT:



MODEL GRAPH:



TABLES:

S.No.	Voltage(V) volts	Current(I) (mA)	Power(P) (mW)

PRECAUTIONS:

1) Ensure that the circuit connections are perfect.
2) Avoid direct contact of light source and solar cell.
3) Light from the lamp should fall normally on the cell.
4) Vary the voltage slowly and measure the corresponding current from ammeter.

RESULT:

i) V-I and V-P characteristics of solar cell are studied.

ii) Fill factor of given solar cell = ………………

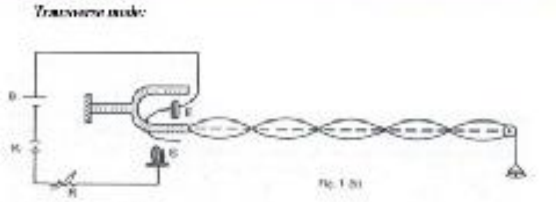
EXPT.NO: ______

MELDES EXPERIMENT

DATE: ________

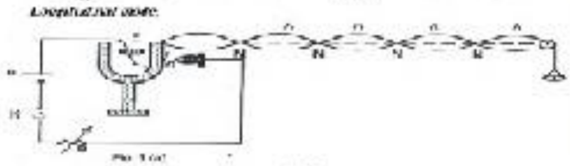
AIM: To determine the Frequency of electrically vibrating tuning fork by meldes apparatus in longitudinal and transverse modes.

APPARATUS: electrically vibrating tuning fork, thread, pulley with pan, weight box, battery, connecting wires.



FORMULA: 1) IN TRANSVERSE MODE

$$\text{Frequency (n)} = \frac{1}{2l}\sqrt{\frac{T}{\mu}} \ \text{Hz}$$



2) IN LONGETUDINAL MODE

$$\text{Frequency (n)} = \frac{1}{l}\sqrt{\frac{T}{\mu}} \ \text{Hz}$$

Where, l → Length of each loop = ……………………cm

T → Tension suspended to string = …………………… dynes

μ → linear density of the thread = ……………………gm/cm

IN TRANSEVERSE MODE:

S.No.	Mass in pan(M) (gm)	Tension in string (T) =(M+m)g (dynes)	Length of the string(L) (cm)	Number of loops (x)	Length of each loop l=L/x (cm)	Frequency (n) = $\frac{1}{2l}\sqrt{\frac{T}{\mu}}$ (Hz)

Average Frequency(n) = …………………………Hz

IN LONGITUDINAL MODE:

S.No.	Mass in pan(M) (gm)	Tension in string (T) =(M+m)g (dynes)	Length of the string(L) (cm)	Number of loops (x)	Length of each loop l=L/x (cm)	Frequency (n) = $\frac{1}{l}\sqrt{\frac{T}{\mu}}$ (Hz)

Average Frequency(n) = …………………………Hz

Where, g → Acceleration due to gravity = 980 cm/sec^2

m → pan mass = …………………… gm

PRECAUTIONS:

1) Should not operate more than 4 volt in battery.
2) You should take loops values by observing perfect loops.

RESULT: 1) Frequency in transverse mode (n) =……………………Hz

2) Frequency in longitudinal mode (n) =……………………Hz

EXPT.NO:

DATE:

STEWART AND GEE'S EXPERIMENT

AIM: To study the variation of magnetic field along the axis of current carrying circular coil using Stewart and Gees type of tangent galvanometer.

APPARATUS: Tangent galvanometer, battery eliminator, rheostat, commutator, plug key, ammeter, connecting wires.

FORMULA:

1) THEORETICALLY

From Boit-savert law,

$$\text{Induced Magnetic field (B)} = \frac{\mu_0 n i r^2}{2(r^2+d^2)^{3/2}} \quad \text{Tesla (or) Wb/m}^2$$

2) EXPERIMENTALLY

From Tangent law,

$$\text{Induced Magnetic field (B)} = B_H \text{Tan}\theta \quad \text{Tesla}$$

Where, μ_0 → permeability of free space = $4\pi \times 10^{-7}$ H/m

n → Number of turns in coil = ...

i → Current across the coil = ... amp

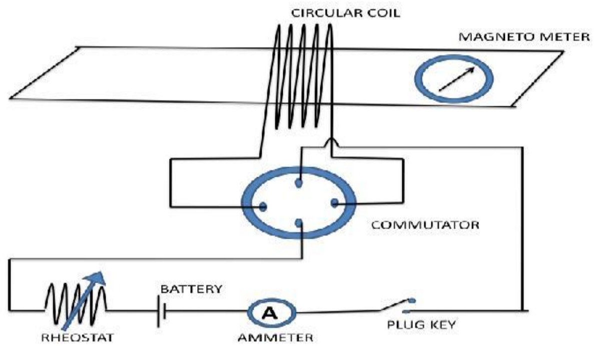
r → Radius of the coil =........................ m

d → Distance between coil and Magnetometer = ... m

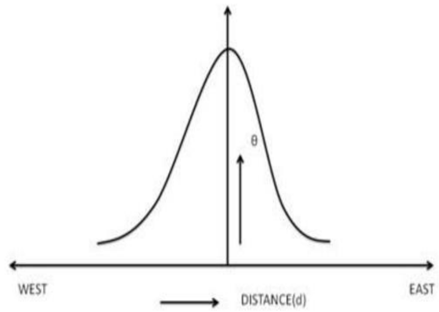
B_H → Horizontal component of earth magnetic field= 0.39×10^{-4} Tesla

θ → Mean deflection in magnetometer = ... (Degrees)

CIRCUIT:



MODEL GRAPH:



S.No.	Distance (d) (meters)	Deflections in magnetometer										$\theta = (\theta_E+\theta_W)/2$	$\tan\theta$	$B = B_H \tan\theta$	$B = \frac{\mu_0 n i r^2}{2(r^2+d^2)^{3/2}}$ (tesla)
		East of the coil					West of the coil								
		θ_1	θ_2	θ_3	θ_4	θ_E	θ_1	θ_2	θ_3	θ_4	θ_W				

RESULT: The variation of intensity of magnetic field at various points along the axis of current carrying circular coil using Stewart and Gee's method is studied.