Date..10.10.19.....

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Photoelectric Effect

Apparatus Available :

- Photoelectric equipments, fibers

Aim :

- Determination of Planck's constant
- Determinatin of work function

Formulae Used :

$$W = h\nu_0$$

W : work function

ν_0 : frequency, h : Planck's const.

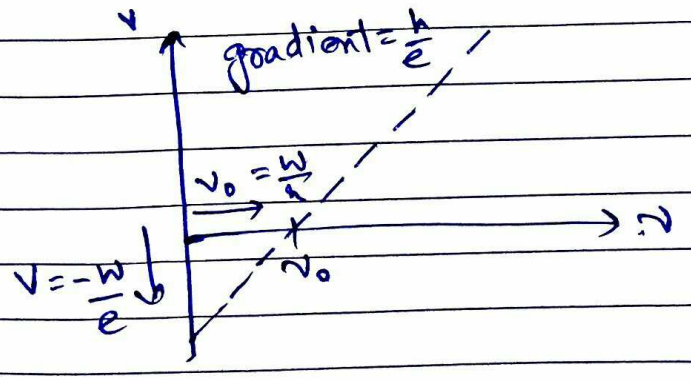
Einstein's Equation

$$h\nu = KE + W$$

$$h\nu = eV_s + W$$

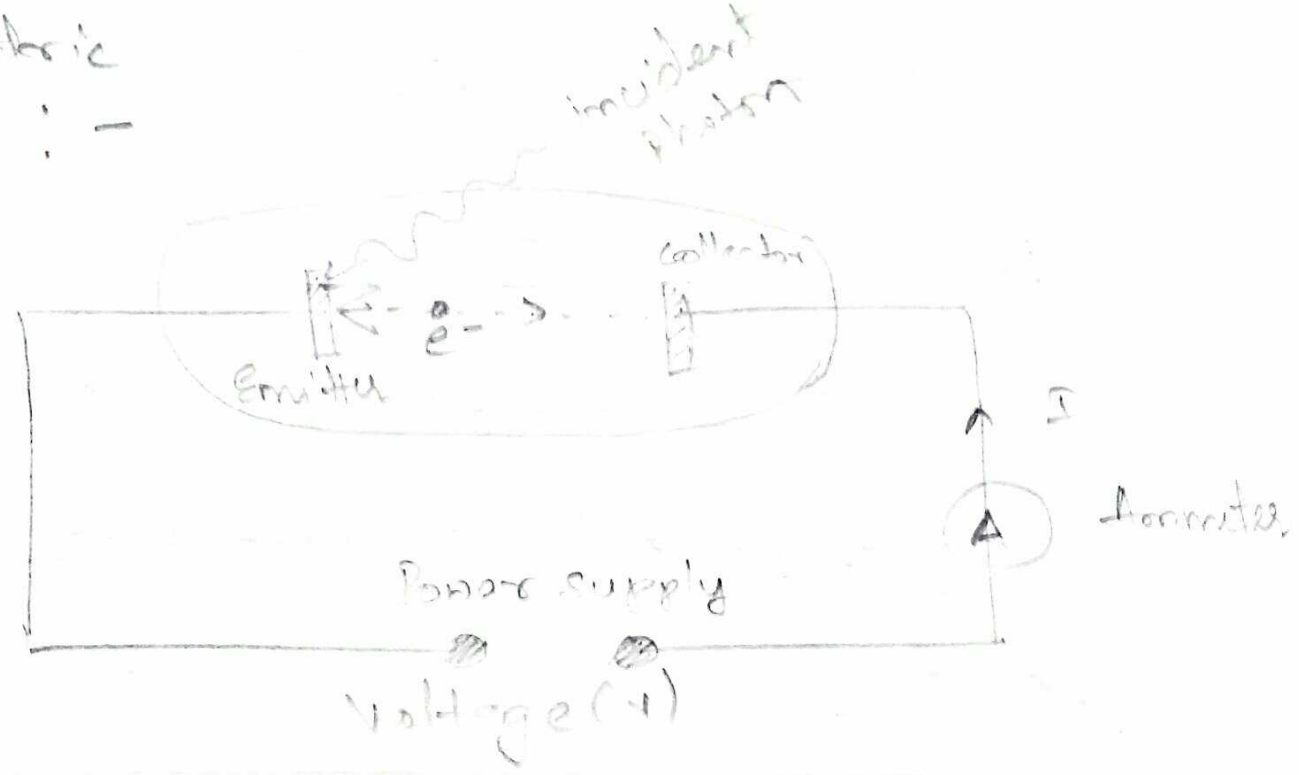
$$V_s = \frac{h\nu}{e} - \frac{W}{e}$$

V_s : Stopping potential



Teacher's Signature : .....

Photoelectric Effect :-



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Observation:

No	Incident Photon wavelength (nm)	Incident Photon frequency (Hz)	Stopping Voltage (V)
1	635	4.72×10^{14}	-0.38
2	570	5.26×10^{14}	-0.55
3	540	5.55×10^{14}	-0.69
4	500	6.0×10^{14}	-0.90
5.	460	6.5×10^{14}	-1.06

Results:

Work function of given metal = 1.48 eV (Units)

Planck's constant = 6.7×10^{-34} JS (units)

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Calculations:

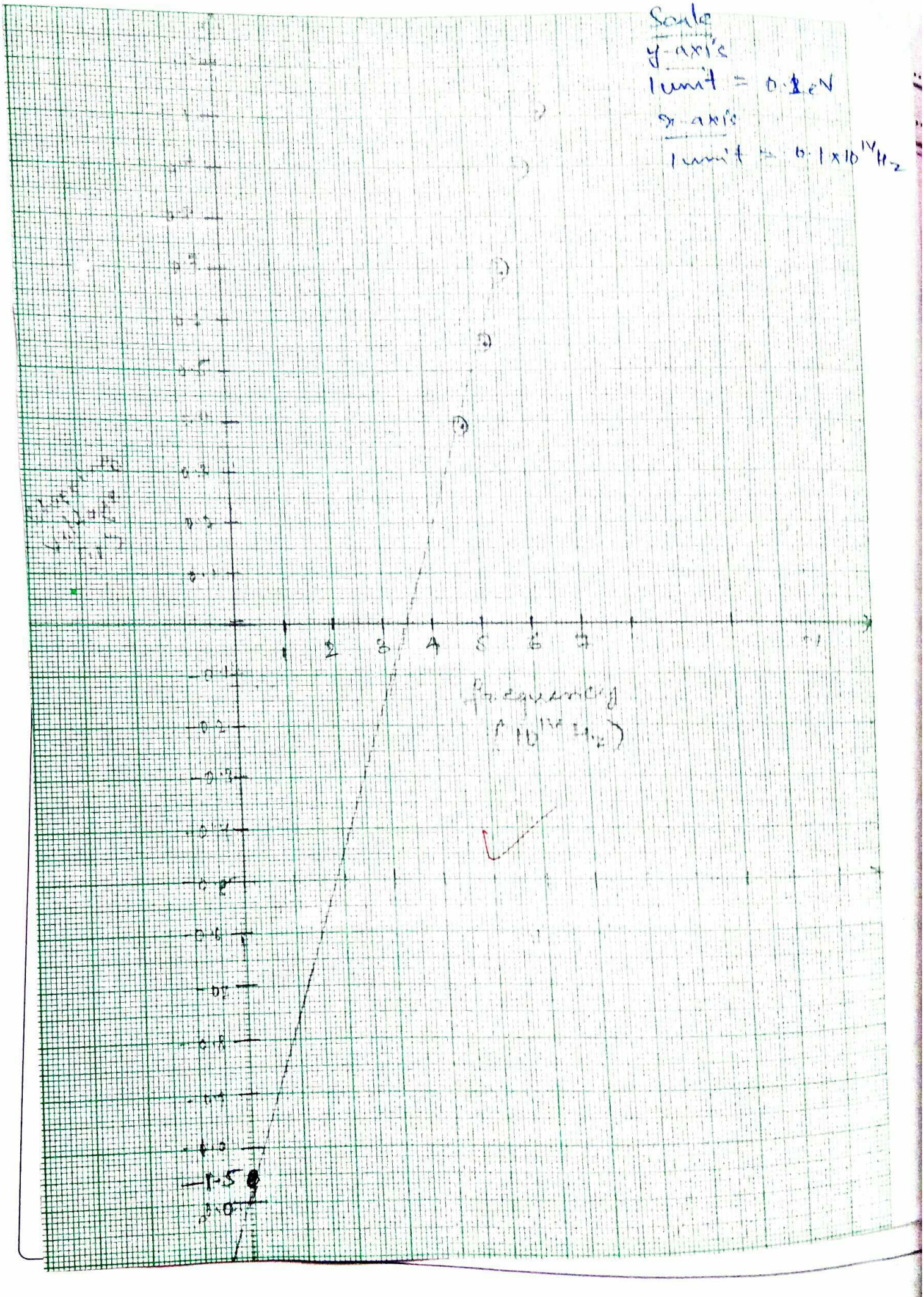
$$\text{gradient} = \frac{h}{e} = \frac{0.75}{1.75 \times 10^{14}}$$

$$h = \frac{0.75}{1.75 \times 10^{14}} \times 1.6 \times 10^{-19}$$

$$h = 6.7 \times 10^{-34}\ J$$

$$V_s = -\frac{\omega}{e} \Rightarrow \omega = -V_s e$$

$$= -(-1.48) = 1.48$$


Scale
y-axis
1 unit = 0.1 eV
x-axis
1 unit = 0.1 × 10^14 Hz
Photon energy
(× 10^14 Hz)