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Photoelectric effect-

Aim: Determination of Plank's constant, and work function. Also to study photoelectric effect.

Apparatus Required: Photoelectric equipment and filters

Theory- It has been observed that a min. amount of energy is required for electrons to escape from metal surface. It is called the work function of a metal.

$w = h\nu_0$, where h is plank's constant and ν_0 is threshold frequency.

Metal	Work function
Pt	6.4
Ag	4.7
Na	2.3
K	2.2
Cs	1.9

Calculations-

$$\nu = \frac{c}{\lambda} = \frac{3\times10^8}{460\times10^{-9}}$$

$$\nu_1 = \frac{3\times10^8}{460\times10^{-9}} = 6.52\times10^{14}\ s^{-1}$$

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Sr No.	Incident Photon wavelength (nm) (λ)	Incident Photon (ν) frequency (s^{-1})	Stopping voltage (V)
1	460nm	6.52×10^{14}	-1.09
2	500nm	6×10^{14}	-0.83
3	540nm	5.5×10^{14}	-0.68
4	570nm	5.26×10^{14}	-0.51
5	635nm	4.72×10^{14}	-0.33

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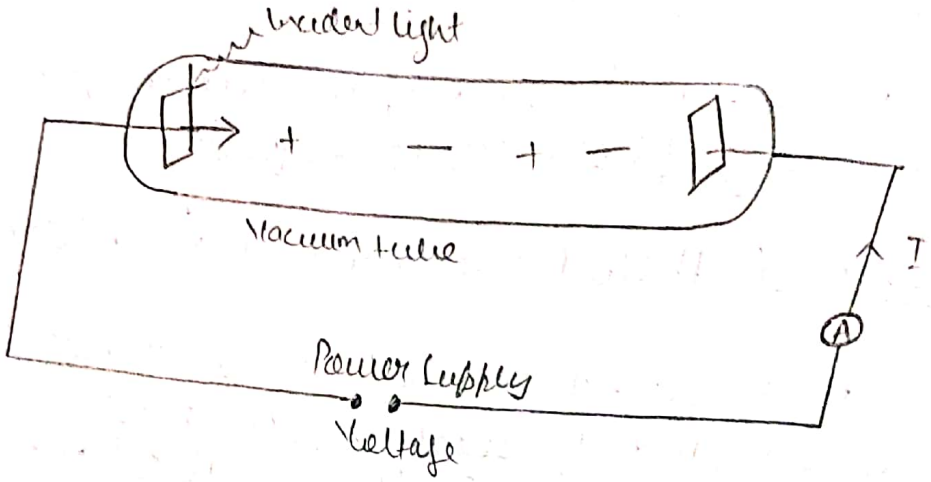
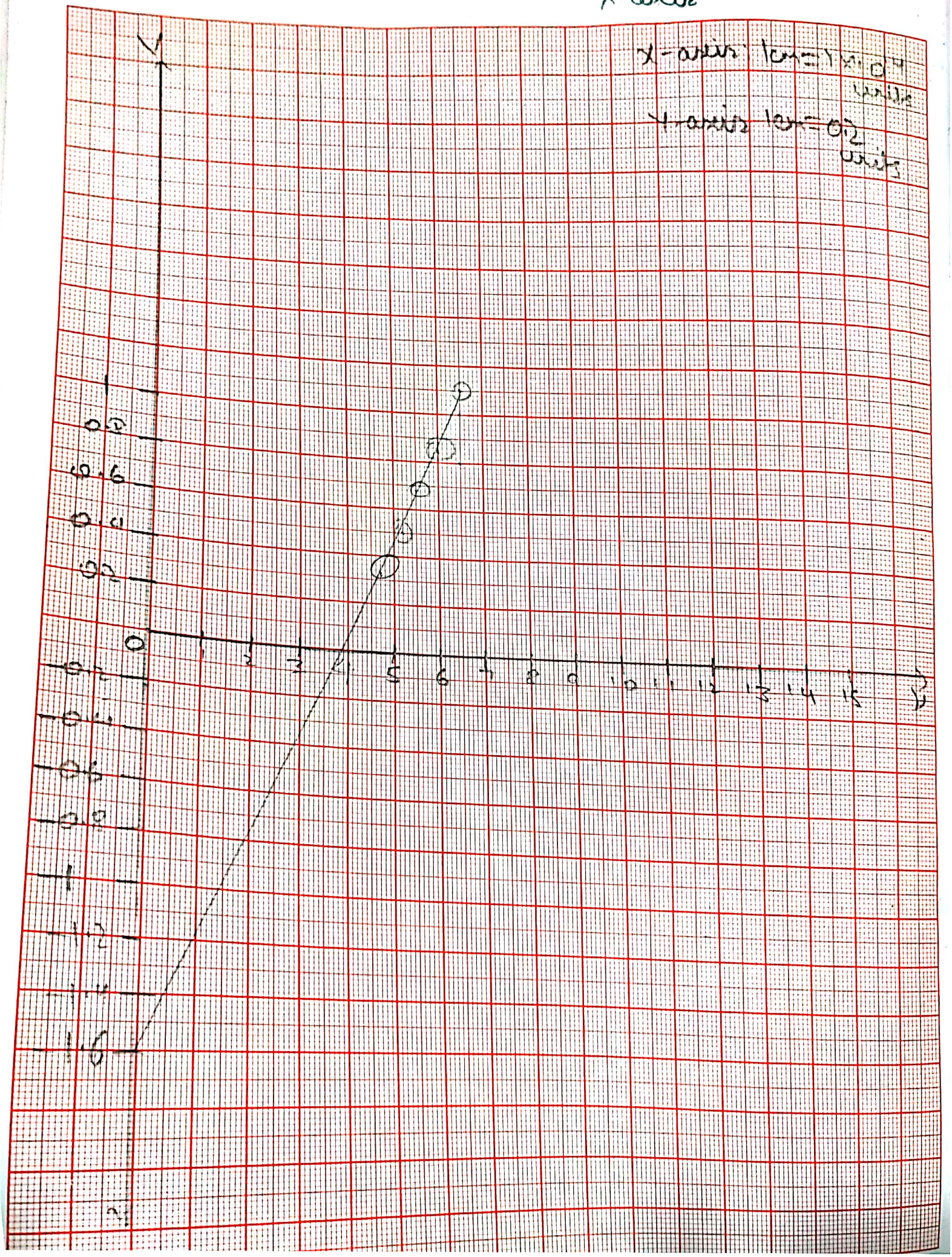


slope = $\frac{0.}{5.5 - 5.26} = \frac{-0.57}{} = 0.378 \times 10^{-14} = \frac{h}{e}$

$\frac{0.9 - 0.4}{6 - 4.8} = 0.42 \times 10^{-14}$

$W = eV = 0.42 \times 10^{-14} \times 1.6 \times 10^{-19} = 6.67 \times 10^{-34}$

X-axis



$\nu_2 = \frac{3\times10^8}{5006\times10^{-9}} = 6\times10^4\ s^{-1}$

$\nu_3 = \frac{3\times10^8}{540\times10^{-9}} = 5.5\times10^{14}\ s^{-1}$

$\nu_4 = \frac{3\times10^8}{570\times10^{-9}} = 5.26\times10^{14}\ s^{-1}$

$\nu_5 = \frac{3\times10^8}{635\times10^{-9}} = 4.72\times10^{14}\ s^{-1}$

From graph, $\nu_0 = 3.75\times10^{14}$ Hz

~~$W = h\nu = 6.626\times10^{-34}\times3.75\times10^{14}$~~

~~$\Rightarrow 24.84\times10^{-20}\ J = 1.55\ eV$~~

$W = h\nu\ eV = 1.6\times10^{-19}\times1.4 \Rightarrow 2.24$

Results – Work fn of given metal $= 2.48\times10^{-19}$ J

Planks constant $= 6.67\times10^{-34}$ Js

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