Tabulation:

S no	Voltage across resistor in volt	Series resistance ohm (R)	Voltage across diode in volts (V_D)	current through diode in mA ($I = V_R/R$)
1.	3.45	1.89	1.66	2.804
2.	3.44	1.83	1.67	2.94
3.	3.43	1.71	1.67	3.27
4.	3.43	1.58	1.68	3.72
5.	3.42	1.45	1.69	4.33
6.	3.37	0.98	1.74	10.53

Diode series Resistance (R) =

Total resistance - 666 Ω

$R = 1.89 - 0.66 = 1.23\ k\Omega$

$R = 1.83 - 0.66 = 1.17\ k\Omega$

$R = 1.71 - 0.66 = 1.05\ k\Omega$

$R = 1.58 - 0.66 = 0.92\ k\Omega$

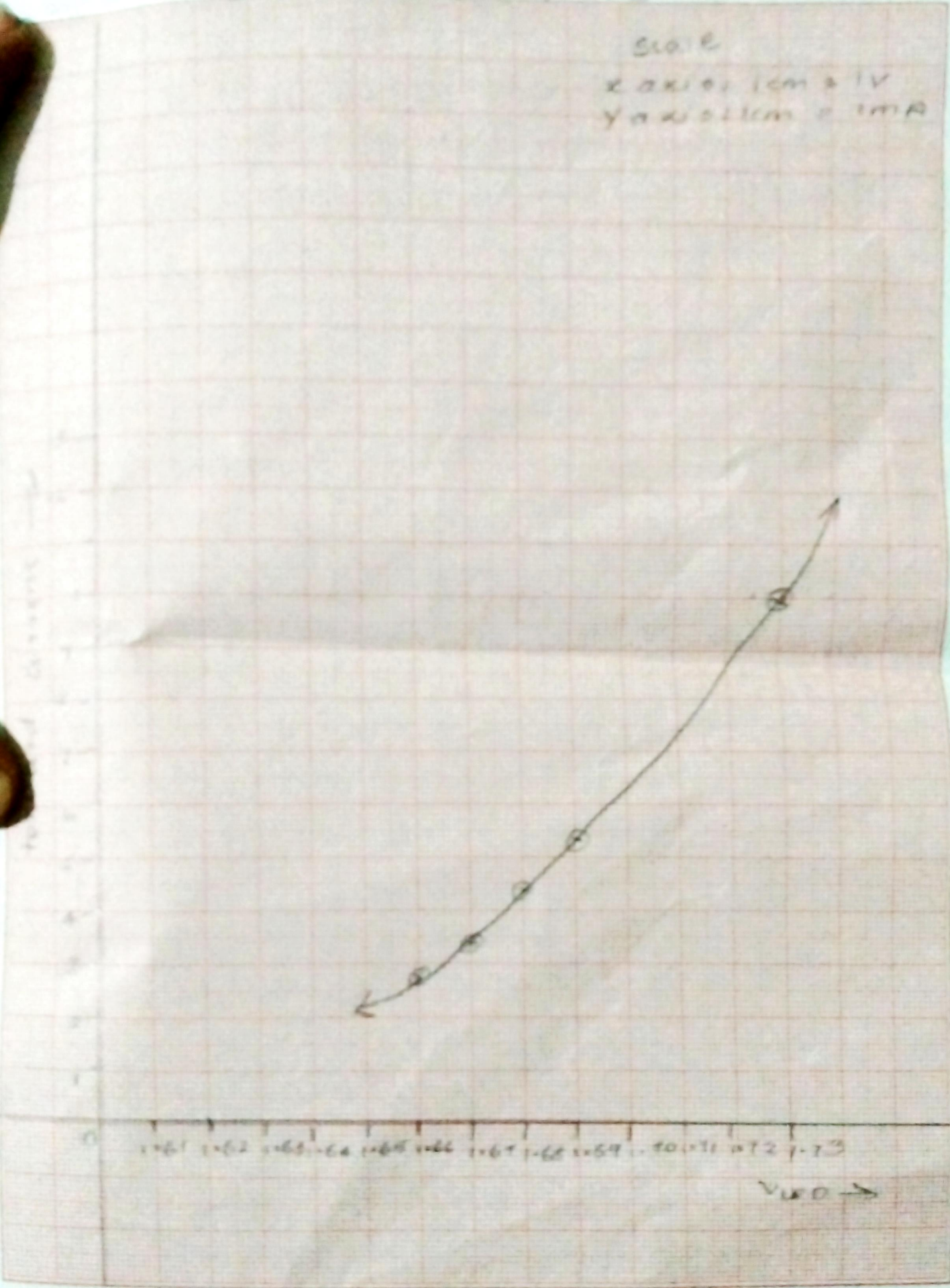
$R = 1.45 - 0.66 = 0.79\ k\Omega$

$R = 0.98 - 0.66 = 0.32\ k\Omega$

Scale

x axis: 1cm = 1V

y axis: 1cm = 1mA



Connection loss:

$V_{in} = 1V$

S.NO	Length of fibre (m)	Amplitude
1	1m	1V
2	3m	0.6V

Measurement:

Bending loss

length = 1m , $V_{in} = 1V$

S.NO	Diameter of fibre (cm)	Amplitude
1	6	3
2	5	2.8
3	4	2.5
4	2	2
5	1	2.7

Connection loss:

$$e^{-\alpha}(x_2 - x_1) = V_1/V_2$$

$$e^{-\alpha}(3-1) = 1/0.6$$

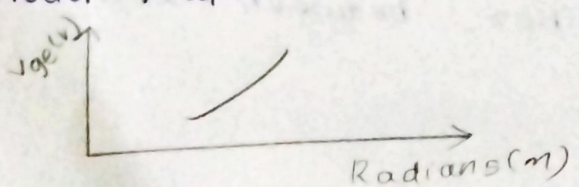
$$e^{-2\alpha} = 1/0.6$$

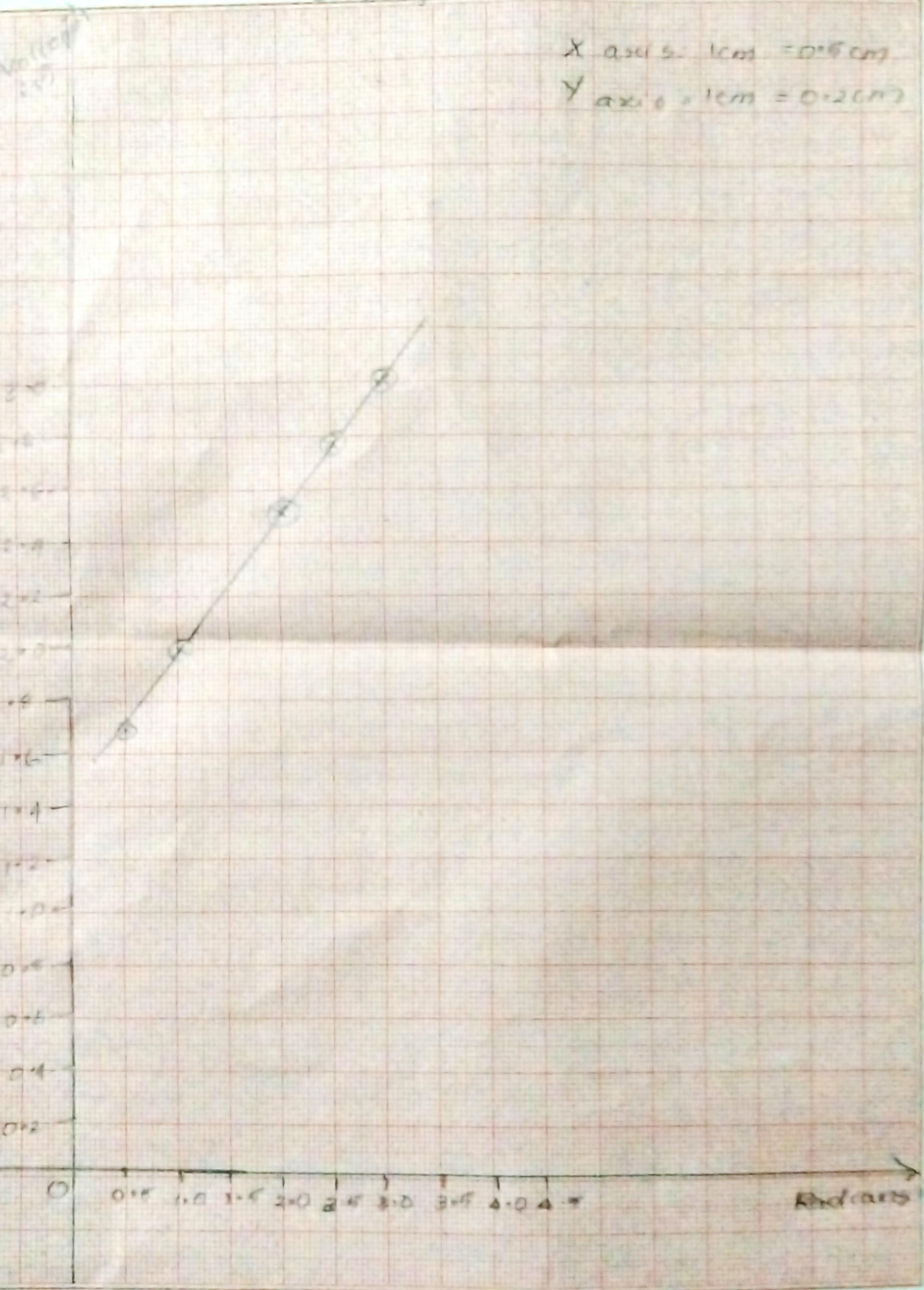
$$\log e^{-2\alpha} = \log(1/0.6)$$

$$\alpha = -0.11$$

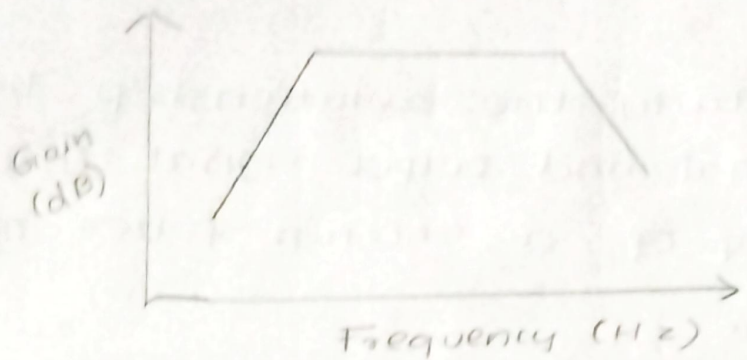
Bending loss:

Model graph




X axis: 1cm = 0·5 cm
Y axis: 1cm = 0·2 (m)
0·4
0·6
0·8
1·0
1·2
1·4
1·6
1·8
2·0
2·2
2·4
2·6
2·8
0
0·5
1·0
1·5
2·0
2·5
3·0
3·5
4·0
4·5
Radians

model graph:

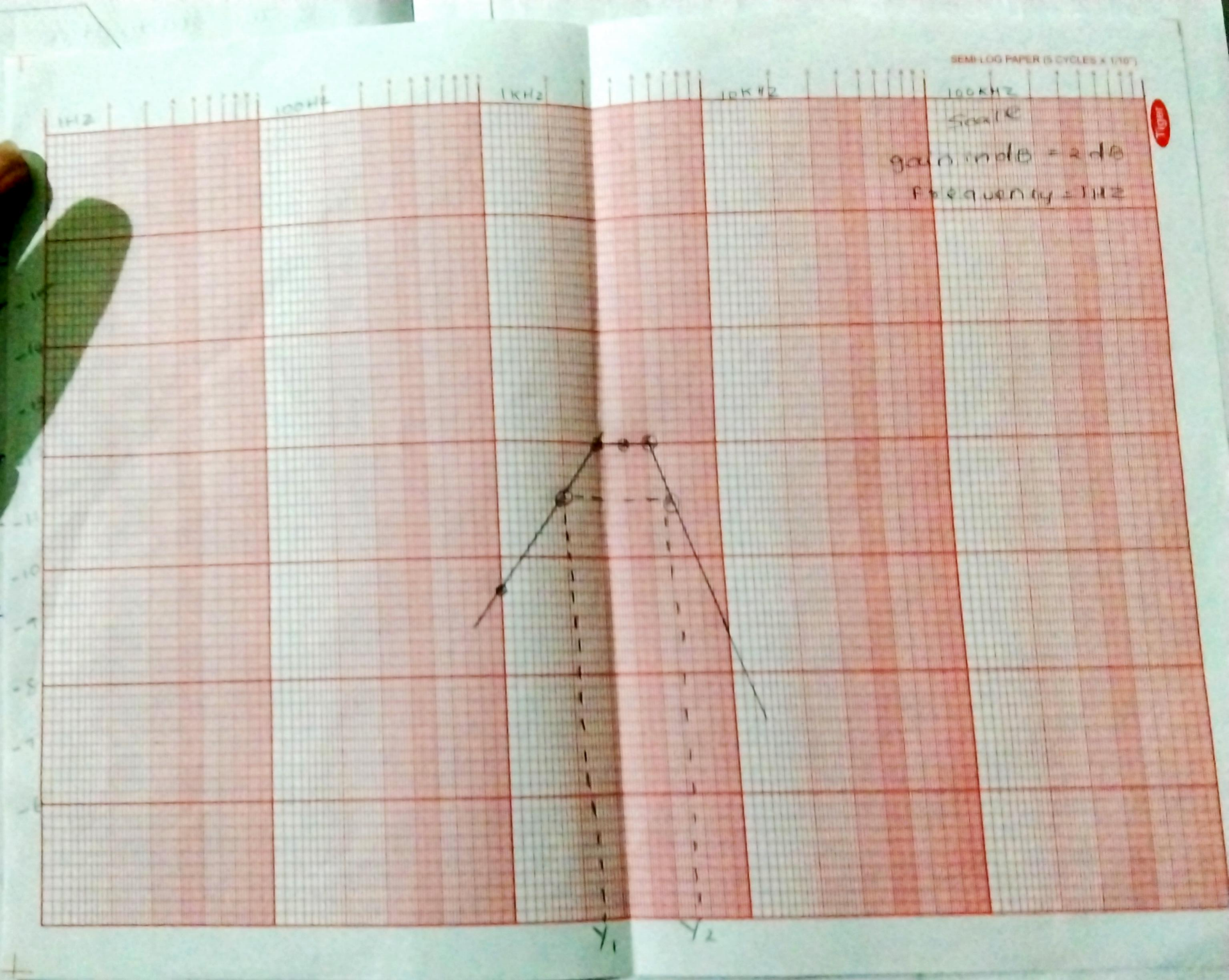


S.no	Frequency (Hz)	V_o(V)	Gain $\frac{V_o}{V_{in}}$	Gain = $20 \log (V_o/V_i)$
1	300 Hz	3	3	-9.5
2	500 Hz	3.5	3.5	-10.89
3	1000 Hz	4	4	-12.04
4	1500 Hz	4	4	-12.04
5	1800 Hz	4	4	-12.04
6	2000 Hz	4	4	-12.04
7	2500 Hz	3.5	3.5	-10.89
8	3000 Hz	2	2	-6.02

Band width = $F_2 - F_1$

$= 2500 - 500$

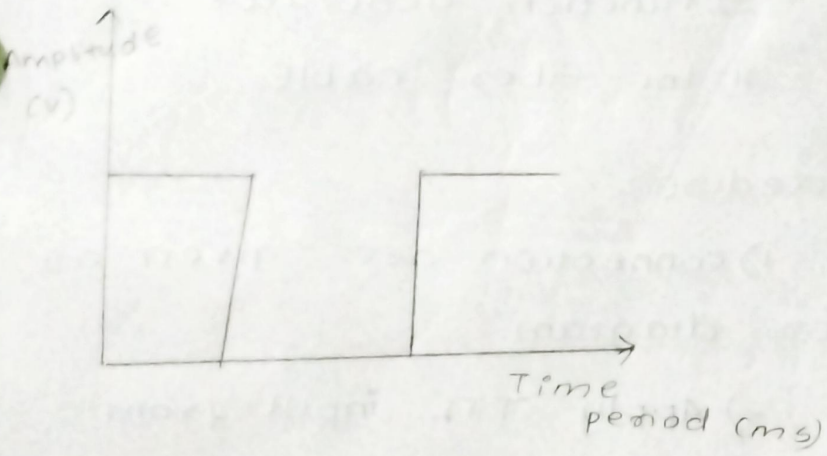
$= 2000$


SEMI-LOG PAPER (5 CYCLES x 1/10")
1HZ
100HZ
1KHZ
10KHZ
100KHZ
Scale
gain = 0dB = 2dB
Frequency = 1HZ
Y1
Y2

Tabulation $T = T_{ON} + T_{OFF}$

S.no	Frequency (Hz)	T_{ON}	T_{OFF}	Bit rate = $1/T_{ON}$	Duty cycle: $T_{ON}/T_{ON}+T_{OFF}$
1	1	0.5	0.5	$1/1ms = 1000$ Hz	50%
2	2	0.25	0.25	$\frac{1}{0.5ms} = 2000$ Hz	50%

Model graph



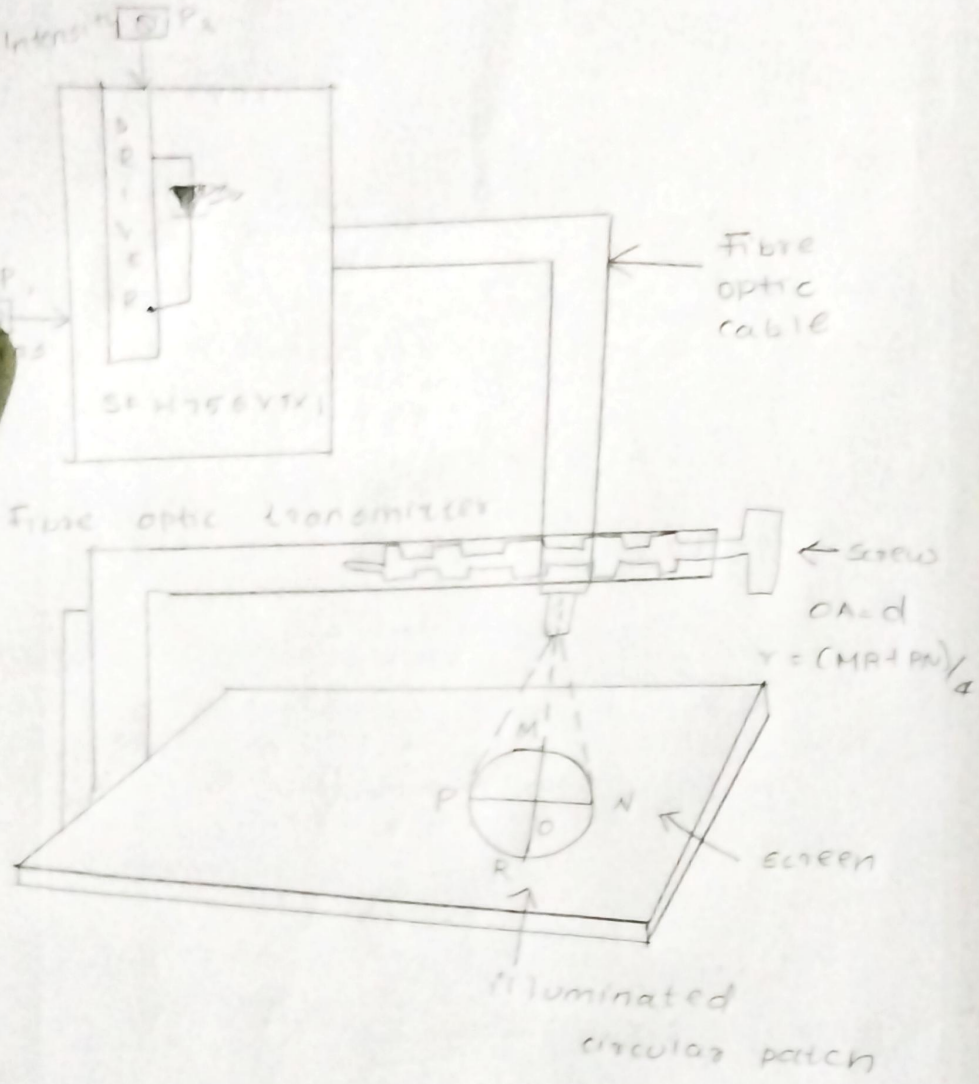
$$\text{Duty cycle} = \frac{T_{ON}}{T_{ON}+T_{OFF}}$$

$$= \frac{0.5}{1} \times 100$$

$$= 50\%$$

$$\text{Duty cycle} = \frac{T_{ON}}{T_{ON}+T_{OFF}}$$

$$= \frac{0.25}{0.50} \times 100$$



S.no	Height (h) cm	Diameter (D) cm	R = D/2	NA = $r/\sqrt{r^2+h^2}$
1.	1	2.8	1.4	0.87373
2.	1.5	2.8	1.4	0.6823
3.	2	2.8	1.4	0.60

calculation

(i) $N_A = \frac{r}{\sqrt{r^2 + d^2}}$

$= \frac{1.4}{\sqrt{1^2 + 1.4^2}}$

$= 0.81373$

(ii) $N_A = \frac{r}{\sqrt{r^2 + d^2}}$

$= \frac{1.4}{\sqrt{1.4^2 + 1.5^2}}$

$= 0.6823$

(iii) $N_A = \frac{r}{\sqrt{r^2 + d^2}}$

$= \frac{1.4}{\sqrt{1.4^2 + 2^2}}$

$= 0.60$