Electronics - Lab Assignment

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Group :- K4

→ **Aim:**
Draw the IV - characteristics of pn junction diode

→ **procedure:**
To draw I-V characteristics follow the procedure which is given below:-

① You need to compute current (Id) through the diode for different values of voltage (Vd) across the diode.

② To find voltage (Vd) use your roll no. and add 3-4 more data pts. after the last pt with step size 0.005 that the total no. of voltage pts be 15.

③ Compute the diode current Id for each value of Vd across the diode using current - voltage diode eqn where $I_D = I_S(e^{qV_d/\eta KT} - 1)$

$I_S = 0.1\,\mu A$
$T = 27°$; $T = 47°$
$q = 1.6 \times 10^{-19} C$
$K = 1.38 \times 10^{-23} J/K$

④ Plot the VI characteristics of the diode in forward biased condition for both temp values on same chart.

⑤ Compute the above set of values and plot the VI characteristics for $(n=2)$

⑥ Study the above plots & express the conclusion at end of the assignment for plots pertaining to two different temp & η

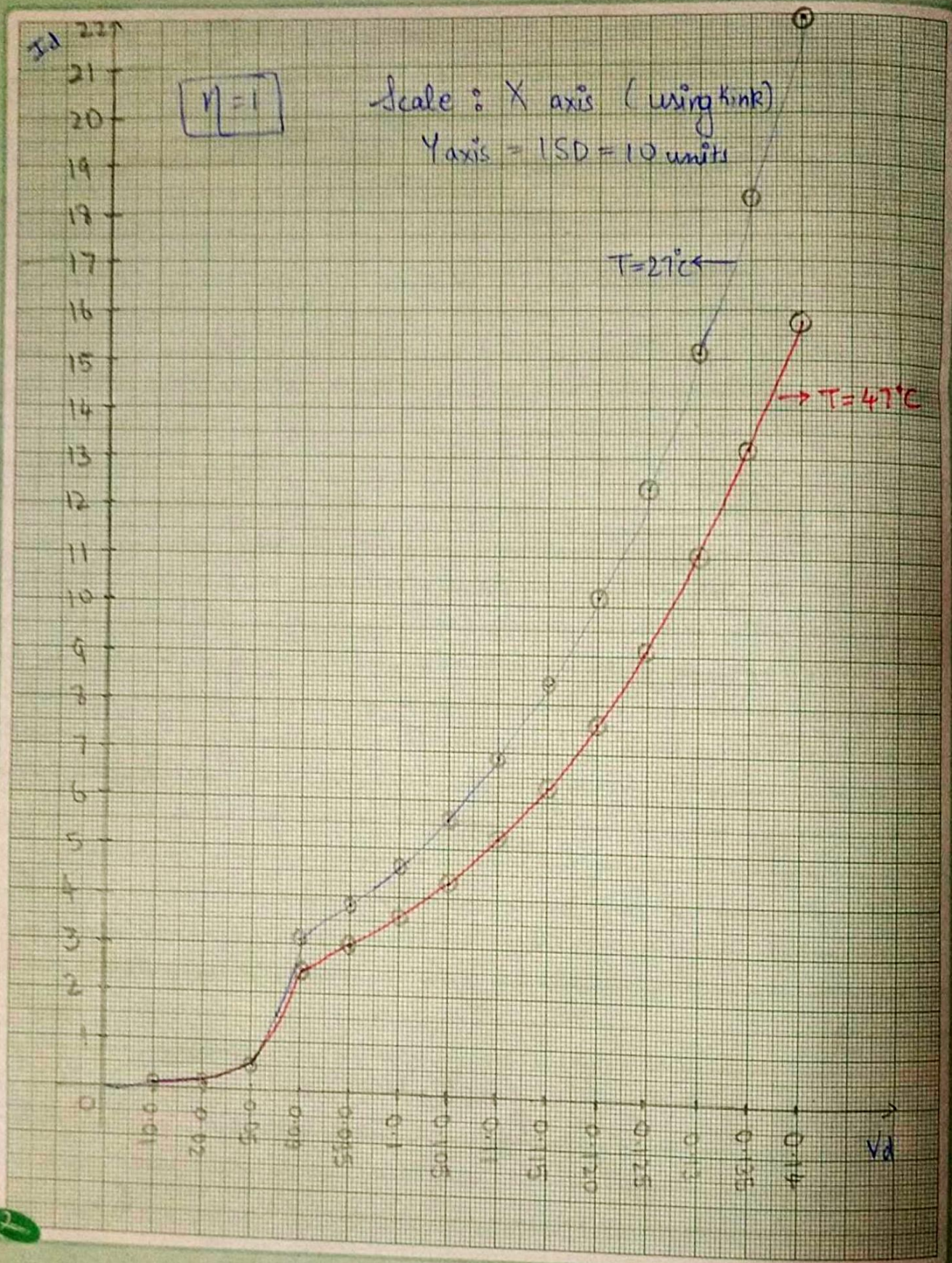
Ans My Roll no: 101915211

→ after removing repeated digits ⇒ 10952

→ ascending order → 01259

$n=1$

S.NO	Voltage point in volts	Id (in μ amps) ($T=27°C$)	Id (in μ amps) ($T=47°C$)
1	0.0	0	0
2	0.01	0.0471	0.0436
3	0.02	0.116	0.106
4	0.05	0.590	0.512
5	0.09	3.140	2.507
6	0.095	3.831	3.025
7	0.1	4.669	3.645
8	0.105	5.685	4.389
9	0.11	6.919	5.281
10	0.115	8.415	6.350
11	0.12	10.230	7.631
12	0.125	12.432	9.166
13	0.13	15.104	11.006
14	0.135	18.345	13.212
15	0.14	22.277	15.856


I
V=1
Scale : X axis (using kink)
Y axis = 1SD = 10 units
T=27°C
T=47°C
Vd

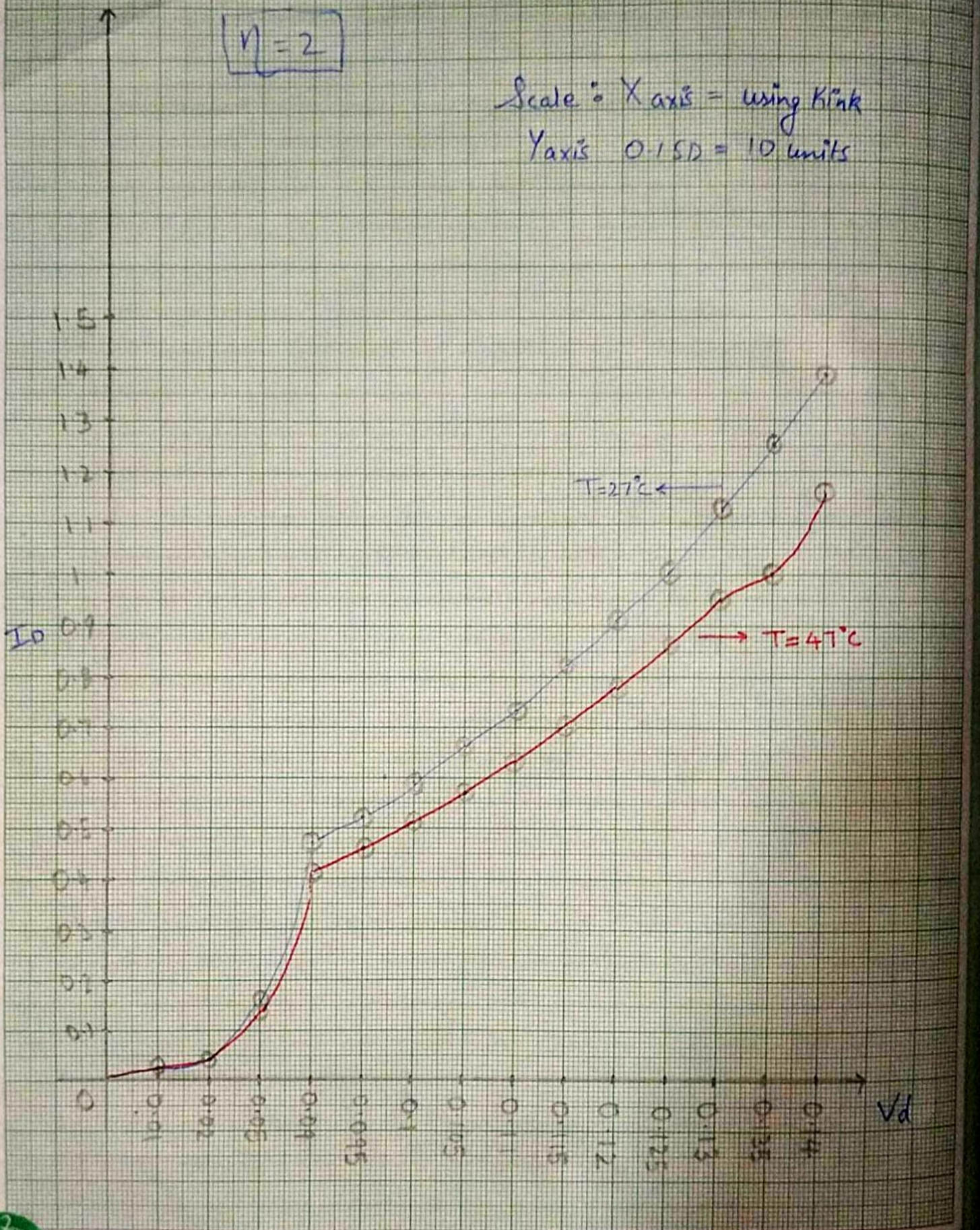
$\eta = 2$

S.NO	Voltage point in volts	Id (in μ amps) (T = 27°C)	Id (in μ amps) (T = 47°C)
1	0.0	0	0
2	0.01	0.021	0.019
3	0.02	0.047	0.043
4	0.05	0.162	0.147
5	0.09	0.469	0.410
6	0.095	0.526	0.459
7	0.1	0.590	0.512
8	0.105	0.660	0.570
9	0.11	0.737	0.633
10	0.115	0.822	0.703
11	0.12	0.916	0.779
12	0.125	1.019	0.862
13	0.13	1.133	0.953
14	0.135	1.258	1.053
15	0.14	1.395	1.163

$\eta = 2$

Scale : X axis = using Kink

Y axis 0.1 SD = 10 units



Conclusion:-

→ As temperature increases current in forward biasing decreases -

→ As from above graphs as temperature increases from 300K to 320K diode current decreases.

→ As diode ideality factor increases current in forward biasing decreases -

As from above graphs as ideality factor increases from 1 to 2 diode current decreases.