Experiment No. 8. Name : _____ DOMS Page No. Date

DETERMINATION OF STRENGTH OF AN ACID USING PH METER

Aim :-

To find out the strength of given hydrochloric acid solution by titrating it against sodium hydroxide (0.1N) using PH meter.

Principle →

When an alkali is added to an acid sol^n, the Ph of the solution increase slowly, but at vicinity of the end point the rate of change of pH of the solution is very rapid. From the sharp break in the curve, we can find out the end point, from which the strength of HCl can be calculated.

PROCEDURE -

1. First standardize the pH meter using different buffers of known pH. Then wash the glass electrode and reference electrode with distilled water and then with the acid sol^n.

Teacher's Signature: _____

Experiment No. _____ Name : _____ DOMS Page No. Date

(2)- The given acid is diluted to 100mL using distilled water. 10mL of this made up solution is pipetted out into a 250mL clean beaker and 100mL of distilled water is added to it, so that the glass electrode and reference electrode are completely dipped.

(3) Note the initial pH of the pure acid solution. Fill the burette with standard NaOH solution and run down into the beaker in small increments (0.5mL).

(4) Stir the solution well using glass rod. Note down the pH after every successive addition. Continue the titration till beyond neutralisation point as indicated by an abrupt change in pH (at least in 3 readings).

(5) Plot a pilot graph of volume of NaOH vs pH. The midpoints of the 'S' shaped curve of the graph gives the equivalence point.

(6). In order to get an accurate end point, perform one more similar titration.

Teacher's Signature: _____

Experiment No. _____ Name : _____

DOMS Page No. Date

in a small volume range (1.0 mL on either side of the abrupt change in pH) and measure the pH after addition of every 0.2 mL of standard NaOH sol^n.

⑦. Plot a pair plot graph of volume of NaOH v/s ΔpH/Δv. Find out the exact end point from the pair plot. The peak point of the pair plot graph gives us the end point.

CALCULATION:-

Volume of NaOH, V_1 = 8.2 mL (from PAIR graph)

Normality of NaOH, N_1 = 0.1 N
Volume of HCl = 10 mL
Strength of HCl, N_2 = 0.0485 N

Then strength of HCl (N_2) = $\frac{N_1 \times V_1}{V_2} = \frac{8.2 \times 0.1}{10}$

= 0.082 N.

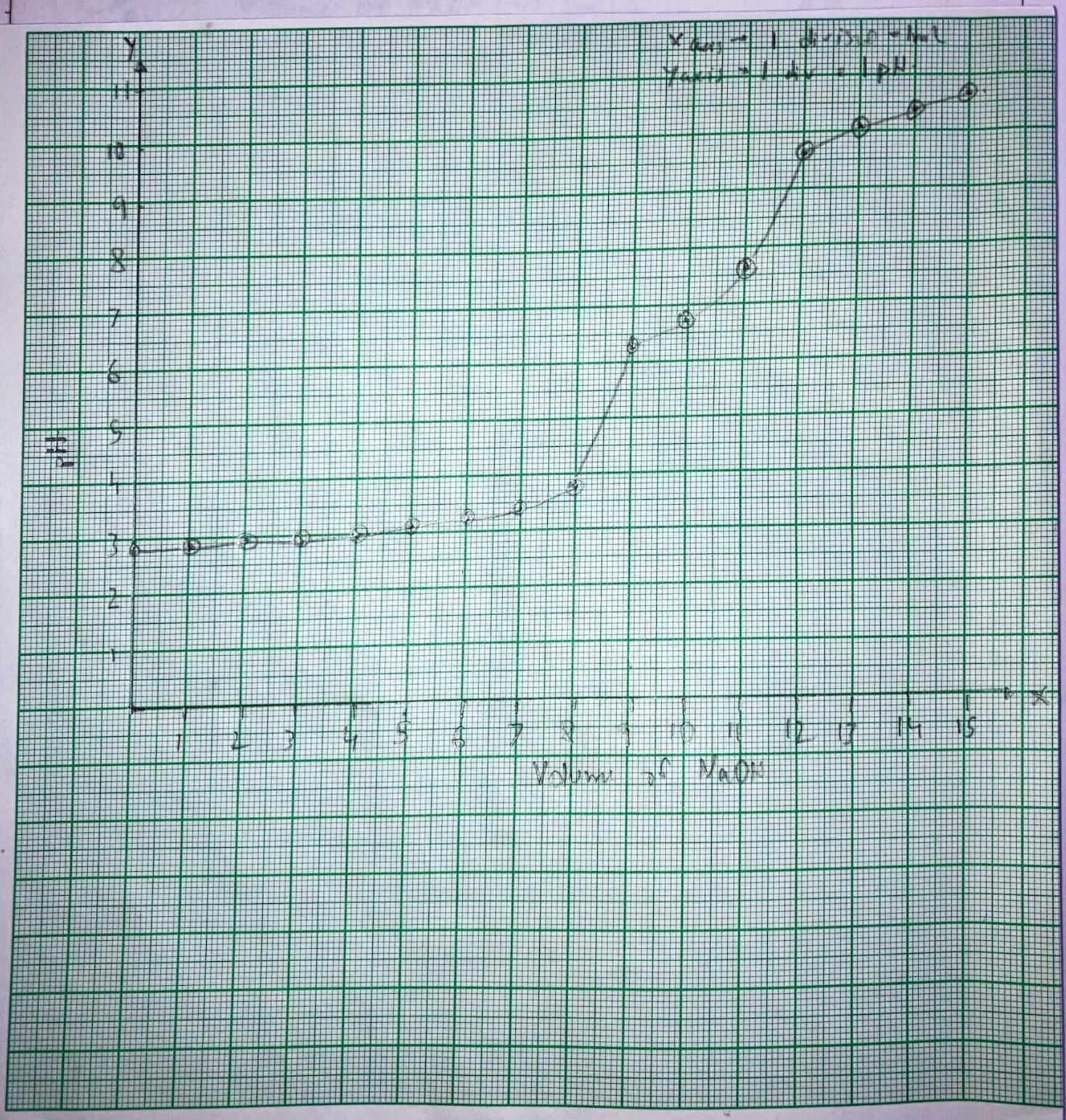
FAIR TITRATION (HCl vs NaOH).

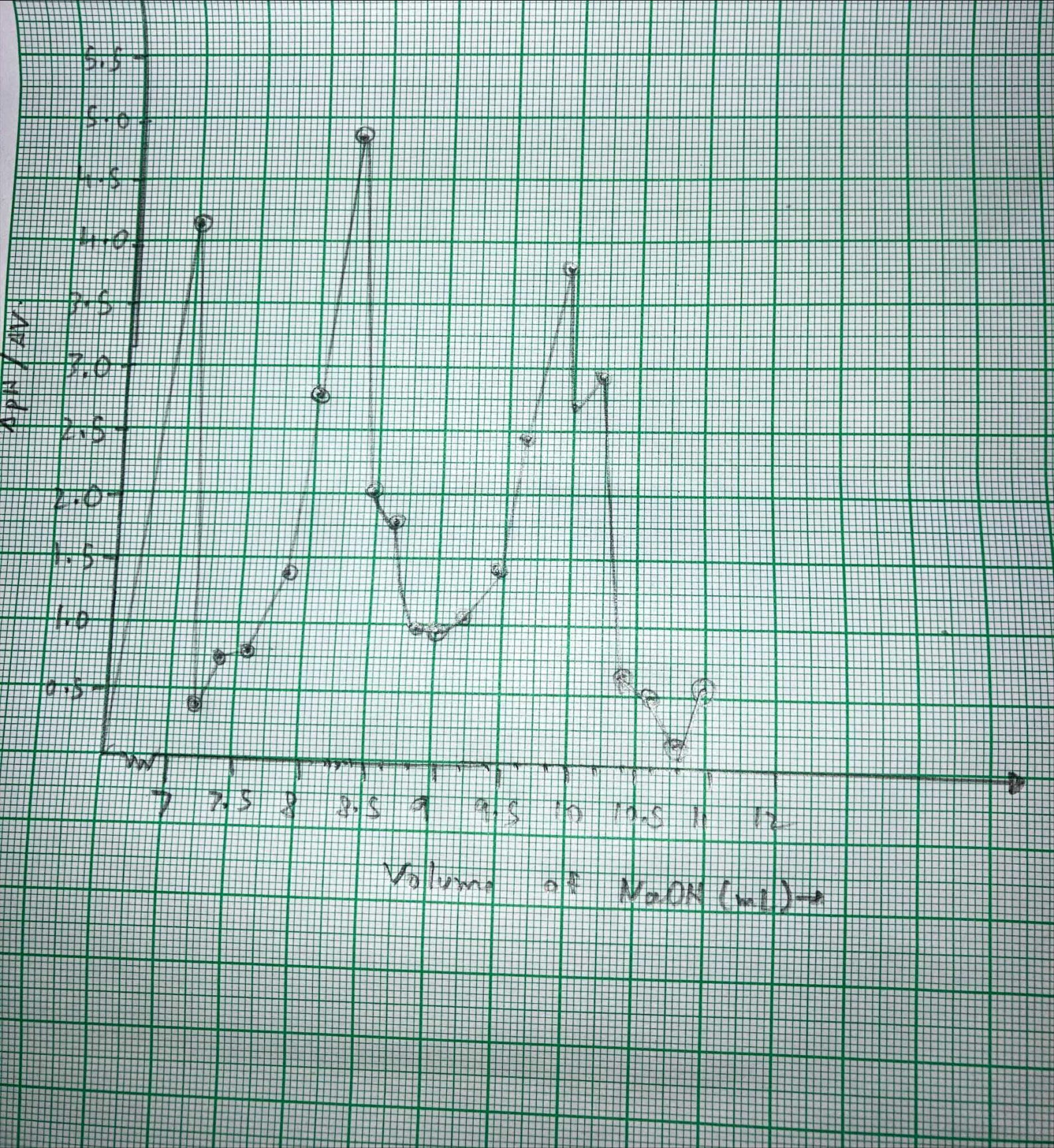
Sl. No.	Volume of NaOH (v) (mL)	pH	ΔpH	ΔV	ΔpH/ΔV.
1.	0	2.77	0	0	0
2.	7	3.60	0.83	0.2	4.15
3.	7.2	3.68	0.08	0.2	0.4
4.	7.4	3.83	0.15	0.2	0.75
5.	7.6	3.99	0.16	0.2	0.8
6.	7.8	4.27	0.28	0.2	1.4
7.	8.0	4.83	0.56	0.2	2.8
8.	8.2	5.80	0.97	0.2	4.85
9.	8.4	6.20	0.40	0.2	2.0
10.	8.6	6.56	0.36	0.2	1.8
11.	8.8	6.76	0.20	0.2	1
12.	9.0	6.95	0.19	0.2	0.95
13.	9.2	7.16	0.21	0.2	1.05
14.	9.4	7.44	0.28	0.2	1.4
15.	9.6	7.93	0.49	0.2	2.45
16.	9.8	8.69	0.76	0.2	3.8
17.	10.0	9.23	0.54	0.2	2.7
18.	10.2	9.82	0.59	0.2	2.95
19.	10.4	9.95	0.13	0.2	0.65
20.	10.6	10.05	0.10	0.2	0.5
21.	10.8	10.13	0.03	0.2	0.15
22.	11.0	10.24	0.11	0.2	0.55.

PILOT TITRATION (HCl vs NaOH)

Sl No.	Volume of NaOH (V) (mL).	pH
1	0	2.85
2	1.0	2.88
3	2.0	2.90
4	3.0	2.94
5	4.0	3.01
6	5.0	3.10
7	6.0	3.22
8	7.0	3.41
9	8.0	3.80
10	9.0	6.03
11	10.0	6.75
12	11.0	7.66
13	12.0	9.69
14	13.0	10.11
15	14.0	10.42
16.	15.0	10.66

PILOT GRAPH.




ΔpH / ΔV
5.5
5.0
4.5
4.0
3.5
3.0
2.5
2.0
1.5
1.0
0.5
7
7.5
8
8.5
9
9.5
10
10.5
11
12
Volume of NaOH (mL)

RESULT :-

The strength of given hydrochloric acid is 0.082 N.