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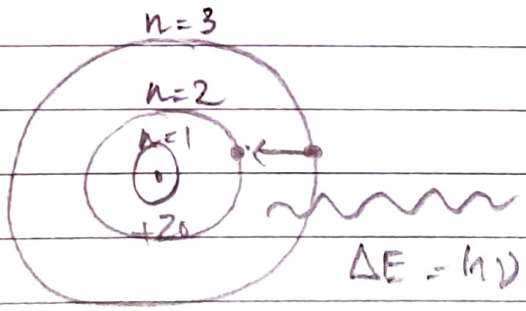
EXPERIMENT - 8

AIM: Experimental verification of the existence of discrete energy state in atoms according to Bohr's model.

APPARATUS: A mercury filled or neon-filled Franck-Hertz tube, an oven, a control unit for power supply, and a DC current amplifier

THEORY: The Franck-Hertz experiment, performed in 1914, is an experiment for confirming the Bohr Model of that atom. It was found that when electrons in a potential field were passed through mercury vapour they experienced an energy loss in distinct steps, and that the mercury gave an emission line at $\lambda = 254$ nm. This was due to collisions between the electrons and the mercury atoms.

$$h\nu = eV$$



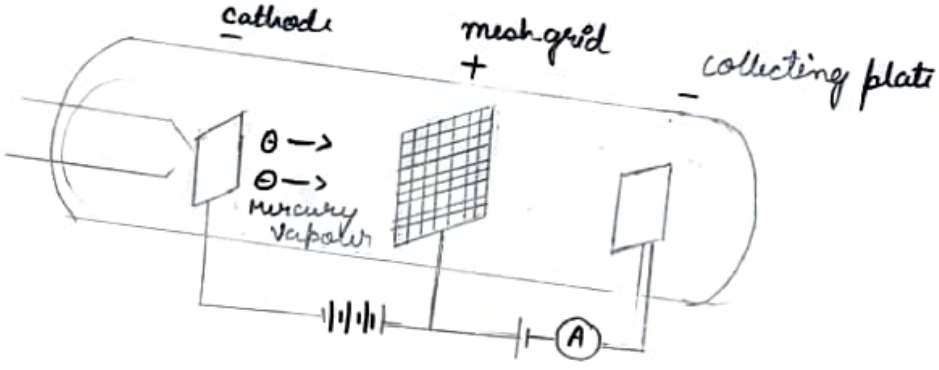


Fig:- Mercury filled Franck-Hertz Tube

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OBSERVATIONS

TABLE-1

V_F = 10V

V_C (V)	I_A (mA)
0.2	0.7
0.4	0.7
0.6	0.7
0.8	0.6
1.0	0.9
1.2	2.1
1.4	4.3
1.6	7.1
1.8	10.4
2.0	14.2
2.2	18.8
2.4	23.9
2.6	29.3
2.8	34.5
3.0	39.6
3.2	44.6
3.4	49.6

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3.6	54.3
3.8	58.6
4.0	62.2
4.2	64.8
4.4	67.3
4.5	69
4.6	71.4
4.7	74.5
4.8	77.4
4.9	79.2
5.0	79
5.1	75.7
5.2	68.8
5.4	48.6
5.6	30
5.8	21.9
6.0	22.4
6.2	27.7
6.4	32.1
6.6	37.9
6.8	43.6
7.0	49.2
7.2	55

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7.4	60.9
7.6	66.4
7.8	71.2
8.0	75.7
8.2	80.2
8.4	84.5
8.6	87.9
8.8	90.1
9.0	92.4
9.1	94.3
9.2	96.8
9.3	99.3
9.4	101.1
9.5	101.3
9.6	99.3
9.7	94.5
9.8	87.3
9.9	78.2
10.0	68

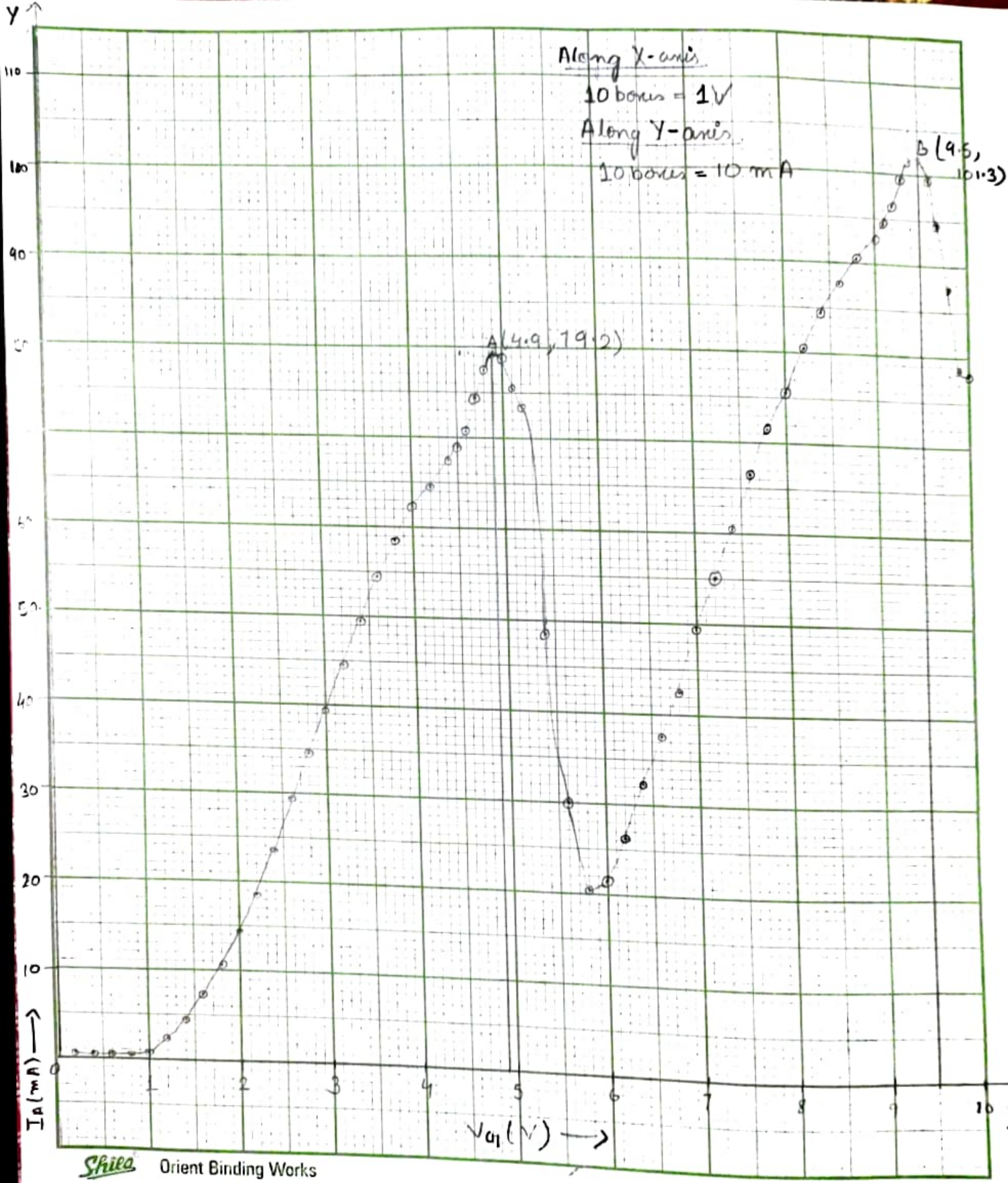

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TABLE 2

EXCITATION POTENTIAL ENERGY (eV)	AVERAGE (eV)
9.5 - 4.9 = 4.6.	4.6.

CONCLUSION : The average excitation potential energy of mercury atoms is 4.6 ev. Thus the existence of discrete energy states in atoms is verified.