LGS GROUP OF COLLEGES
A PROJECT OF LAHORE GRAMMAR SCHOOL

Name: Namra Saeed Class: 1st year Roll No.

Subject: Chemistry Test No. WT-5 Date: 21st Nov, 2024.

	A	B	C	D		A	B	C	D		A	B	C	D		A	B	C	D
1	○	●	○	○	6	○	○	○	○	11	○	○	○	○	16	○	○	○	○
2	●	○	○	○	7	○	○	○	○	12	○	○	○	○	17	○	○	○	○
3	●	○	○	○	8	○	○	○	○	13	○	○	○	○	18	○	○	○	○
4	○	○	●	○	9	○	○	○	○	14	○	○	○	○	19	○	○	○	○
5	●	○	○	○	10	○	○	○	○	15	○	○	○	○	20	○	○	○	○

Marks Obtained

Subjective Type

Part- I

Short Question

(1)

Positive rays produced by the hydrogen gas are basically the protons and cathode rays are the fast moving electrons. As protons are 1836 times heavies than electrons therefore the e/m values of hydrogen gas positive rays is 1836 times smaller than that of cathode rays.

(2)

At high pressure the greater number of molecules creates hindrance in the way of electrons and does not let the electrons pass through them. Therefore, it is necessary to decrease the pressure in discharge tube to get the cathode rays.

Frequency

- The number of waves passing through a point per second is called its frequency.
- It's symbol is ν.
- It's unit are hertz. Cycle/sec. revolution/sec.

Wave number

- Number of waves per unit length is called wave number.
- It's symbol is $\bar{\nu}$.
- It's unit are cm^{-3}, m^{-1} etc.

Part-II

LONG Question.

Millikan's Oil drop method:

In 1909, Millikan determined the charge on electron.

1- Instrumentation

(a) Mettalic Chamber:

The apparatus consists of metallic chamber. The chamber is filled with air whose presure is adjusted by vaccum pump.

(b) Electrodes: There are two electsones, A and A' which are used to generate an electrical field in the space betweenelectrode

Illumination of droplet: The droplet is illuminated which appears as a bright speck against a dark background. The droplets falls under the force of gravity with the electric field.

2) Working:

a) In the absence of electric field:

- Tiny droplets of oil are introduced into chamber by an atomizer - Some droplets ofter through tiny hole
- The droplet falls under the forces of gravity without applying the electric field.
- The velocity is determined - The velocity of the droplet depends upon its weight

$$V_1 \propto mg. \quad — (i)$$

b) Ionization of air: The air between the electrodes is ionized by X-rays - The droplet takes up an electron and gets charged.

c) In the presence of electric field: Now, connect A and A' to a battery which generates an electric field having a strength E. The droplet moves upwards against the action of gravity with a velocity (V_2).

$$V_2 \propto Ee - mg \quad — (ii).$$

(3) Calculation:

Dividing (i) by (ii)

$$\frac{V_1}{V_2} = \frac{mg}{Ee - mg}$$

Where:

V_1 = Downward velocity of droplet
V_2 = Upward velocity of droplet
m = Mass of droplet
g = Acceleration due to gravity
E = Strength of electric field.
e = Charge on droplet.

(4) Conclusion:

- Millikan determined charge on many oil droplets and found that it was always 1.59×10^{-19}C or some multiple of it.
- The least charge 1.59×10^{-19}C on oil droplet is because when it picks up one electron from the air in the chamber. This value is very close to the modern value of charge which is 1.6022×10^{-19}C.
- Thus, charge on one electron = 1.6022×10^{-19}C.
- This charge present on an electron is the smallest charge of electricity that has been determined so far.