



Name: Jamila Kausar

Class: 1st year (A)

Roll No. _____

Subject: Chemistry

Test No. Assignment

Date: 21/11/24

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Marks Obtained

Subjective Type

Part - I

Question 2

(i)
e/m value of positive
rays from hydrogen

When hydrogen gas is used in discharge tube, the positive ion produced is H^+ ion and has only one proton.

This is because when electron is knocked due to the cathode rays, only proton is left. H^+ ion is proton as its mass is 1836 times than the electron hence e/m value is 1836 times lesser.

(iii)

Difference
Frequency | Wave Number

Definition

Frequency is the number of waves passing through a point per second. Wave number is the number of waves per unit length, and is reciprocal to wavelength.



(II) Pressure of Discharge Tube

At high pressure there are a lot of gas molecules in the discharge tube. Due to which cathode rays fail to pass through. When the pressure is less there are less gas molecules. So that's why the pressure is kept less so the cathode rays pass through easily.

LONG QUESTION

Part-II

QUESTION 3

MILLIKAN'S OIL DROP EXPERIMENT

Name of Scientist:

R.A. Millikan (1909)

EXPLANATION:

He determined the charge on electron by the following experiment:



Experiment :

APPARATUS:

It consists of a metallic chamber. It has **2 parts**. The chamber is filled with air whose pressure can be adjusted by a vacuum pump. There are **2** electrodes **A & A'**. They are used to generate electric field in space between electrodes. The upper electrode has a hole in it.

Explanation:

A fine spray of oil droplets is created by an **atomizer**. An arc lamp is used to illuminate the space b/w ~~them~~ electrodes. The droplet is observed through a ~~telescope~~ ^{microscope}. It falls due to gravity. The velocity of droplet depends on its weight.

Derivation:

$$V_1 \propto mg$$
$$V_2 \propto E_e - mg$$

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

Mass of Electron:

Charge on electron = 1.602×10^{-19} coulombs

e/m of electron = 1.7588×10^{11} coulombs Kg^{-1}

$$\therefore \frac{1.602 \times 10^{-19}}{1.7588 \times 10^{11}} = \boxed{9.1095 \times 10^{-31} \text{ Kg}}$$

Mass of Electron



DIAGRAM

