

• Mishael Omar

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• Chemistry

Mcq's

01

The nature of the positive rays depend upon:

- a) The nature of the electrode
- b) The nature of the residual gas ✓
- c) The nature of the discharge tube.
- d) All of the above.

02

Bohr model of atom is controlled by's

- a- Heisenberg's uncertainty principle ✓
- b- Plank's quantum theory
- c- Dual nature of matter
- d- All of the above

03

Velocity of photon is:

- a- Independent of its wave length ✓
- b- depend on its wave length
- c- Equal to square of its amplitude
- d- Depend on its source.

04

Rutherford's model of atom failed because:

- a- The atom did not have atom or electron
- b- It did not account for the attraction between
- c- protons and neutrons.
- d- It did not account for the stability of the atom. ✓
- e- There is actually no space between the nucleus and the electron.

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• Q5
Mass of one mole of
electronic.

- a. 0.55 mg ✓
- b. 0.148 mg
- c. 1.673 mg
- d. 1.008 mg

→ SHORT ANSWER:

02.

Positive Rays:-

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

02

Decrease the pressure:-

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

get the cathode rays.

03

Frequency and Wave numbers:-

Frequency:- is the number of waves passing through the point per second.

Unit:-

Hz

Relation:-

$$v = \frac{1}{\lambda}$$

Wave Number:-

Wave number is the number of waves per unit length and its reciprocal to wavelength

Unit:-

$\text{cm}^{-1}, \text{m}^{-1}$

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-: LONG :-

-: QUESTION :-

-: Millikan's :-

-: Oil drop :-

-: Method :-

Introduction

In 1909,
 Millikan's determined the
 charge on electron by a
 simple arrangement.

CONSTRUCTION

The
 apparatus consist of a metallic
 chamber. It has two
 parts. The chamber is

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filled with air, the pressure of which can be adjusted by a vacuum pump. There are two electrodes A and A'. These electrodes are used to generate an electrical field in the space between the electrodes. The upper electrode has a hole in it.

Working:-

A fine spray of oil droplets is created by an atomizer. A few droplets pass through the hole in the top plate and into the region between the charged plates, where one of them is observed through a microscope. This droplet, when illuminated perpendicularly to the direction of view, appears in the microscope as bright speck against a dark background.

Gravity without :

Electric field:

The droplet falls under the force of gravity without applying the electric field. The velocity of the droplet (v_i) depend upon weight, mg .

$$v_i \propto mg \dots \dots \dots (1)$$

Gravity with a :

Velocity:-

Where m is the mass of the droplet and g is the acceleration due to gravity. After that air between the electrodes is ionized by X-rays. The droplet under observation takes up an electron

and gets charged. Now connect A and A' to a battery which generates an electric field having a strength, E . The drop let moves upwards against the action of gravity with a velocity, v_2 .

$$v_2 \propto Ee - mg \dots\dots\dots (2)$$

Where 'e' is the charge on the electron and Ee is the upward driving force on the droplet due to applied electrical field of strength E .

Dividing 1 by 2:-

$$\frac{v_1}{v_2} = \frac{mg}{Ee - mg}$$

Record:-

The value of v_1 and v_2 are recorded with the help of microscope. The factors like E and

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g are known. Mass of the droplet can be determined by varying the electric field in such a way that the droplet is suspended in the chambers. Hence 'e' can be calculated.

Conclusion:-

By changing the strength of electric field, Millikan found that the charge on each droplet was different.

Smallest Charge:

The smallest which he found was 1.59×10^{-19} coulombs, which is very close to the recent value of 1.6022×10^{-19} coulombs.