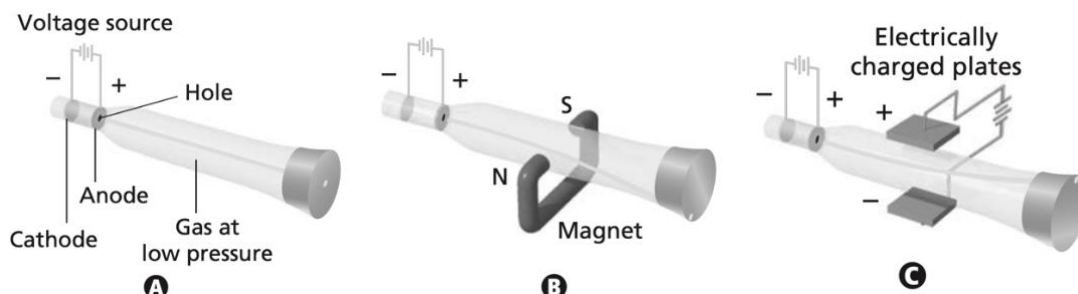


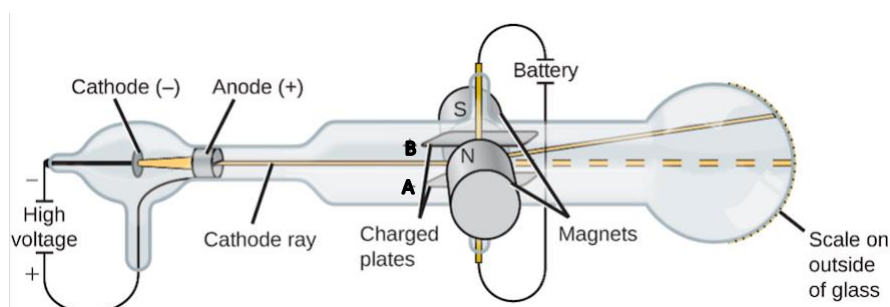
UNIT 1: TUTORIAL 1- CATHODE RAY TUBE EXPERIMENT

1.



- What is a cathode ray?
- What do the experiments in A, B, and C have in common?
- Examine the cathode ray experiment in A. Describe the path of the cathode ray from its origin to its termination.
- Compare the experimental setup in B with the setup in C. How do the two setups differ? What do both experiments show in terms of the cathode ray's charge?
- Examine the cathode ray experiment in B. What does this experiment show?
- Examine the cathode ray experiment in C. Explain why the cathode ray bends.

Modified gas discharge tube to understand that the electron is an elementary particle for all forms of matter by J.J. Thomson is shown below. He used an electric field together with a magnetic field to observe the deflection of the cathode ray on a florescent screen.



2. What direction do the cathode rays move when no electric field is applied?
 - i. From the positive metal electrode to the negative metal electrode
 - ii. From the negative metal electrode to the positive metal electrode
 - iii. The cathode rays do not move
 - iv. The cathode rays could move in either direction

3. J. J. Thomson discovered that cathode ray particles carry a negative charge. These negatively charged particles are deflected from their straight-line path when an electric field is applied. In the figure above, what is the charge on the lower electrode of the applied electric field, B ? Assume that the electromagnet here is switched off
 - i. positive
 - ii. negative
 - iii. neutral
 - iv. unable to be determined

4. How did Thomson determine that the cathode ray particles were a new particle and not simply an atom, molecule or ion carrying a negative charge?
 - i. The mass/charge ratio (m/e) was equal to the m/e of a hydrogen ion.
 - ii. The m/e was higher than any known atom, molecule, or ion.
 - iii. The m/e was one thousand times smaller than the m/e for any known atom, molecule, or ion.
 - iv. m/e ratio is same as that of He atom.

5. How would you describe J. J. Thomson's model of the atom?
 - a) An atom is indivisible.
 - b) The atom is composed of only negatively charged particles.
 - c) The atom is composed of a positive core with negatively charged particles
 - d) orbiting the positive core.
 - e) The atom is composed of diffuse ball of positive charge with negative particles dispersed throughout.

6. Draw a picture of Thomson's atomic model in the space given below.