1) Give the number of protons, neutrons, and electrons for each of the following

\[
\begin{align*}
\text{Cl}^{37}_{17} & : \text{protons} \\ 
\text{Na}^+^{23}_{11} & : \text{protons} \\ 
\text{U}^{235}_{92} & : \text{protons} \\ 
\text{S}^{-2}^{32}_{16} & : \text{protons}
\end{align*}
\]

2) For each of the following, indicate which historical experiment led to the discovery shown

Choose from: a) Cathode Ray tube, b) Rutherford Gold Foil experiment, c) Millikan's oil drop experiment, and d) Chadwick's bombardment of beryllium with alpha particles

- 1) Discovery of the electron
- 2) Discovery of the neutron
- 3) Discovery that the atom is mostly empty space
- 4) Discovery of the quantity of the charge of the electron

3) Complete the following table

<table>
<thead>
<tr>
<th>Particle</th>
<th>Mass in grams</th>
<th>Coulomb charge</th>
<th>Unit charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>proton</td>
<td></td>
<td>+1.6022 x 10^{-19}</td>
<td></td>
</tr>
<tr>
<td>electron</td>
<td></td>
<td>-1</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.67493 x 10^{-24}</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

4) Define the following terms

- alpha particle
- beta particle
- Isotope