NOTE

- Do calculations in appropriate significant figures and unit of physical quantities.
- Do specify the directions by the signs (+ve or –ve).
- Useful Constants: $1A° = 10^{-10}m$, mass of electron = $9.1 \times 10^{-31}kg$, $1\mu = 10^{-6}$

QUANTISATION OF CHARGE

1. Which is bigger, a coulomb or charge on an electron? How many electric charges form one coulomb of charge?
2. A polythene piece rubbed with wool is found to have a negative charge of 3.2×10^{-7} C,
   (a) Estimate the number of electrons transferred from which to which?
   (b) Is there a transfer of mass from wool to polythene?
3. How many electrons must be removed from a piece of metal to give it a positive charge of $1.0 \times 10^{-7}C$?
4. What is the total charge of 75.0kg of electrons?
5. Calculate the total positive or negative charge on a 3.11g copper penny. Given Avogadro No. 6.023×10^{23}, for copper Z = 29, A = 63.5.
6. How many mega coulombs of positive or negative charge are in 1.00 mole of natural molecular Hydrogen gas (H_2).

COULOM B 'S LAW

7. How far apart two proton s be if the electrostatic force exerted by one on the other is equal to the weight of electron?
8. The electrostatic force of repulsion between two positively charged ions carrying equal charge is $3.7 \times 10^{-9}N$, when they are separated by a distance of $5A°$. How many electrons are missing from each ion?
9. The electrostatic force on a small sphere of charge $0.4\mu C$ due to another small sphere of charge $-0.8\mu C$ in air is 0.2N.
   (a) what is the distance between the spheres?
   (b) what is the force on the second sphere due to the first?
10.   Two isolated charged copper sphere A & B have their centres separated b y a distance of 50cm.
    (a) What is the mutual force of repulsion if charge on each is $6.5 \times 10^{-7}C$.
    (b) What is the force of repulsion if each sphere is charged double the above amount and the distance between them is halved?
    (c) Suppose a third sphere of same size but uncharged is brought in contact with the first, then brought in contact with second and finally removed from both. What is the new force of repulsion between A & B?