

Question

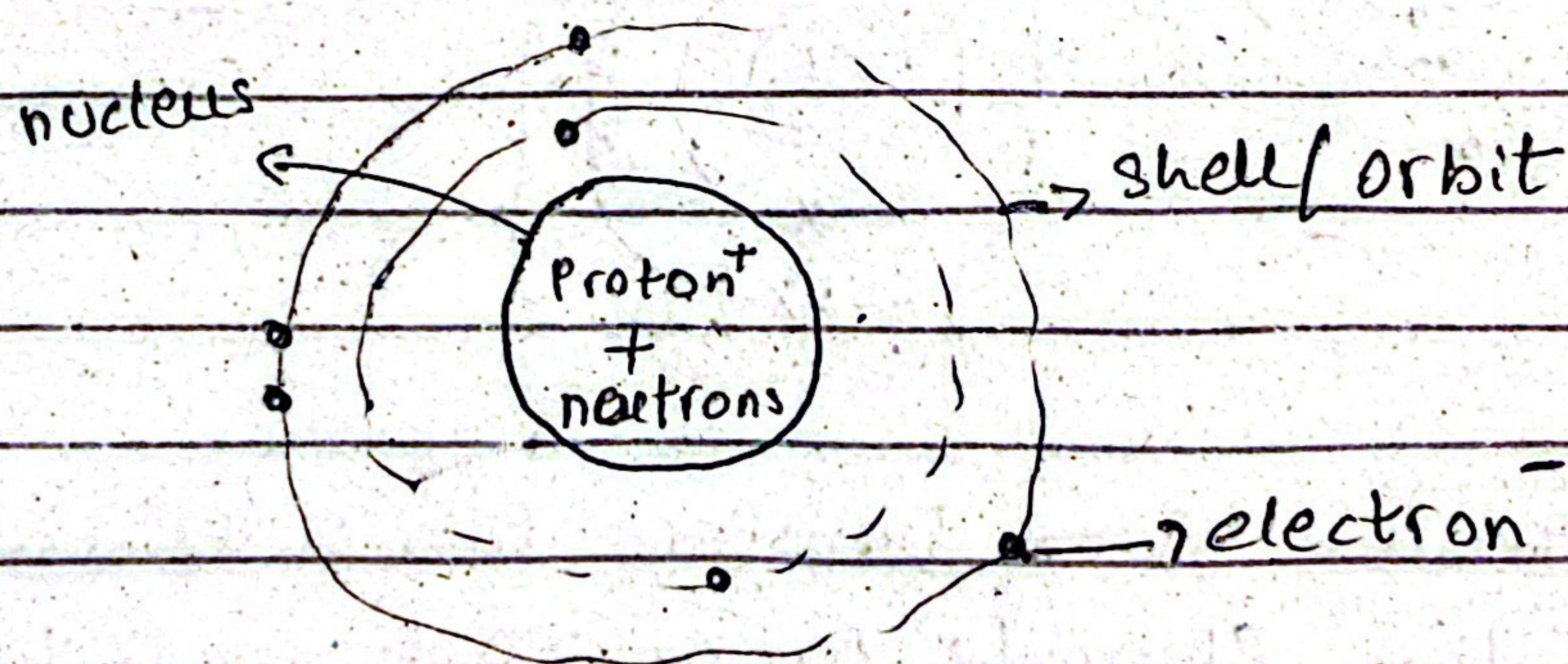
Why do atoms form bond? Name three major types of chemical bonds. (ess 2019)

Answer

Matter is made up of particles called atom. Atom is the smallest particle of an element, however, it is not fundamental particle. Atom consist of smaller, fundamental particles known as protons, electrons, and neutrons.

Proton having a positive charge and neutron which is neutral and have no charge, both exist in the center of atom in region known as nucleus. Electron, negatively charged, revolves around nucleus in orbits or shells.

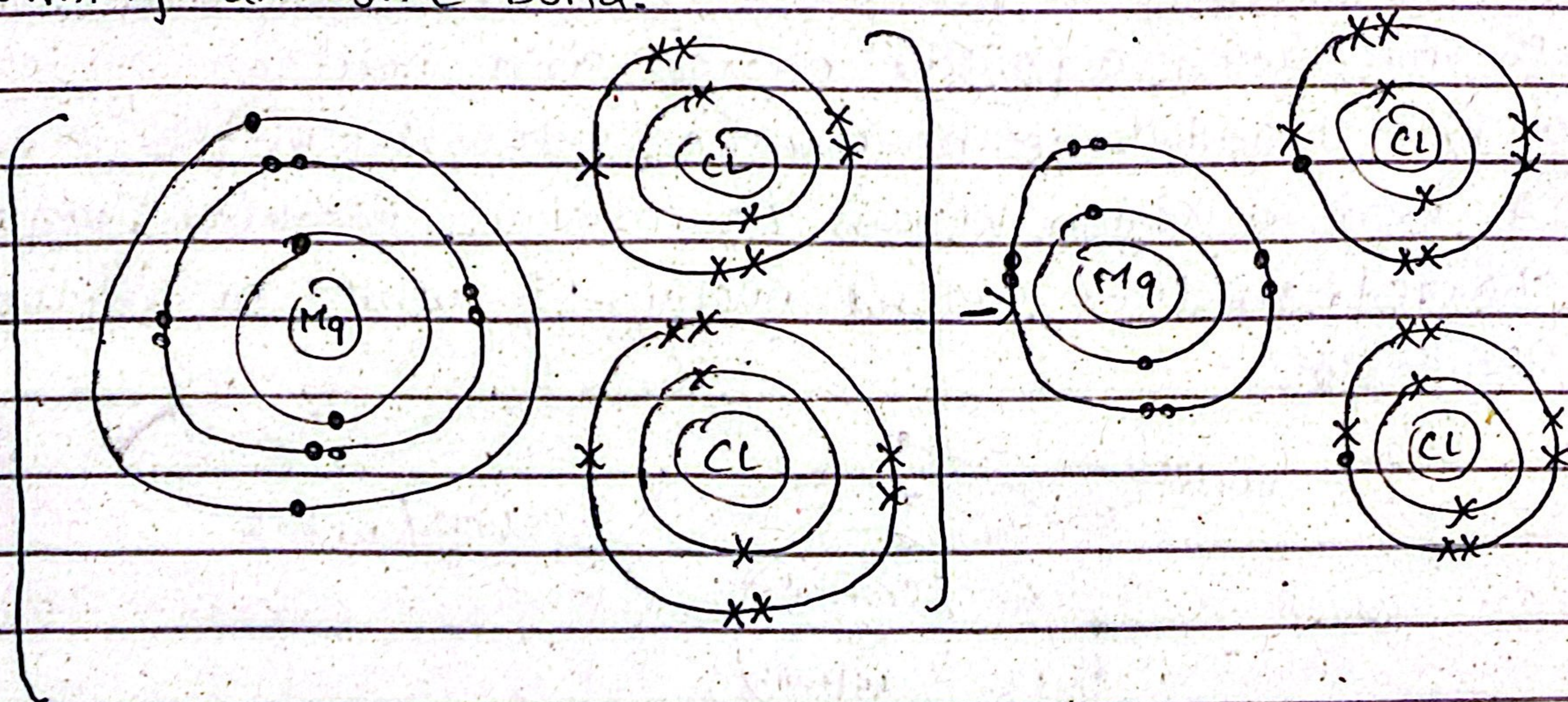
~~Charges~~



The valence electrons in the outermost shell of the atom tends to chemically bond with other atoms in order to achieve a ~~very~~ stable electron configuration, a phenomenon known as Octet rule. An atom achieve the either by performing ionic bonding, covalent bonding, or metallic bonding.

Ionic Bonding

Ionic bonding is the bonding between the metals and the non-metals, e.g. Magnesium chloride ($MgCl_2$). The charged atom, ion, either gains or loses its valence electron to the other atom in order to achieve stable electronic configuration, hence forming an ionic bond.

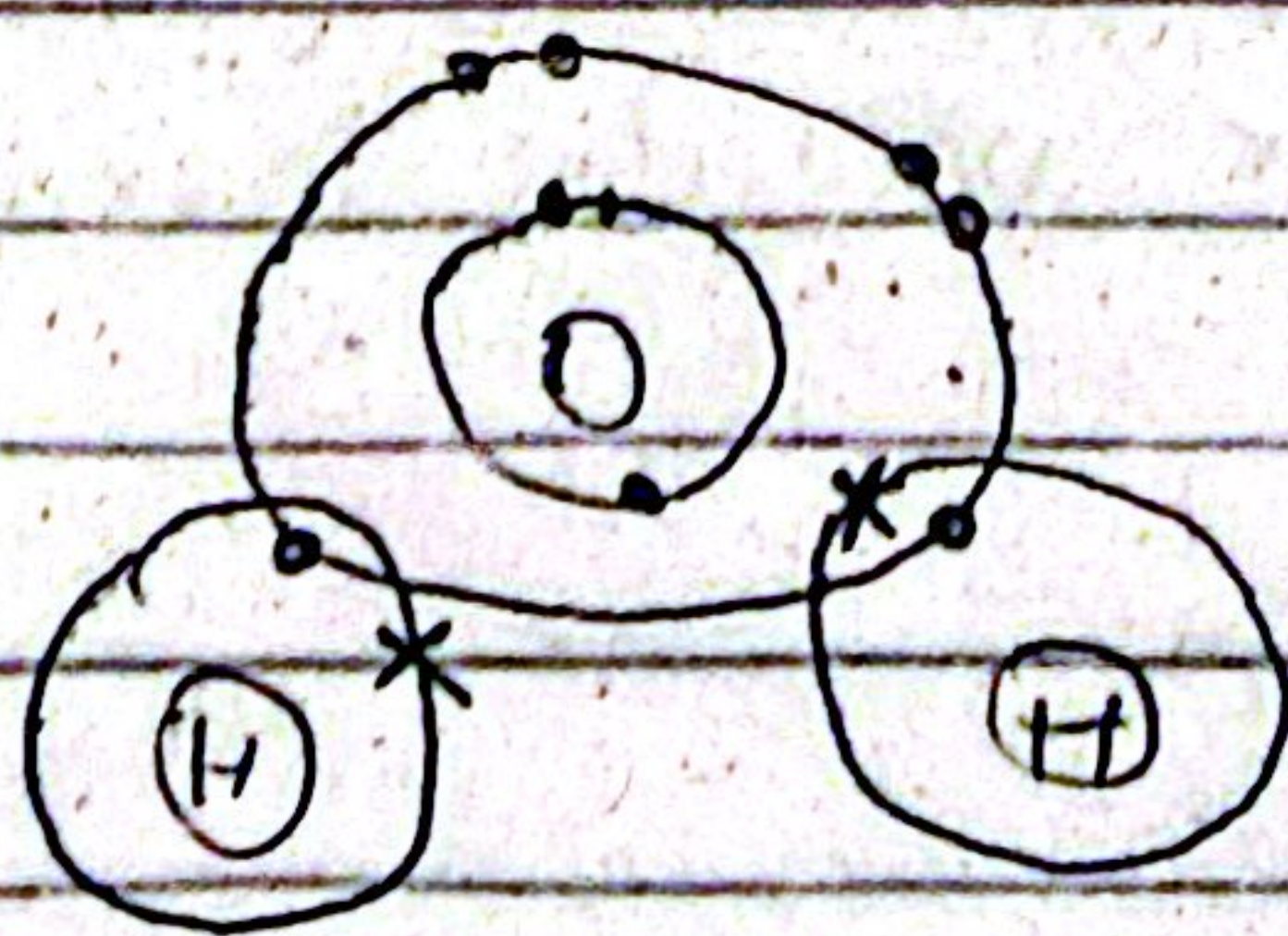


The magnesium atom transfers two of its valence electrons to the Chlorine atom each and hence form an ionic bonded compound, magnesium chloride.

Covalent Bonding

Covalent bonds are formed between two non-metal by mutual sharing of their valence electrons.

For example, H_2O



The Hydrogen atoms does not completely transfer their electron, instead by mutual sharing they are able to achieve stable electronic configuration.

Metallic Bonding

Metallic bond is formed due to the electrostatic forces with the metal ions. The electron in the outer most shell of an atoms tends to achieve an excited state and form a free electron. Hence the metallic bond essentially is the bonding between the positively charged atom and the sea of electrons.

