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Deg III Chem. Hons, Paper - V

Topic :- Magnetic Properties

Origin of Magnetism :-

If an electric current which is a flow of electron is allowed to flow through a wire coiled a round core, a field is produced which behaves as if it were due to a magnet ie magnetic field is produced.

Now we know that, according to classical model of atom (Bohr's model) the electron has two types of motion

(1) Orbital motion which is due to the motion of electron round the nucleus in an orbit, Orbital motion can be compared to the flow of electric current through a coiled wire. The orbital motion, therefore, like an electric current flowing in a coiled wire, also produces magnetic field or magnetic moment which is called orbital angular moment or simply orbital moment of the electron.

(2) Spin motion which is due to the

spinning of the electron round its own axis. This spin motion also Produces magnetic field or magnetic moment which is called spin magnetic moment or simply spin moment of the electron. These two magnetic moments (ie orbital magnetic moment and spin magnetic moment) make an atom behave like a small magnet ie it is these two magnetic moment which produce magnetic properties in substances.

Now we know that when one magnet is placed in the field of another magnet, the magnetic field produced by one magnet will interact with that produced by the other. This in other words mean that when a substance (which behaves as a magnet due to orbital and spin motion of its electrons as we have seen above) is placed between the poles of a magnet, the magnetic field produced by the orbital and spin motion

of the electrons interacts with the externally applied magnetic field. It is interesting to note that when the various substances are placed between the poles of a magnet (ie in a magnetic field) they donot behave in a similar way ie they show different behaviours which are known as magnetic behaviours.

They are classified as diamagnetism, Paramagnetism, ferromagnetism, and antiferromagnetism. of these the last two are of rare occurrence and will, therefore, not be considered in detail.

On the other hand Paramagnetism and diamagnetism are of great importance.

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