**Physics Topic 7: Magnetism and Electromagnetism**

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| **Definitions** | | | **Higher Only** | | | | |
| 1 | Magnetic field | The area around a magnet where it’s force is felt. | 1 | Motor effect | When a conductor carrying a current is placed in a magnetic field the magnet producing the field and the conductor exert a force on each other | | |
| 2 | Pole | The place on a magnet where the magnetic field is strongest. Magnets have a north and south pole. |
| 3 | Attraction | When poles are opposite and magnets are pulled together. | 2 | Electric motors | A coil of wire carrying a current in a magnetic field tends to rotate. | | |
| 4 | Repulsion | When poles are alike and magnets are pushed apart | **Equation (given to you in test)** | | | | |
| For a conductor at right angles to a magnetic field and carrying a current | | | | |
| 5 | Permanent Magnet | Produces its own magnetic field | 1 | force = magnetic flux density x current x length | | | *F* = *B I l* |
| 6 | Induced Magnet | Becomes a magnet only when inside a magnetic field. Loses magnetism quickly when removed. |  | **Quantity** | | **Units** | |
| 1 | Magnetic flux density (B) | | Tesla (T) | |
| 7 | Solenoid | A coil of wire that produces a controlled magnetic field | 2 | Current (I) | | Amps (A) | |
| 3 | Force (F) | | Newtons (N) | |
| **Diagrams** | | | **Diagrams** | | | | |
| **Magnetic field around a solenoid and bar magnet** | | | **Fleming’s Left Hand Rule**    **This shows the various directions of actions in an electric motor.**  **Thumb – direction of the magnetic force**  **First finger – direction of the magnetic field**  **Second finger – direction of the current in the wire** | | | | |
| **Magnetic field around a wire** | | | The current passes through the coil at right angles to the magnetic field between the 2 magnets.  This creates a force perpendicular to the coil according to Fleming’s left hand rule.  The force is in opposite directions on either side because the current is flowing in opposite directions.  This causes the coil to spin. | | | | |