ELECTRICITY AND CIRCUITS – EXAM CRAM

Electric Charge

• Two types of charge: positive and negative

• Only electrons are transferred

• Like charges repel, unlike charges attract

• Conductors allow charge flow, insulators do not

Methods of Charging

• Friction: rubbing transfers electrons

• Conduction: charging by contact

• Induction: charging without contact

Coulomb’s Law

• Electric force depends on charge magnitude and distance

• Greater charge means stronger force

• Greater distance means weaker force

• Always use SI units

Electric Potential and Potential Difference

• Electric potential energy is stored energy of a charge

• Electric potential is energy per unit charge

• Unit of potential is volt or joule per coulomb

• Potential difference is work done per unit charge

Electric Current

• Current is charge flow per unit time

• Unit of current is ampere

• Current requires an electric field

• Drift velocity is average charge velocity

Types of Current

• Direct current flows in one direction

• Alternating current reverses direction

• Conventional current assumes positive charge flow

• Electron flow is opposite to conventional current

Resistance

• Resistance opposes current flow

- Unit of resistance is ohm
- Resistance depends on material, length, and area

Ohm’s Law

- Voltage equals current times resistance
- Increasing voltage increases current
- Increasing resistance decreases current

Electric Power

- Power equals voltage times current
- Unit of power is watt
- Power is energy used per second

Limitations of Ohm’s Law

- Applies only to ohmic conductors
- Does not apply to LEDs and transistors
- Temperature must remain constant