# ELECTRICITY SUMMARY NOTES

|  |  |
| --- | --- |
| Voltage (potential difference) is the energy transferred to each coulomb of charge.It is measured in volts (V). 1 V = 1 J per C Current is the charge transferred per second. It is measured in amps (A). 1A = 1 C per s | **Mains Voltage:** 230V, 50 Hz**Factors that increase resistance**Increase:TemperatureLength of wireThickness of wire |
| https://classconnection.s3.amazonaws.com/54/flashcards/3300054/png/equation-142D9BC12E768746E61.png |  |
| Image result for V = I R |
| A.C. - alternating current  - changes direction and magnitudehttp://www.bbc.co.uk/staticarchive/ca9e2a6bb03c38a88e1c8c0821289d9249a0c21c.gif - from the mains | D.C. - direct current - one direction only - from a batterySame magnitudehttp://www.bbc.co.uk/bitesize/standard/physics/images/ph_elect23.gif | **Ohms Law Experiment**Adjust resistance of variable resistor and take readings of V & I | **Ohms Law Graph** |
| If the polarity of D.C. trace is reverse (the connections are swapped) the trace goes below the line by the same amount | http://www.bbc.co.uk/bitesize/standard/physics/images/ph_elect23.gif | **Resistance opposes the flow of current (Ω)** | Gradient, m = V/ I = R |
| Series RulesIs = I1 = I2…Vs = V1 + V2… RT = R1 + R2…Adding R = RT  | Parallel RulesIs = I1 + I2…Vs = V1 = V2…1/RT = 1/R1 + 1/R2… | **Connecting meters**Ammeters -> seriesVoltmeters -> Parallel  Ohmmeters -> no power supply |
| **Transistors are electronic switches** | **The input voltage controls the switch.** |
| npn transistorInput voltage must be 0.7V or above to switch on the output device. | n channel enhancement MOSFET Input voltage must be 2V or above to switch on the output device |
| **Output Devices**All the components below change electrical energy into another form of energy |
|  |  |
| **Input devices**All the components below change another form of energy into electrical energy  |
|  |  |
| **Other components** | **More about LEDs**Series resistor protects LED from high currentCurrent flows in opposite direction the arrow |
| To calculate R:1. VR = VS – VLED
2. Use R = VR/ I

 |
|  | **High Light sensor**Voltage across transistor increases above 0.7V, transistor switches ONLED switches ON  |  | **Low Light sensor**Voltage across transistor increases above 0.7V, transistor switches ONLED switches ON  |
|  | **Switch on Low Temperature** Voltage across transistor increases above 0.7V, transistor switches ONLED switches ON  |  | **Switch on High Temperature** Voltage across transistor increases above 0.7V, transistor switches ONLED switches ON  |
| **Voltage (potential) dividers**These divide a supply voltage between 2 resistors |  | Power is the energy transferred per second It is measured in Watts (W). 1W = 1 J per s | $$E\_{w}=QV$$Energy supplied to the charges = Charge × voltage**Ew****Q****V** |
| A fuse melts to break the circuit if the current is too high.Power rating less than 720W – 3A fuse Power rating above 720W – 13A fuseSome appliances with a power rating less that 720W require a 13A fuse as they have a high current on switch on. |
| ***Power = current x voltage*** https://greycellsenergy.com/wp-content/uploads/2015/08/energy-power-time-rearranged.jpg***Power = current 2 x resistance******Power = voltage 2 /resistance***Greater current/voltage = greater power developed |  |
| **Charges and Electric fields**- Opposites ATTRACT- Like/Similar REPEL | A charged particle experiences a force in an electric field |
| Capacitors store charge on their plates. Capacitance, C, is measured in **farads** (F). Capacitors can be used **with resistors in series** **as timing devices**.The bigger the value of the resistance and the bigger the value of the capacitor, the longer it takes to charge to Vs |