Graveney School Year 11 Physics Checklist
P6 Logic Circuits & Transformers

transforming

- A transformer changes the size of an alternating voltage - it does not work with DC.
- A transformer has two coils of wire wound on an iron core.
- A step-up transformer has more turns on the secondary coil.
- A step-down transformer has more turns on the porimary coil.
- Recall and use the equation:
- Vp/ Vs = Np / Ns (p - primary, s - secondary)
- ***A changing field in the primary coil of a transformer induces an output voltage in the secondary coil.***
- An isolating transformer is used (e.g. bathroom shaver socket) to keep the user away from the live parts.
- ***Isolating transformers have equal numbers of turns in the primary and secondary coils;***
- Step-down transformers are used in a variety of everyday applications e.g. phone chargers, radios, laptops.
- Step-up transformers increase the voltage from the generator at a power station to supply the National Grid.
- Step-down transformers in sub-stations to reduce the voltage for domestic and commercial use.
- The power loss in the transmission of electrical power is related to the square of the current flowing in the transmission lines.
- ***Use and manipulate the equation:***
- ***Vp x Ip = Vs x Is (p - primary, s - secondary)***
- ***High voltage and low current results in low heat loss in transmission lines.***

charging

- Know the symbol for a diode.
- Explain the current-voltage graph for a silicon diode in terms of high and low resistance in reverse and forward directions.
- ***Describe the action of a silicon diode in terms of the movement of holes and electrons.***
- A single diode produces half-wave rectification.
- Recognise full-wave rectification from a voltage –time graph.
- Explain how four diodes in a bridge circuit produce full-wave rectification.
- Know the symbol for a capacitor.
- When a current flows in a circuit containing an uncharged capacitor, charge is stored and the pd across the capacitor increases.
- Explain the flow of current and reduction in pd across a capacitor when a conductor is connected across it.
- Explain the action of a capacitor in a simple smoothing circuit.

it's logical

- Describe that the output of a logic gate is high or low depending on its input signal(s).
- A logic 'high' or '1' is usually 5V.
- A logic 'low' or '0' is usually 0V.
- Describe the truth tables for NOT, AND and OR (***NAND and NOR higher paper***) logic gates in terms of high and low signals.
- Explain how to use switches, LDRs and thermistors in series with fixed resistors (***variable resistor provides an adjustable threshold***) to provide input signals for logic gates.

even more logical

- Explain how to work out the truth table of a logic
- system with up to three (***four higher paper)*** inputs made from logic gates.
- ***Know the NOR gate bistable latch circuit.***
- ***Explain the operation of a NOR gate latch:***

* ***a brief high signal at one input results in a permanent high signal at the latch output;***

* ***a brief high signal at the other input causes a low signal at the latch output;***

- ***Explain how*** an LED and series resistor can be used to indicate the output of a logic gate.
- Describe that a relay is needed for a logic gate to switch a current in a mains circuit because:

* ***a logic gate has a low power output;***

* ***the relay isolates the low voltage from the high voltage mains.***

Do not keep saying to yourself, if you can possibly avoid it, 'But how can it be like that?' because you will get 'down the drain' into a blind alley from which nobody has yet escaped. Nobody knows how it can be like that.

Richard Feynman