


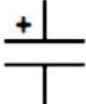

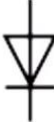
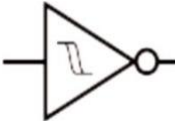
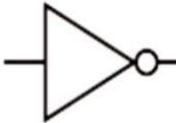



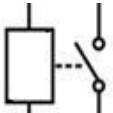


A Level Electronics Summer Homework

Instructions: In the first year of the A level course you will cover all of the key areas of electronics such as operation amplifiers, semi-conductors, logic systems, power supply systems and microcontrollers. It is important that you are 'up to speed' on all the key concepts surrounding these topics. Ensure that you complete all tasks and bring them with you on the first day of term.

- Complete the table – symbols or names

	Switch (non-latching)	Light dependent resistor	Thermistor
Photodiode			Potentiometer
Resistor	Capacitor		Inductor
NPN transistor		N channel MOSFET	
Zener diode	Op-amp		
	OR gate	NAND gate	NOR gate
XOR gate		Voltmeter	Ammeter
	Speaker	Signal lamp	Filament lamp
Cell	Battery	AC supply	Earth
Light emitting diode	Heater	Motor	

- **Resistor Colour Codes** - Resistors have coloured bands on them to indicate what resistance they have. Use these websites to understand how the colour bands work.

https://reviseomatic.org/rOmV4/rOmV4/page/15/Resistors_Colour_Codes

<https://www.allaboutcircuits.com/tools/resistor-color-code-calculator/>

Test yourself with this web page - at least 20 times please!

http://www.play-hookey.com/dc_theory/resistors/color_code_practice.html

- **Electronics History** – When did the technology first appear?

Approximate Date	Technology
	Battery / Cell
	The Diode
	Triode
	First Radio programme
	The Transistor
	Transistor Radio
	Integrated circuit
	Television
	Radar
	Computer - Thermionic
	Computer - solid state
	LCD screen
	Calculator
	Solid state watch
	Intel 4004 microprocessor
	Intel Pentium processor
	Microwave cooker
	LED
	Blue LED
	Printed circuit Boards
	Float soldering
	Surface Mount Technology
	Mobile Phone
	Fuel Cell
	Li Ion cell
	Superheterodyne radio receiver
	Ethernet
	Internet
	Fibre Optic
	Twisted Pair
	The Logic gate (solid state)

- **Explain what these components can be used for:**

Photodiode	
555 timer	

- **Microcontroller control**

5a) What is a microcontroller

5b) What two general architectures exist

5c) What is the difference between these architectures

- **Microcontroller introduction**

Create an account on the following website: http://picaxecloud.com/users/sign_in

Or

Download the Picaxe 6 editor <http://www.picaxe.com/downloads/pe6093/PICAXEEditor6.exe>

Start the Picaxe cloud simulation and set the Picaxe using an 18M2 chip simulation (settings, Picaxe type)

- Use the Blockly language to develop a program that will count in binary and display the number on the B pins (turning B pins on / off as needed) every time c2 is switched on (click with mouse for simulation). When the B pins have binary 15 (1111) on them pin C0 should flash 10 time on / off then B pins should be reset to zero.
- If you have downloaded the Picaxe 6 editor, solve the above problem using the flowchart model.

Possible strategy:

1. Read Blockly manual http://www.picaxe.com/docs/picaxe_manual5.pdf
2. Find out how to turn individual pins on
3. Find out how to turn B pins on with a single instruction
4. Find out how to sense the state of an input
5. Find out how to set and increment a variable.
6. Find out how to start a Blockly program