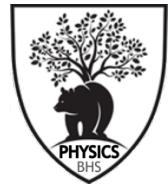


N5 Practical Electronics Success Criteria



Name _____

Circuit Theory

- I can Use appropriate SI units, scientific notation and the prefixes pico (p), nano (n). micro (μ), milli (m), kilo (k), and mega (M).
- I can use $V = IR$ to determine voltage, current or resistance for a combination circuit of 3 resistors
- I can use $R_t = R_1 + R_2 + \dots$ & $\frac{1}{R_t} = \frac{1}{R_1} + \frac{1}{R_2} + \dots$ to calculate resistance for a combination circuit of 3 resistors
- I can use $P = IV$, $P = I^2R$ & $P = \frac{V^2}{R}$ to calculate power, voltage, current or resistance for a combination circuit of 3 resistors
- I can identify a potential divider circuit
- I can use $V_2 = \frac{R_2}{R_1+R_2} \times V_s$, $\frac{V_1}{V_2} = \frac{R_1}{R_2}$ or the ‘ratio method’ to determine the Voltage or resistance in a potential divider circuit
- I can describe a.c. and d.c.
- I can use an oscilloscope to determine whether a source is a.c. or d.c.
- I can use an oscilloscope to determine whether a source is analogue or digital
- I can use $f = \frac{1}{T}$ to calculate the frequency of an a.c. trace on an oscilloscope.
- I can describe charging and discharging a capacitor in terms of current and voltage
- I can explain 2 ways to change the charging rate of a capacitor
- I can explain that a current flowing in a conductor causes a magnetic field.
- I can describe how to make the magnetic field stronger
- I can describe the operation of a motor.

Circuit Simulation

- I can explain the benefits of circuit simulation
- I can use the computer software ‘Yenka’
- I can identify AND, OR & NOT (inverter) logic gates from their symbols

- I can identify AND, OR & NOT (inverter) logic gates from their truth tables
- I can identify NAND, NOR & XOR logic gates from their symbols
- I can identify NAND, NOR & XOR logic gates from their truth tables
- I can complete a truth table for a combinational logic circuit (at least 2 different gates)
- I can determine the logic levels at all points of a combinational logic system (maximum 4 inputs and 2 outputs)
- I can decide where to include test points in a combinational logic circuit.
- I can identify potential faults with a circuit diagram printout
- I can identify potential faults with a circuit layout schematic printout
- I can decide what pre power up checks to take place for circuit testing
- I can describe the operation of a transistor switching circuit
- I can describe the operation of a bi-stable switching circuit
- I can describe the operation of a half-adder circuit
- I can describe the operation of a 741-comparator circuit
- I know how to layout block-diagrams
- I can use block-diagrams to design a circuit
- I can identify the input, process, and output of a circuit
- I can complete an IC pin layout schematic from a circuit diagram printout.
- I can produce a circuit diagram from a layout schematic (and vice versa)
- I can complete a costing sheet for a circuit, using rapid electronics website.

Circuit Construction

- I can convert resistance between ohms and British standard notation (e.g. $270\Omega = 270R$ or $5800\Omega = 5K8$)
- I can give examples of ‘real life’ resistor values (e.g. 4k7 is closest to 5000Ω)
- I can calculate the value of resistance of a resistor using its colour code

- I can calculate the maximum and minimum possible values of resistance of a resistor using its tolerance colour code
- I can complete partial circuit diagrams
- I can identify, draw the circuit symbols, and describe the function for: (both British and American symbols)
 - Cell
 - Battery
 - Voltage Rail
 - Fixed resistor
 - Variable resistor
 - LDR
 - Thermistor
 - Potentiometer
 - Diode
 - LED
 - Electrolytic Capacitor
 - Non-electrolytic capacitor
 - NPN Transistor
 - N-channel enhancement MOSFET
 - SPST Switch
 - SPDT Switch
 - DPDR Switch
 - Push to make switch
 - Push to break switch
 - Relay
 - Motor
 - Buzzer
 - Lamp
 - Solenoid
 - Speaker
 - Connectors/wires/leads
 - Fuses
 - AND Logic Gate
 - OR Logic Gate
 - NOT (inverter) Logic Gate
 - NOR Logic Gate
 - XOR Logic Gate

- NAND Logic Gate
 - 555 Timer
 - 741 op-amp
 - Voltmeter
 - Ammeter
 - Ohmmeter
- I can select the appropriate scale on a multimeter for current, voltage and resistance
- I can describe the function of a logic probe
- I can use a logic probe to test the connections between boards, and the logic level at IC Pins
- I can be safe when soldering
- I can describe how to be safe when soldering
- I can describe the use of:
 - Prototype board (breadboard)
 - Stripboard
 - Printed Circuit Boards (pcb)
- I can describe the use of the following cable types:
 - Multi-strand
 - Ribbon
 - Co-axial
 - Fibreoptic
- State the advantages of colour coding or numbering bundled wiring
- Give examples of where colour coding or numbering is used.