

Graveney School Year 11 Physics Checklist

P6 Electricity, Motors & Generators

resisting

- Draw the circuit symbols for resistor, variable resistor, bulb, cell, battery, switch and power supply - (see circuit symbols sheet)
- Units of voltage (volts), current (amps) and resistance (ohms).
- The resistance of a wire increases:
 - * with increasing temperature;
 - * with increasing length;
- A variable resistor in a circuit can:
 - * control the current;
 - * vary the brightness of a bulb;
 - * vary the speed of a motor.
- Use the equation:
 - $\text{resistance} = \text{voltage} \div \text{current}$.
- Calculate the resistance of an ohmic conductor from a voltage-current graph.
- ***Explain the shape of a voltage-current graph for a non-ohmic conductor, such as the filament in a lamp, in terms of changing resistance.***

sharing

- Explain how two fixed resistors can be used as a potential divider.
- Explain how one fixed resistor and one variable resistor in a potential divider allows variation of the output pd.
- ***Calculate the output pd of a potential divider from the values of its resistors using:***
 - $V_{out} = V_{in} \times R2 / (R1 + R2)$
- The resistance of a LDR decreases as the light gets brighter.
- The resistance of a thermistor decreases as the temperature increases.
- ***Explain how an LDR or a thermistor can be used in a potential divider with a fixed resistor to provide an output signal which depends on light or temperature conditions.***

motoring

- Draw the shape of the magnetic field around a straight wire (concentric circles), rectangular coil, or solenoid.
- Know that a current carrying wire at right angles

to a magnetic field experiences a force.

- Know Fleming's Left Hand Rule.
- Electric motors are found in a washing machine, CD player, food processor, electric drill, electric lawnmower, windscreen wiper.
- Explain how the forces on a current carrying coil in a magnetic field produce a turning effect on the coil.
- Explain how the direction of the force on the coil in a DC electric motor is maintained in terms of the change of current direction every half-turn.
- Describe how this is achieved using a split-ring-commutator in a simple DC electric motor.
- Explain why practical motors have a radial field produced by curved pole pieces.
- Describe the effect of changing:
 - * the size of the electric current;
 - * the number of turns on the coil;
 - * the strength of the magnetic field.

generating

- Electricity can be generated by moving a wire near a magnet or moving a magnet near a wire.
- A voltage is induced across a wire when the wire moves relative to a magnetic field.
- A voltage is induced across a coil when the magnetic field within it changes.
- The size of the induced voltage depends on the rate at which the magnetic field changes.
- Label a diagram of a DC generator (motor in reverse) to show the coil, the magnets and the commutator.
- Alternating current is generated when a magnet rotates inside a coil of wire.
- Mains electricity is supplied at 50Hz in the UK.
- Electricity in a power station is generated when an electromagnet rotates inside coils of wire.
- The voltage generated can be increased by:
 - * increasing the speed of rotation of the electromagnet;
 - * increasing the number of turns on the coil;
- Explain how an AC generator works including the action of the sliprings and brushes (diagram supplied).

"I'll just have to ask my general practitioner to keep me alive a bit longer."

Peter Higgs

