## Topic 5

### Generation and transmission of electricity

5.1 Describe current as the rate of flow of charge and voltage as an electrical pressure giving a measure of the energy transferred

5.2 Define power as the energy transferred per second and measured in watts

5.3 Use the equation:

electrical power (watt, W) = current (ampere, A) × potential difference (volt, V)

$P = I \times V$

5.4 *Investigate the power consumption of low-voltage electrical items*

5.5 Discuss the advantages and disadvantages of methods of large-scale electricity production using a variety of renewable and non-renewable resources

5.6 Demonstrate an understanding of the factors that affect the size and direction of the induced current

5.7 *Investigate factors affecting the generation of electric current by induction*

5.8 Explain how to produce an electric current by the relative movement of a magnet and a coil of wire:

a on a small scale

b in the large-scale generation of electrical energy

5.9 Recall that generators supply current which alternates in direction

5.10 Explain the difference between direct and alternating current

5.11 Recall that a transformer can change the size of an alternating voltage

5.12 **Use the turns ratio equation for transformers to predict either the missing voltage or the missing number of turns**

5.13 Explain why electrical energy is transmitted at high voltages, as it improves the efficiency by reducing heat loss in transmission lines

5.14 Explain where and why step-up and step-down transformers are used in the transmission of electricity in the National Grid

5.15 Describe the hazards associated with electricity transmission

5.16 Recall that energy from the mains supply is measured in kilowatt-hours

5.17 Use the equation:

cost (p) = power (kilowatts, kW) × time (hour, h) × cost of 1 kilowatt-hour (p/kW h)

5.18 Demonstrate an understanding of the advantages of the use of low-energy appliances

5.19 Use data to compare and contrast the advantages and disadvantages of energy-saving devices

5.20 Use data to consider cost-efficiency by calculating payback times

5.21 Use the equation:

power (watt, W) = energy used (joule, J) / time taken (second, s)

$$P = \frac{E}{t}$$