Magnetic Flux Density

Checklist statement	✓
I can describe the force on a current-carrying wire in a magnetic field.	☐
I can apply $F = BIl$ when the magnetic field is perpendicular to the current, define all terms and know their standard units.	☐
I can use Fleming's left-hand rule to determine the direction of force.	☐
I can define magnetic flux density, B.	☐
I can define the tesla as the unit of magnetic flux density.	☐
I can describe a required practical investigating how force on a wire varies with flux density, current and wire length.	☐

Moving Charges in a Magnetic Field

Checklist statement	✓
I can describe the force on a charged particle moving in a magnetic field.	☐
I can apply $F = BQv$ when the magnetic field is perpendicular to the velocity, define all terms and know their standard units.	☐
I can determine the direction of force on positive and negative charged particles.	☐
I can explain why charged particles follow circular paths in a magnetic field.	☐
I can describe applications of circular motion of charged particles, including the cyclotron.	☐

Magnetic Flux and Flux Linkage

Checklist statement	✓
I can define magnetic flux.	☐
I can apply $\Phi = BA$, define all terms and know their standard units.	☐
I can define magnetic flux linkage.	☐
I can apply $N\Phi$, define all terms and know their standard units.	☐
I can apply $N\Phi = BAN\cos\ \theta$, define all terms and know their standard units.	☐
I can describe a required practical investigating how magnetic flux linkage depends on angle.	☐

Electromagnetic Induction

Checklist statement	✓
I can describe simple experimental phenomena demonstrating electromagnetic induction.	☐
I can state Faraday's law of electromagnetic induction.	☐
I can state Lenz's law.	☐
I can apply $\varepsilon = \frac{N\Delta\Phi}{\Delta t}$, define all terms and know their standard units.	☐
I can describe applications of electromagnetic induction, including a straight conductor moving in a magnetic field.	☐
I can apply $\varepsilon = BAN\omega\sin\ \omega t$, define all terms and know their standard units.	☐

Alternating Currents

Checklist statement	✓
I can describe sinusoidal alternating voltages and currents.	☐
I can define root mean square (rms), peak and peak-to-peak values for sinusoidal waveforms.	☐
I can apply $I_{\text{rms}} = \frac{I_0}{\sqrt{2}}$, define all terms and know their standard units.	☐
I can apply $V_{\text{rms}} = \frac{V_0}{\sqrt{2}}$, define all terms and know their standard units.	☐
I can calculate peak and peak-to-peak values for mains electricity.	☐
I can use an oscilloscope to measure time intervals and frequencies and to display a.c. waveforms.	☐

The Operation of a Transformer

Checklist statement	✓
I can apply the transformer equation $\frac{N_s}{N_p} = \frac{V_s}{V_p}$, define all terms and know their standard units.	☐
I can apply transformer efficiency, efficiency $= \frac{I_s V_s}{I_p V_p}$, define all terms and know their standard units.	☐
I can explain the production of eddy currents in transformers.	☐
I can explain the causes of inefficiencies in a transformer.	☐
I can explain how electrical power is transmitted at high voltage, including calculations of power loss in transmission lines.	☐