|  |  |  |
| --- | --- | --- |
| **Lesson Number: 25.3** | | |
| **Lesson Title: The alternating current generator** | | |
| **Specification Reference** | | **3.7.5.4** |
| **Learning Objectives** | | |
| Magnitude of induced emf = rate of change of flux linkage  Applications such as a straight conductor moving in a magnetic field.  emf induced in a coil rotating uniformly in a magnetic field:    Sinusoidal voltages and currents only; root mean square, peak and peak-to-peak values for sinusoidal waveforms only.  Use of an oscilloscope as a dc and ac voltmeter, to measure time intervals and frequencies, and to display ac waveforms.  No details of the structure of the instrument are required but familiarity with the operation of the controls is expected. | | |
| **Opportunities for Assessment** | | |
| Page 419 questions | | |
| **Starter:** | Slide #1 is an introduction to AC current – This is a good opportunity to use the oscilloscope to display a low voltage AC current trace, students require this skill in the required practical (Technique *h*) | |
| **Main:** | Slides #2 - #4 go through the mathematics of the main formulae; it is useful on slide #4 t draw a sine wave on the board and show how the rate of change of cos is a sine wave  Slide #5 explains a DC generator – link to the use of a split commutator in a DC motor  Slide #6 and #7 explains the phases in the UK mains and the 3 phase system | |
| **Plenary:** | Slides #8 and #9 are summaries | |

|  |  |  |
| --- | --- | --- |
| **Homework:** | Page 419 questions; research the three phase alternator and the National Grid | |
| **Differentiation / Extension / S&C** | | |
| Discussion on the DC from an LV unit | | |
| **Numeracy / Literacy** | | **SMSC / Fundamental British Values** |
| Formulae and gradients of waves | | National Grid and its effect on human life over the last 100 years |
| **RESOURCES:** | | |
| Demonstration:   * Oscilloscope * Low voltage AC power pack | | |
| **Risk Assessment** e.g. CLEAPSS card reference | | |
| None | | |
| **Working Scientifically (HSW)** | | |
| Power station alternators and three phase systems (Page 419) | | |

Pictures courtesy of:

Slide #5 – Wikipedia <https://upload.wikimedia.org/wikipedia/commons/d/da/Waveform_fullwave_rectifier.png>

Slide #7 - By User:J JMesserly modification of original svg by User:SiriusA (File:3-fas-spänningar.svg) [CC BY 3.0 (http://creativecommons.org/licenses/by/3.0) or Public domain], via Wikimedia Commons