

## Teaching ideas for Topic 8: *Digital technology*, AHL

### Questions

A number of worksheets are provided for this Topic:

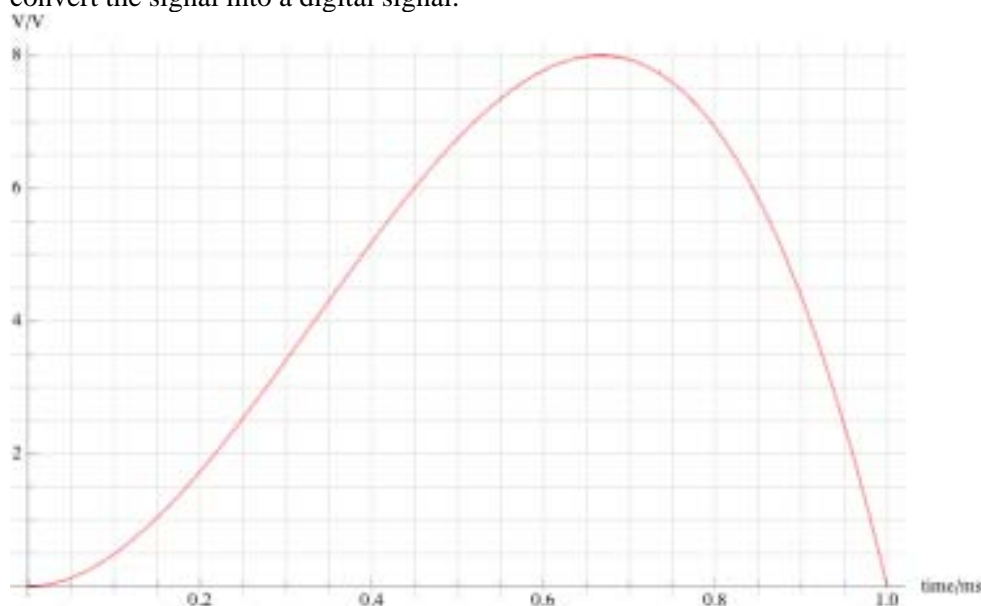
- support questions examine the very basic concepts of the syllabus
- extended questions delve deeper and are equivalent to exam level questions.

### Teaching ideas

- It is not possible to avoid discussion of the beautiful colours one sees when white light is incident on the surface of a CD. This has to do with the fact that the CD surface has a track that runs spirally around the CD. The tracks are typically separated by 1600 nm so a length of 1 mm in the radial direction contains  $\frac{10^{-3}}{1600 \times 10^{-9}} = 625$  tracks. These act as diffraction grating with 625 lines per mm and so analyse white light into its components.

### Practical activities/ICT

- A useful classroom activity is to get some experience with a simple conversion of an analogue signal into a binary word. The diagram below shows an analogue signal. Sample the signal every 0.20 ms, starting at time zero, and state the strength of the signal at each sampling time. Round each value to the nearest integer. Convert each value into a binary number. Now convert the signal into a digital signal.



For example at 0.40 ms the signal is a small amount above 5.0 V so we round this to 5. The binary equivalent is  $5 = 4 + 0 + 1 = 101$ . This can then be represented as

