

Medical physics

Cambridge International AS & A Level Physics

Unlike IGCSE, 9702 gives you a data sheet: it is page 2 of Papers 1, 2 and 4, with more formulae on page 3 of Paper 4. Everything marked GIVEN is printed for you; everything else you must recall. Compiled by GioPhysics from the published syllabus. This is an independent study aid, not a Cambridge document; the official syllabus is the authority.

24.1 Production and use of ultrasound

A LEVEL Specific acoustic impedance

$$Z = \rho c$$

Z — specific acoustic impedance ($\text{kg m}^{-2} \text{s}^{-1}$)

ρ — density of the medium (kg m^{-3})

c — speed of sound in the medium (m s^{-1})

A LEVEL Intensity reflection coefficient

$$IR / I_0 = (Z_1 - Z_2)^2 / (Z_1 + Z_2)^2$$

IR — reflected intensity (W m^{-2})

I_0 — incident intensity (W m^{-2})

Z_1, Z_2 — impedances either side of the boundary

A LEVEL Attenuation of ultrasound

$$I = I_0 e^{(-\mu x)}$$

μ — linear attenuation coefficient (m^{-1})

x — distance travelled in the medium (m)

24.2 Production and use of X-rays

A LEVEL Attenuation of X-rays

$$I = I_0 e^{(-\mu x)}$$

I — transmitted intensity (W m^{-2})

I_0 — incident intensity (W m^{-2})

μ — linear attenuation coefficient (m^{-1})

x — thickness (m)