L6 MRI and PET scanning

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L6.1 a) State an isotope which can be injected into a patient in advance of a PET scan.

b) State which fundamental particle is detected in the 'camera' during a PET scan.

L6.2 How can the computer tell the difference between background counts and genuine 'signal' counts whilst a PET image is being taken?

L6.3 a) On a PET scan, a bright area of the scan implies what?

b) Give one condition which can be identified or diagnosed using a PET scan.

L6.4 How do you make the radioisotope typically used in PET scanning?

L6.5 a) State the material typically used to produce flashes of visible light.

b) State the device used to pick up the minute amount of visible light produced in this detector and convert it to a measurable electrical signal.

L6.6 a) State a typical value for the magnetic flux density inside an MRI scanner.

b) Give the frequency which corresponds to this magnetic field. One significant figure is sufficient.

L6.7 A hydrogen nucleus, with its lone proton has a magnetic moment. What happens to the proton's magnetic field when it is put in a strong magnet, such as during an MRI scan?

L6.8 What is the name of the frequency of radiation which will resonate with a given atom, causing its magnetic orientation to flip?

L6.9 a) When an atom 'relaxes' and gives out waves, how can the scanner/computer work out where the atom was?

b) How does the scanner/computer work out the type of tissue/material at a place where relaxation has just occurred?

L6.10 a) Give one reason or circumstance when MRI scanning would be preferred to a PET scan.

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