Medical physics

1. On the following diagram of an X ray tube (Figure 1) label the parts marked 1 to 5.

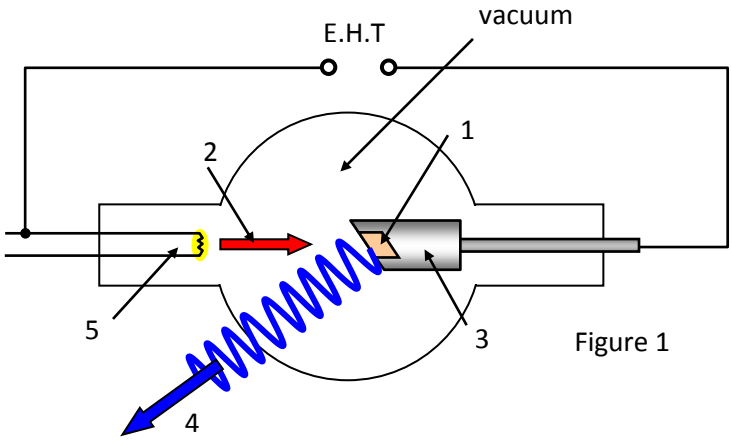

Figure 1

2. What is the approximate potential difference across the X ray tube between the anode and the target?

3. Why is the anode made of a heavy metal?

4. When they pass through matter X rays can be attenuated in four ways.
(a) simple scattering (b) photoelectric effect (c) Compton effect (d) pair production
Choose one of these and write a brief explanation of the process

5. Give one advantage of Computerised axial tomography (CT or CAT scan) over a conventional X ray image.

6. What is a medical tracer?

7. Explain the operation of the scintillation counter shown in the accompanying diagram (Figure 2).

8. On the diagram of the gamma camera (Figure 3) label the parts marked 1 to 4.

9. Give TWO reasons why technetium 99 is a useful isotope in nuclear medicine.

10. (a) In a PET scan the gamma rays that produce the image are formed from the annihilation of two particles – what are they?
(b) What is the angle between the two gamma rays formed in one collision?

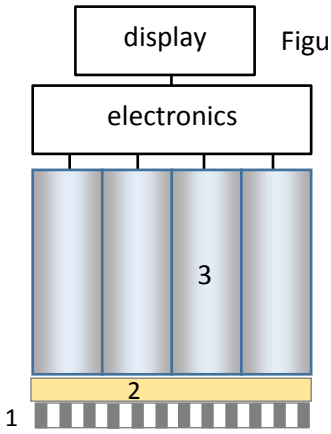

Figure 3

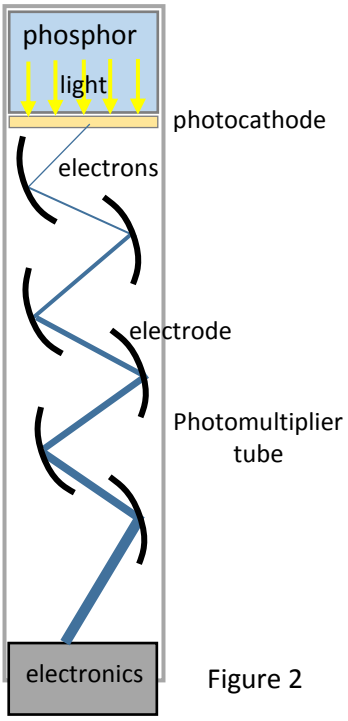

Figure 2