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1. 1. Describe how the high speed stream of electrons generated in the wave guide of a linear accelerator may be used, manipulated and controlled in order to produce beams of:
 - (a) photons and
 - (b) electrons for clinical use.Describe how the doses in these two types of beam may be monitored and give the field sizes, the range of energies and various beam parameters attainable.
2. There are in excess of 1300 different radioactive species. Outline the special features of radionuclides that result in only a few of these being suitable for use in radiotherapy? Indicate appropriate clinical applications for these radionuclides.
3.
 - (a) Discuss the various quantities used to specify the 'strength' of a brachytherapy source. Give the units in each case.
 - (b) How can the strengths of brachytherapy sources be verified and why is it important to do this? Include in your answer an outline of the principles of operation of the measuring system used.
 - (c) What are the typical strengths of LDR, PDR and HDR sources?
 - (d) What are the origins of the dose outside the geometrical edge of a megavoltage x-ray beam, and how does this dose vary with field size and distance from the edge?
 - (e) What can be done to further reduce this dose, eg in case of a pregnant patient where the foetus is some distance from the irradiated region?
4.
 - (a) Describe the changes that take place in the energy spectrum, intensity and angular (spatial) distribution of the photons produced, as the energy of the electrons bombarding a metal target increases through the kilovoltage and megavoltage range.
 - (b) How do aspects of photon production affect the design of treatment units producing photon beams?
 - (c) Discuss filtration of kilovoltage beams.
5. Discuss the physical aspects of total body irradiation.
6. Discuss the types of remote afterloading equipment available for use in interstitial, intravascular and intracavitary brachytherapy. Outline the physical principles of their operation and discuss the relative advantages and disadvantages of each. Include reference to the radiation protection issues in their usage.