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1. Define the term “brachytherapy”, and discuss the various forms this type of treatment may take. Describe the properties of the various radionuclides used in each form of brachytherapy and indicate why they are chosen for that particular mode of therapy.
2. Discuss the various radiation measuring devices used in a Radiotherapy Department and their application in beam monitoring, dosimetry and quality assurance.
3.
 - (a) Briefly describe the equipment and measurement procedure used to obtain a standard isodose chart for:
 - i. a photon beam and
 - ii. an electron beam from a medical linear accelerator
 - (b) Sketch such an isodose chart for a 6-MV photon beam producing a 10cm x 10cm field at 100cm SSD, discuss its clinically relevant features, and compare them with the corresponding features of an orthovoltage beam.
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 these aspects of photon production affect the design of treatment units producing photon beams?
 - (c) Discuss filtration of kilovoltage beams.
5.
 - (a) Discuss the physical and biological half-lives of the unsealed radionuclides Iodine-131, Strontium-89 and Phosphorus-32. Discuss the uptake and elimination of these radionuclides.
 - (b) How are the safe levels of activity for discharge from hospital after radionuclide administration derived?
6. Discuss the problems posed by and methods of dealing with
 - (a) Field junctions in craniospinal irradiation.
 - (b) Spinal cord shielding in head and neck cancer.In each case discuss the relative advantages and disadvantages of the dose distributions obtained using either:
 - i. custom made cerrobend blocks
 - ii. multileaf collimators
 - iii. independent jaws