July 2003

1. Discuss the ward procedures that should be adopted to minimise the radiation hazards associated with patients being treated with:
   (a) Sealed and
   (b) Unsealed radioactive substances.

2. Define the term “Brachytherapy” and discuss the various forms this type of treatment may take. Describe the properties of the various nuclides used in each form of brachytherapy and indicate why they are chosen for that particular mode of therapy.

3. For an orthovoltage treatment unit:
   (a) Briefly describe, with the aid of a diagram, its construction and principles of operation.
   (b) How is the quality of the beam specified and measured?
   (c) Discuss the means by which different quality beams can be obtained, and the criteria used to select the most appropriate beam for a particular clinical application.
   (d) State the range of beam qualities typically provided.

4.
   (a) Define percentage depth dose, tissue-air ratio, scatter-air ratio and tissue-phantom ratio.
   (b) For each of these parameters, indicate a situation in which its use is particularly appropriate.
   (c) Describe and briefly explain the way in which these parameters vary with field size and SSD.

5. Write short notes on
   (a) In vivo dosimetry.
   (b) Factors influencing surface dose in electron beam therapy.
   (c) Monte Carlo method.

6. Discuss prevention of accidents to patients undergoing radiotherapy.