

# **Examination for Diploma, Part 1**

## **Clinical Radiobiology**

Time allowed : 3 hours

ALL QUESTIONS ARE TO BE ATTEMPTED.

All questions are of equal value. Clearly labeled diagrams should be drawn wherever relevant.

1. What is carcinogenesis? Describe the types of neoplasms most often induced by ionising radiation, the dose relationship presently employed by radiological protection authorities for risk estimates and the doses commonly involved in cancer induction. List the various groups of individuals in whom such neoplasms have been observed.
2. Tumor radioresistance has often been ascribed to tumors containing a high proportion of hypoxic cells. On the other hand, the process of reoxygenation, taking place during a fractionated course of radiotherapy, has led some investigators to doubt the validity of this opinion. In RADIOBIOLOGICAL terms describe the basis for both phenomena citing any experimental or clinical evidence to support your viewpoints.
3. Over many years daily fractions of approximately 2.0 Gy per fraction five days per week has become established as "conventional" treatment. Discuss in RADIOBIOLOGICAL terms why such a dose / time / fractionation schedule has stood the test of time.
4. In the treatment of carcinoma of the cervix, compare and contrast the differences, particularly RADIOBIOLOGICAL, between:
  - A) Low dose rate external beam radiotherapy only.
  - B) Low dose rate continuous brachytherapy only.
  - C) High dose rate pulsed brachytherapy (remote afterloading system).
5. In RADIOBIOLOGICAL terms write short notes on three of the following:
  - A) Recall phenomenon.
  - B) Describe what is meant by the term radioresponsiveness.
  - C) Potentially lethal damage.
  - D) X-ray effects on testis.
6. This question is of multiple choice format and is to be answered on the separate QUESTION DOCUMENT provided, according to the instructions of the document itself.

August, 1993