

**THE ROYAL AUSTRALIAN AND NEW ZEALAND COLLEGE OF
RADIOLOGISTS**

EXAMINATION FOR DIPLOMA, PART I

*RADIATION ONCOLOGY
RADIOTHERAPEUTIC PHYSICS*

Time allowed: 3 hours

*ALL QUESTIONS are to be attempted. All questions are of equal value.
Clearly labelled diagrams should be drawn wherever relevant.*

PART A

1. Write notes on the production, fabrication and physical properties of the radionuclides which are used for interstitial and intracavitary therapy.
2. Describe the processes that occur in the absorption of an electron beam as it passes from air into a tissue medium and from tissue into an air cavity.

PART B

3. Discuss the physical principles of after-loading in interstitial and intracavitary brachytherapy. Detail the advantages and disadvantages of manual versus remote automatic after-loading .
4. 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.
5. Discuss the roles of both simulators and computerised tomography in treatment planning.
6. Define, and write short notes on the following quantities used in radiotherapeutic physics:
 - a) absorbed dose
 - b) dose equivalent
 - c) integral dose
 - d) energy.

February 1989.