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 labeled diagrams should be drawn wherever relevant.

Part A

1. Give details of the design and operational features of a Cobalt-60 teletherapy machine. Outline its physical advantages and disadvantages.

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 roles of Therapy Simulators, CT Scanning and Computer Planning in the treatment of small volume deeply seated malignancies.

5. Write concise notes on the following topics:
   a) The basic features of a radiation protection programme for Dose Equivalent limitation;
   b) The types and particular features of personal monitors used in a radiotherapy department;
   c) The occupational exposure of women of reproductive capacity;
   d) Emergency procedures required in the case of gross spillage of urine from a patient receiving radioactive iodine for the treatment of thyroid carcinoma.

6. Write concise notes on the following topics:
   a) Absorbed Dose;
   b) Linear Energy Transfer;
   c) Electronic Build-up;
   d) Dose Equivalent.

October, 1987.