

POSTGRADUATE INSTITUTE OF MEDICINE
UNIVERSITY OF COLOMBO

MD (CLINICAL ONCOLOGY) PART I EXAMINATION
AUGUST 2012

Date : 20th August 2012

Time : 1.00 p.m. – 4.00 p.m

PAPER I

Part A and B must be answered

If the examiners cannot read your writing they will be unable to give you full credit for your knowledge.

SECTION A – PHYSICS

Each questions carries 100 marks.

Each question to be answered in a separate book.

Question one is compulsory.

Answer five questions of the six questions from 2 to 7.

1.

1.1.

- (a) Define the term "Radiation Absorbed Dose" (15marks)
- (b) Define the unit "Gray" and explain why biological damage to the body from all ionizing radiation cannot be expressed in this unit. (20 marks)
- (c) Give the SI unit to measure biological damage to the body. (05 marks)

1.2

- (a) List three (03) emergencies that may result in contamination or exposure of persons during radionuclide therapy for thyroid carcinoma. (15 marks)
- (b) Briefly explain the procedure for handling each of the above three emergencies. (45 marks)

- 2.
- 2.1. What is meant by a radioisotope ? (15 marks)
 - 2.2. Some radionuclides decay by emission of beta (β^-) particles. Briefly explain this process with two examples in radiation therapy. (25 marks)
 - 2.3. Define the half life of a radionuclide. (15 marks)
 - 2.4. Write down the equation to find the radioactivity at any time. (10 marks)
 - 2.5. List three physical properties to be a successful radionuclide in gamma imaging. (15 marks)
 - 2.6. List the radiation safety instructions to be given to a patient who is discharged from the hospital after administration of radioactive iodine (^{131}I) (20 marks)
- 3.
- 3.1 Define the following terms in relation to ICRU (International Commission on Radiological Units and Measurements) 50 and 62 reports.
 - (a) Clinical Target Volume (CTV) (15 marks)
 - (b) Irradiated Volume (IV) (15 marks)
 - 3.2. Give reasons to define a margin between CTV and ITV (Internal Target Volume) (15 marks)
 - 3.3. Discuss the advantages of virtual simulation against conventional simulation. (25 marks)
 - 3.4. Briefly explain the following terms in Radiotherapy Treatment Planning
 - (a) Beams Eye View (BEV) (15 marks)
 - (b) Cumulative Dose Volume Histogram (DVH) (15 marks)

4.
 - 4.1. Define Tissue Maximum Ratio (TMR) in radiotherapy using a diagram. (20 marks)
 - 4.2. A post operative glioblastoma patient is to be treated by 6 MV X-rays at 100 cm source axis distance (SAD) with three beams as shown in the figure below. The prescribed dose to the tumour centre is 60Gy in 30 fractions over 6 weeks.