

# Question Paper

Exam Date & Time: 01-Jul-2022 (10:00 AM - 01:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. MRP DEGREE EXAMINATION - JUNE/JULY 2022  
SUBJECT: MRP5203 - RADIATION DETECTION MEASUREMENT AND INSTRUMENTATION  
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Explain the principle of Fricke dosimeters and the method for determining the dose to water in Fricke dosimeter. (20)
- 2) Explain with diagram the principle and working of a scintillation detector. (20)
- 3A) Explain the principle of thermo luminescence dosimeters with energy level diagrams. (10)
- 3B) Explain the method of measurement of X and Gamma exposure using ion chamber. (10)
- 3C) Write in detail about the single-channel analyzer. (10)
- 3D) What is personal monitoring? Explain the different types of personal monitors. (10)
- 4A) Write about Radioisotope Calibrator. (5)
- 4B) Explain Whole body counter. (5)
- 4C) Write about RIA counter. (5)
- 4D) Write about Water phantom dosimetry system. (5)

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# Question Paper

Exam Date & Time: 04-Jul-2022 (10:00 AM - 01:00 PM)



## MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. MRP DEGREE EXAMINATION - JULY 2022  
SUBJECT: MRP5204 - RADIOBIOLOGY AND RADIOBIOLOGICAL BASIS OF RADIOTHERAPY  
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Derive the BED equation for fractionated radiotherapy based on the LQ model and discuss the modified fractionation schemes based on this model (20)
- 2) Discuss the 4Rs of fractionated radiotherapy (20)
- 3A) Describe the radiation effects on skin and eye lens (10)
- 3B) Explain tumour hypoxia and reoxygenation during radiotherapy (10)
- 3C) Discuss the importance of dose rate effect in low dose rate (LDR) brachytherapy (10)
- 3D) Discuss the role of chromosomal aberrations in biological dosimetry of human beings exposed to ionizing radiation (10)
- 4A) Explain the importance of repair of sublethal damage (5)
- 4B) Describe a method to find out the  $\alpha/\beta$  values by comparing two fractionation schedules (5)
- 4C) Discuss the use of permanent implants in brachytherapy (5)
- 4D) Describe the cell division process with the help of a diagram (5)

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