

Question Paper

Exam Date & Time: 27-Jun-2022 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. MRP DEGREE EXAMINATION - JUNE/JULY 2022
SUBJECT: MRP5201 - RADIATION PHYSICS RADIATION QUANTITIES AND UNITS
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer the following:

- 1A) Derive the expression $N = N_0 e^{-\lambda t}$. (10)
- 1B) Define Specific Activity and derive the expression for the same. (10)
- 2) When charged particles pass through matter, what are the types of interactions that takes place in the medium? (20)
- 3A) Discuss in detail operational quantities. (10)
- 3B) Derive an expression for the change in wavelength of a scattered photon and the energy of the recoil electron. (10)

3C. Explain:

- i) Particle number and radiant energy. (2.5)
- ii) Flux and energy flux. (2.5)
- iii) Fluence and energy fluence. (2.5)
- iv) Fluence rate and energy fluence rate. (2.5)
- 3D) Discuss the different modes of decay of an atom. (10)
- 4A) Define Annual Limit of Intake (ALI) and Derived Air Concentration (DAC). (5)
- 4B) Discuss about mass energy transfer coefficient and mass energy absorption coefficient. (5)
- 4C) Define HVL. Derive an expression for the same. (5)
- 4D) Define Absorbed Dose and Kerma and explain their relationship with a graph. (5)

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Question Paper

Exam Date & Time: 29-Jun-2022 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. MRP DEGREE EXAMINATION - JUNE/JULY 2022
SUBJECT: MRP5202 - RADIATION SOURCES AND RADIATION GENERATING EQUIPMENTS
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Describe the important parts of a Linac with neat diagram. (20)
- 2) Describe about the particle accelerators with necessary neat diagram. (20)
- 3A) Write a short note on klystron and magnetron. (10)
- 3B) Discuss the difference between X-ray and electron mode of treatment in a Linac. (10)
- 3C) Discuss in detail about the working of the betatron and microtron. (10)
- 3D) Explain the working of source house moving in tele therapy. (10)
- 4A) Write a short note on bremsstrahlung X-rays. (5)
- 4B) Explain the different types of waveguides used in a Linac. (5)
- 4C) Write a short note on vandegraff generator. (5)
- 4D) Scattering foil and flattening filters. (5)

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