

Question Paper

Exam Date & Time: 25-Jan-2023 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

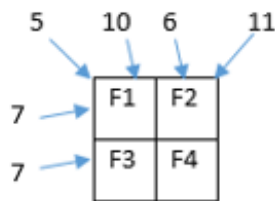
FIRST SEMESTER M.Sc. (NUCLEAR MEDICINE TECHNOLOGY) DEGREE EXAMINATION - JANUARY 2023
SUBJECT: NMT5101- PHYSICS AND DOSIMETRY IN NUCLEAR MEDICINE
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Explain beta spectrum in detail. Also mention the importance of beta radiations in nuclear medicine (20)
- 2) Describe three common personnel dosimeters and explain how the dose is estimated for each one. (20)
- 3A) Explain curl, gradient and divergence in vector calculus. (10)
- 3B) Find the values of 4 pixels from the provided 6 bin values using the method of algebraic reconstruction technique. (10)



- 3C) Discuss interaction of neutrons and matter with special emphasis on neutron activation analysis (10)
- 3D) Discuss how charged particles are accelerated in a medical cyclotron (10)
- 4A) Explain forward and backward finite differences with example (5)
- 4B) Explain Unijunction transistor. (5)
- 4C) Solve using the Cramer's rule $5x - 2y - 3z = 17; 3x - y + z = 15; x + y - 6z = -13$. (5)
- 4D) Define laws of radioactivity (5)

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FIRST SEMESTER M.Sc. (NUCLEAR MEDICINE TECHNOLOGY) DEGREE EXAMINATION - JANUARY 2023
SUBJECT: NMT5102- RADIOPHARMACY AND RADIOPHARMACEUTICALS IN NUCLEAR MEDICINE
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Write in detail about clinical application of Cu-64 and Lu-177 radiopharmaceuticals and the rationale behind their use. (20)
- 2) Explain in detail good manufacturing practice (GMP) for radiopharmaceutical manufacture and handling in hospital radio-pharmacy (GLP). (20)
- 3A) Categorize the type of medical cyclotron facilities. (10)
- 3B) Describe substitution chemistry for Iodine and coordination chemistry reaction principles for Tc-99m labeled complexes? (10)
- 3C) Compare the construction and working of Germanium-gallium generator with Moly generator. (10)
- 3D) Briefly describe the procedure for preparation of Lu-177-PSMA (10)

4) Write short note:

- 4A) Radio- HPLC (5)
- 4B) Freeze drying during manufacture of cold kits (5)
- 4C) Production of I-124 (5)
- 4D) F-18- FDG synthesis process (5)

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