

Question Paper

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



MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. NMT DEGREE EXAMINATION - SEPTEMBER 2022
SUBJECT: NMT5201 - PET AND THERAPEUTIC RADIOPHARMACEUTICALS
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Write in detail about Ga-68 chemistry and clinical application of commonly used Ga-68 radiopharmaceuticals and the rationale behind their use. (20)
- 2) Explain in detail about cyclotron production method and production techniques for any 2 PET radioisotopes. (20)
- 3A) Explain the basics of F-18 labelling chemistry. (10)
- 3B) Describe synovectomy procedure and radiopharmaceuticals used for the therapy. (10)
- 3C) Describe in detail the ideal characteristics of therapeutic radionuclides. Compare characteristics of any two theranostic radionuclides. (10)
- 3D) Describe radiopharmaceutical purification and quality control process. (10)

4. Write short note:

- 4A) Production of Samarium -153, P-32 and Sr-89. (5)
- 4B) Copper labelled radiopharmaceuticals. (5)
- 4C) Tungsten-Rhenium generator. (5)
- 4D) Radio thin layer chromatography. (5)

-----End-----

Question Paper

Exam Date & Time: 02-Sep-2022 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. NMT DEGREE EXAMINATION - SEPTEMBER 2022
SUBJECT: NMT5202 - IMAGING PHYSICS
(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

- 1) Discuss in detail hybrid imaging modalities in nuclear medicine. (20)
- 2) Discuss in detail iterative reconstruction and importance of Fourier transformation in removing noise from images. (20)
- 3A) Discuss how geometric mean can help in reducing attenuation effects but not the arithmetic mean. (10)
- 3B) Discuss factors which affect spatial resolution of a PET camera. (10)
- 3C) Discuss various parameters which affect image quality of a gamma camera. (10)
- 3D) Write in detail on working of a semiconductor-based nuclear imaging camera. (10)
- 4A) Write a short note on annihilation coincidence detection. (5)
- 4B) Write a short note on prompt events in PET. (5)
- 4C) Give applications of small animal imaging camera. (5)
- 4D) Write in brief how development of an anger camera changed nuclear imaging. (5)

-----End-----

Question Paper

Exam Date & Time: 03-Sep-2022 (10:00 AM - 01:00 PM)



MANIPAL ACADEMY OF HIGHER EDUCATION

SECOND SEMESTER M.Sc. NMT DEGREE EXAMINATION - SEPTEMBER 2022

SUBJECT: NMT5203 - NUCLEAR MEDICINE PROCEDURES

SECTION A: DIAGNOSTIC NUCLEAR MEDICINE PROCEDURES

SECTION B: THERAPEUTIC NUCLEAR MEDICINE PROCEDURE

(2021 SCHEME)

Marks: 100

Duration: 180 mins.

Answer all the questions.

Section A: Diagnostic Nuclear Medicine Procedures (60 Marks)

- 1) Write in detail the basis or using thallium for diagnosing ischemia. What property of Thallium are you using? Describe the same in detail. What are the drawbacks of using Thallium? (20)
- 2A) Explain the radioisotopic imaging procedure and interpretation criteria for the diagnosis of brain death. (10)
- 2B) Describe the radiopharmaceuticals used to evaluate CSF dynamics, listing their names, administered activity, route of administration, required properties and clinical application in Nuclear Medicine. (10)
- 2C) Describe the properties of radiopharmaceuticals used for infection imaging. (10)
- 3A) Describe the clinical indication and procedure for perchlorate discharge test. (5)
- 3B) What is VQ mismatch? (5)

Section B: Therapeutic Nuclear medicine Procedures (40 Marks)

- 4) As per regulatory body, patient is discharged below 5mR/hr. Explain with reasons why and what are the implications if not followed. (20)
- 5) Write in detail the physical and chemical characteristics of I-131. (5+5 = 10 marks) (10)
- 6A) Write short note on Sodium Iodide Symporter. (5)
- 6B) Write short note on patient preparation for radiosynovectomy. (5)

-----End-----