

MANIPAL ACADEMY OF HIGHER EDUCATION**SECOND YEAR M.Sc. NMT DEGREE EXAMINATION – MAY/JUNE 2018****SUBJECT: PAPER III: NON IMAGING NUCLEAR MEDICINE TECHNIQUES
(NEW REGULATIONS)**

Friday, June 01, 2018

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions.**

1. Explain about the working mechanism and the principle of Thyroid uptake probe.
2. **Write short notes on:**
 - 2A. Ideal characteristics/features of nuclear gamma probe.
 - 2B. Coincidence circuit of Liquid scintillation counting.
 - 3A. Explain the types of GFR estimation by plasma sampling after single injection.
 - 3B. Explain plasma sampling in single compartment model.
 - 4A. Explain about the statistical analysis application in Nuclear Medicine.
 - 4B. What is propagation of error? Explain.
5. What is the principle of RIA? How does it differ from other immunoassays?
6. **Write short notes on:**
 - 6A. Principle of IRMA.
 - 6B. Production of antibodies.
7. **Write short notes on:**
 - 7A. Carbon 14 breath analysis principle.
 - 7B. Factors affecting radiometric detection of bacterial metabolism.
8. Which is the non-invasive method for finding the H-pylori infection in patients? Explain the procedure, patient preparation and precautions during the procedure.

(10 marks × 8 = 80 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION**SECOND YEAR M.Sc. NMT DEGREE EXAMINATION – MAY/JUNE 2018****SUBJECT: PAPER IV: IMAGING NUCLEAR MEDICINE TECHNIQUES
(NEW REGULATIONS)**

Monday, June 04, 2018

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ Answer ALL the questions:

1. A 49 year old woman with end stage renal disease underwent renal transplantation. She developed anuria one week later. She has been referred for evaluation. Write about:

- 1A. Patient preparation
- 1B. Radiopharmaceutical preparation
- 1C. Acquisition protocol

(3+3+14 = 20 marks)

2. A 18 month old girl with history of gastrointestinal bleeding has been referred to your department. Discuss the scan you will do for the evaluation for the same.

(20 marks)

3. A male patient suffering from fullness of the stomach after food has been referred to the department of Nuclear Medicine with a request for gastric emptying study for solids. Write about:

- 3A. Patient preparation.
- 3B. Preparation of the solid meal.
- 3C. Acquisition protocol.
- 3D. Interpretation of the study.

(2+8+8+2 = 20 marks)

4. Write short notes on:

- 4A. Pseudo gases for ventilation imaging.
- 4B. Radioactive iodine thyroid uptake.
- 4C. Denatured RBC Scan.
- 4D. Myocardial viability assessment.

(5 marks × 4 = 20 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION
SECOND YEAR M.Sc. NMT DEGREE EXAMINATION – MAY/JUNE 2018
SUBJECT: PAPER V: THERAPEUTIC NUCLEAR MEDICINE PROCEDURES
(NEW REGULATION)

Wednesday, June 06, 2018

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions:**

✍ **Long questions:**

1. A patient suffering from carcinoma thyroid has come for a ^{131}I low dose scan to the department but on inquiry you find that the patient has not stopped thyroxine (Eltroxin). Enumerate along with their physical characteristics the radiopharmaceuticals/radionuclides, which may be used to scan this patient.

(20 marks)

2. A patient has been referred for ^{131}I MIBG therapy. Discuss the preparation, scan protocol, and the related precautionary instructions.

(20 marks)

3A. How will you minimize external radiation hazard while handling ^{131}I for high dose ablation therapy?

3B. How will you confirm internal contamination with ^{131}I ?

(15+5 = 20 marks)

4. **Short notes:**

4A. Ideal characteristics of the radiopharmaceutical used for radiation synovectomy.

4B. ^{89}Sr Chloride.

4C. Thermoluminescent dosimeter.

4D. Hybridoma technique.

(5 marks \times 4 = 20 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION
SECOND YEAR M.Sc. NMT DEGREE EXAMINATION – MAY/JUNE 2018
SUBJECT: PAPER VI: RADIATION BIOLOGY AND RADIATION PROTECTION
(NEW REGULATION)

Friday, June 08, 2017

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

- ✍ **Answer ALL the questions.**
- ✍ **Students are instructed to answer Section – A and Section – B on the separate answer paper.**

SECTION – A: RADIATION BIOLOGY (30 MARKS)

1. **Short notes:**

- 1A. Chromosomal Aberration due to radiation.
- 1B. Compare Acute Radiation Syndromes and Chronic Radiation Syndromes.
- 1C. Hormetic effects of Radiation.
- 1D. Role of quality and quantity of radiation on biological system.
- 1E. Somatic effects and Genetic effects of Radiation.

(6 marks × 5 = 30 marks)

SECTION – B: RADIATION PROTECTION (50 MARKS)

✍ **Answer the following:**

- 1A. What is radiation survey meter? Write a short note on survey meters.
 - 1B. Write a note on Transport Index and Categories of Transport Containers for Radioactive Sources.
- (5 marks × 2 = 10 marks)
- 2A. Describe the procedure monitoring contamination and decontamination.
 - 2B. What are the responsibilities of RSO in Nuclear Medicine Facilities?

(20 marks × 2 = 40 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION
SECOND YEAR M.Sc. NMT DEGREE EXAMINATION – MAY/JUNE 2018

SUBJECT: PAPER I: RADIO PHARMACY – II
(NEW REGULATIONS)

Monday, May 28, 2018

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

✍ **Answer ALL the questions.**

1. **Write in short about the following:**

- 1A. Difference between Fume hood and Laminar Air Flow Bench.
- 1B. Role of Hospital Radiopharmacy Lab in Nuclear medicine.
- 1C. Chromatography method for RCP test.
- 1D. Normal Biodistribution of F-18 Fluoride.

(5 marks × 4 = 20 marks)

✍ **Answer the following:**

2. Write about any two positron emitting radionuclide generators with applications. (no details).
3. What are important criteria to become investigational new drugs in Nuclear Medicine.
4. Describe checking method for the Radionuclidic impurities present in the ^{99m}Tc eluate.
5. Write important features of any one Commercial Black Box used in radiochemistry lab? (no details)

(5 marks × 4 = 20 marks)

✍ **Answer the following:**

6. Brief about the lyophilized kit suitable for Radiopharmaceuticals Preparation. What is the role of Antioxidants and reducing agents in cold kits of ^{99m}Tc Radiopharmaceuticals?
7. Enlist the various radio iodination methods. Difference between Iodo chloride and Chloramine T method of iodination technique.
8. Describe various mechanisms of localization of radiopharmaceuticals with suitable example.
9. Describe the methods of sterilization and pyrogen testing as a quality control for checking the cold kits.

(10 marks × 4 = 40 marks)



MANIPAL ACADEMY OF HIGHER EDUCATION**SECOND YEAR M.Sc. N.M.T. DEGREE EXAMINATION – MAY/JUNE 2018****SUBJECT: PAPER II: NUCLEAR MEDICINE INSTRUMENTATION – II
(NEW REGULATIONS)**

Wednesday, May 30, 2018

Time: 10:00 – 13:00 Hrs.

Max. Marks: 80

Answer ALL the questions. Draw neat and labeled diagram as and when required.

1. “The projection data acquired in form of sinograms are affected by a number of factors.”
Opine on this statement. List and elaborate on these factors.
(20 marks)
2. Comment upon the design and performance characteristics of parallel hole collimators. How septal penetration can be identified and confirmed.
(20 marks)
3. What is gamma camera computer interface?
(10 marks)
4. What are the compensation methods for uniform attenuation?
(10 marks)
5. **Write short notes on the following:**
 - 5A. Anticoincidence circuit
 - 5B. H-D curve
 - 5C. Photodiodes
 - 5D. CRT

(5 marks × 4 = 20 marks)

