

[LF 0212]

AUGUST 2014

Sub. Code: 2121

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE  
TECHNIQUES**

***Q.P. Code : 802121***

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Explain SPECT imaging.
2. Explain the instrumentation of PET scanner.
3. Explain iterative reconstruction methods for SPECT.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Compare 2D and 3D modes in PET.
2. LOR.
3. CT detectors.
4. C11-choline.
5. Butterworth Filter.
6. IMRT.
7. PACS.
8. Image registration PET and CT.

**III. Short answers on:**

**(10 x 3 = 30)**

1. BGO.
2. DICOM server.
3. Noise Equivalent Count Rate.
4. TOF.
5. Collimator resolution.
6. Nyquist frequency.
7. Attenuation correction.
8. Scatter correction in PET.
9. FFT.
10. LSF.

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[LF 0215]

FEBRUARY 2015

Sub. Code: 2121

B.Sc. NUCLEAR MEDICINE TECHNOLOGY

THIRD YEAR

PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE  
TECHNIQUES

*Q.P. Code : 802121*

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Explain the sources of image degradation in SPECT.
2. Explain the principle and working of PET.
3. Explain the FBP reconstruction.

**II. Write notes on:**

**(8 x 5 = 40)**

1. TOF.
2. Sinogram.
3. FanBeam Collimator.
4. Beam Hardening artifact.
5. OSEM.
6. Tumour delineation for radiation therapy.
7. Angular sampling in SPECT.
8. Alpha blending technique.

**III. Short answers on:**

**(10 x 3 = 30)**

1. DICOM.
2. PACS.
3. F18 DOPA.
4. GTV.
5. LSO.
6. Nyquist frequency.
7. SUV.
8. LOR.
9. FWHM.
10. RAMP filter.

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[LH 0815]

AUGUST 2015

Sub. Code: 2121

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE  
TECHNIQUES**

**Q.P. Code : 802121**

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Discuss the attenuation, random, dead time and scatter corrections for PET CT Scanner.
2. Explain the various components of iterative reconstruction for PET CT Scanner.
3. Describe the various factors affecting quantitative SPECT.

**II. Write notes on:**

**(8 x 5 = 40)**

1. LOR.
2. Matrix selection for SPECT Imaging.
3. Continuous Rotation vs Step and Shoot in SPECT acquisition.
4. Chang attenuation connection.
5. Short lived positron emitters.
6. Image guiding for Radiotherapy.
7. Principle of fusion Techniques in Image Processing.
8. Image guidance for stereotactic Surgery.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Nomenclature of planes in SPECT.
2. Partial volume effect.
3. Cyclotron.
4. Y90 Microsphere.
5. Radiation Synovectomy.
6. Mention BGO-density, effective Z and decay time.
7. FFT.
8. Mention LSO- density, effective Z and decay time.
9. Pocket dosimeter.
10. Mention GSO-density, effective Z and decay time.

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**B.Sc. NUCLEAR MEDICINE TECHNOLOGY  
THIRD YEAR  
PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE  
TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Describe the newer image processing techniques in Nuclear Medicine practice.
2. Mention any four of the current radiopharmaceuticals for SPECT imaging.  
Describe the basic steps in the image acquisition for any one of them.
3. What are the basic principles of PET imaging?

**II. Write notes on:**

**(8 x 5 = 40)**

1. Newer scintillation crystals.
2. Butterworth filter in image processing.
3. Attenuation correction in SPECT CT imaging.
4. Radiation safety precautions in <sup>18</sup>F-FDG PET study.
5. Symptoms of contrast allergy.
6. Reconstruction of Myocardial SPECT images.
7. Precautions to be followed during <sup>18</sup>F FDG administration for PET study.
8. Standardized uptake value max (SUV max).

**III. Short answers on:**

**(10 x 3 = 30)**

1. Non-ionic contrast.
2. Principle of bone SPECT study.
3. Importance of serum creatinine prior to <sup>18</sup>F FDG PET-CT study.
4. Hydrocortisone injection.
5. Muscle uptake in FDG PET study.
6. Lead apron.
7. Picture Archiving and Communication System (PACS).
8. Image guided radiotherapy.
9. Pixel.
10. Colour scale for image display.

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[LK 0217]

**FEBRUARY 2017**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY  
THIRD YEAR  
PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE  
TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:** **(3 x 10 = 30)**

1. Describe the image fusion techniques in Nuclear Medicine practice.
2. Mention any four of the current radiopharmaceuticals for PET imaging.  
Describe the basic steps in the synthesis of any one of them.
3. What are the basic principles of SPECT image processing?

**II. Write notes on:** **(8 x 5 = 40)**

1. Scintillation crystals in PET scanner.
2. Filters in imaging processing.
3. Attenuation correction in PET CT imaging.
4. Patient preparation for 18F-FDG PET study.
5. Contrast allergy.
6. Reconstruction of SPECT images.
7. Precautions to be followed during 18F administration for bone scintigraphy.
8. Standardized uptake value (SUV).

**III. Short answers on:** **(10 x 3 = 30)**

1. Ionic contrast.
2. Principle of parathyroid SPECT study.
3. Blood sugar estimation prior to 18F FDG PET study.
4. Hydrocortisone injection.
5. Brown fat.
6. Lead apron.
7. DICOM image.
8. Image guided radiotherapy.
9. Voxel.
10. Grey scale.

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[LL 0817]

**AUGUST 2017**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR**

**PAPER I – RECENT ADVANCES IN NUCLEAR MEDICINE TECHNIQUES**

**Q.P. Code: 802121**

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Principles and working of SPECT and CT imaging.
2. PET imaging for Epilepsy.
3. Recent therapeutic applications of radiopharmaceuticals in NM.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Image guidance for stereotactic Surgery.
2. Attenuation correction in SPECT CT imaging.
3. PERCIST.
4. Filtered back Projection.
5. Histogram.
6. Line of response.
7. Glycolysis.
8. Scatter coincidence in PET.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Noise Equivalent Count Rate.
2. Partial volume effect.
3. List three new radiopharmaceuticals for Neuro applications other than Tc99m ECD & HMPAO and its applications.
4. Mechanism of FDG uptake.
5. Tabulate three differences between 2D and 3D modes in PET.
6. Normalization in PET.
7. Cross calibration factor in PET.
8. PACS.
9. Low pass filter.
10. Multi planar reconstruction.

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[LM 0218]

**FEBRUARY 2018**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Instrumentation of PET scanner and its working principles.
2. Image registration and segmentation of PET CT images.
3. Image reconstruction in CT.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Standardized uptake value (SUV).
2. Alpha Blending technique.
3. Volume rendering.
4. Biological tumour volume.
5. Hypoxia imaging in PET.
6. OSEM reconstruction.
7. Linogram.
8. Fan beam collimator.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Image guided radiotherapy.
2. RAMP filter.
3. Time of flight.
4. Gaussian filter.
5. DaT Scan.
6. Streak artefacts.
7. Different planes of tomography.
8. Angular sampling in SPECT.
9. Cyclotron.
10. List 3 radiopharmaceuticals used in PET other than FDG and its applications.

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[LN 0818]

**AUGUST 2018**

Sub. Code: 2121

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

*Q.P. Code: 802121*

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Registration of PET CT imaging principles.
2. Principle and working of PET.
3. Iterative reconstruction techniques of SPECT imaging.

**II. Write notes on:**

**(8 x 5 = 40)**

1. C11-Choline.
2. Beam Hardening artifact.
3. Time of Flight.
4. Reducing the random noise in PET.
5. List three cardiac PET radiopharmaceuticals and its mechanism.
6. Stereotactic radio surgery.
7. Gross tumour volume.
8. Maximum intensity projection.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Voxel.
2. Brown fat.
3. Segmentation.
4. Biological tumour volume.
5. Use of markers on Radiotherapy Planning.
6. Sinogram.
7. Butterworth filter.
8. DaTscan.
9. Surface rendering.
10. DICOM.

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**B.Sc. NUCLEAR MEDICINE TECHNOLOGY  
THIRD YEAR  
PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:** **(3 x 10 = 30)**

1. Describe the various principles of localization of Radioactive drugs in the body.
2. A tertiary care teaching hospital decides to acquire a new, well equipped nuclear medicine facility. List out the different equipment needed, design and regulatory approvals required. Also briefly describe what molecular imaging equipment will be appropriate and its technical justification.
3. Enumerate the Radionuclides involved in evaluation of Cardiac performance. Discuss in detail about any one of the commonly used radiopharmaceutical.

**II. Write notes on:** **(8 x 5 = 40)**

1. Inhalation Radiopharmaceuticals.
2. Tracers used in Thyroid imaging.
3. Radioimmuno Assays.
4. Factors affecting image formation.
5. Scintillation Detectors in PET imaging.
6. Right Ventricular function imaging.
7. Genetic effects of radiation.
8. Methods of waste disposal in Nuclear medicine.

**III. Short answers on:** **(10 x 3 = 30)**

1. Internal Contamination.
2. Carrier Free Radionuclide.
3. Cardiac PET imaging agents.
4. Correction steps in PET image processing.
5. Pyrogenic reactions.
6. Uses of MIBI.
7. List mode acquisition.
8. <sup>131</sup>I MIBG.
9. Radiopharmaceuticals in brain imaging.
10. Nuclear imaging in Neuroendocrine tumors.

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**B.Sc. NUCLEAR MEDICINE TECHNOLOGY****THIRD YEAR****PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES****Q.P. Code: 802121****Time: Three Hours****Maximum: 100 Marks****Answer all questions****I. Elaborate on:****(3 x 10 = 30)**

1. A 3 year old child has complaints of recurrent respiratory infections because of aspiration. Her pediatrician has requested for Radionuclide study of G.E. Reflux evaluation. Describe the general principles involved in imaging this patient.
2. What are the general principles involved in localization of a radiopharmaceutical in the target organ?
3. A tertiary care government hospital is planning to start high dose radionuclide therapy facility in its premises. What are the various factors to be considered in its design and commissioning as well as waste disposal methods from this facility?

**II. Write notes on:****(8 x 5 = 40)**

1. Imaging method for Osteomyelitis.
2. Medical Internal Radiation Dose (MIRD) Calculations.
3. Shielding for Alpha, Beta, X-Rays and Gamma Radiations.
4. Daily and weekly quality control parameters for SPECT-CT.
5. Biological effects of low dose radiation.
6. Right ventricular function imaging and quantification.
7. Describe about various radiopharmaceuticals in Cerebral Perfusion Imaging SPECT.
8. Carrier – free Radiopharmaceuticals.

**III. Short answers on:****(10 x 3 = 30)**

1. PET – MRI: Types of Acquisition.
2. PET based RT planning.
3. Weekly quality check parameters for SPECT-CT.
4. Advantages of Diagnostic CT along with SPECT images.
5. Use of Adenosine in Nuclear Medicine.
6. Intraoperative Gamma Probe.
7. IRMA assays.
8. ALARA Principle.
9. <sup>68</sup>Ga Gallium generator.
10. Prostate cancer imaging.

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**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Maximum: 100 Marks**

**Answer all questions**

**I. Elaborate on:** **(3 x 10 = 30)**

1. PET MRI principles. Will it replace PET CT? Compare PET MRI and PET CT.
2. Advanced tracers in PET imaging of Heart.
3. Newer computer applications in nuclear medicine.

**II. Write notes on:** **(8 x 5 = 40)**

1. Translational imaging.
2. PACS.
3. Telemedicine.
4. PET brain tracers.
5. What is F -18 sodium fluoride used for imaging? Compare with MDP.
6. F -18 FDG mechanism of localisation in cancer cell.
7. SPECT CT applications in nuclear medicine.
8. SUV.

**III. Short answers on:** **(10 x 3 = 30)**

1. TOF.
2. Cyclotron produced tracers.
3. F 18 DOPA uses.
4. Liver cancer radiopharmaceuticals for treatment (TARE).
5. Alpha tracers.
6. FDG viability – protocol.
7. Gallium 68 PSMA.
8. PRRT radiopharmaceuticals.
9. RIT.
10. F 18 FCH uses.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[LR 1220]**

**DECEMBER 2020  
(AUGUST 2020 EXAM SESSION)**

**Sub. Code: 2121**

**BACHELOR IN NUCLEAR MEDICINE TECHNOLOGY  
THIRD YEAR – (Regulation from 2010-2011)  
PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. A tertiary care institution wishes to establish a full-fledged high dose Radioiodine therapy facility in its premises. Describe in detail, its planning, regulatory obligations involved and patient preparation protocols for this facility.
2. Describe about the technology and applications of the PET-MRI.
3. A 26 years old lady has complaints of body pains and swelling in her Thyroid region of her neck. Describe in detail about imaging of her Parathyroid glands.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Three phase Bone Scan.
2. Applications of Radioactive technetium.
3. Radioactive waste disposal technique.
4. Intraoperative Gamma Probe.
5. PET Scintillation Detectors.
6. First Pass Radionuclide imaging procedures.
7. Personal monitoring devices.
8. Protein binding Radiopharmaceuticals.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Agents in Skeletal Imaging.
2. Gastrointestinal Scintigraphy in Children: Radiopharmaceutical and technique.
3. Weekly quality check parameters for SPECT-CT.
4. Agents used in Bone Scintigraphy.
5. Delay tank design for high dose Radionuclide therapy wards.
6. Multigated Acquisition.
7. Uses of <sup>131</sup>Iodine.
8. Shielding agents for Beta and Alpha radiation.
9. ALARA Principle.
10. Imaging agents for Cardiac function.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[AHS 0122]**

**JANUARY 2022**

**Sub. Code: 2121**

**(FEBRUARY 2021 & AUGUST 2021 EXAM SESSION)**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR – (Regulation from 2010-2011)**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Describe the newer image processing techniques in Nuclear Medicine practice.
2. A tertiary care teaching hospital decides to acquire a new, well equipped nuclear medicine facility. List out the different equipment needed, design and regulatory approvals required. Also briefly describe what molecular imaging equipment will be appropriate and its technical justification.
3. Newer computer applications in nuclear medicine.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Standardized uptake value (SUV).
2. Inhalation Radiopharmaceuticals.
3. Tracers used in Thyroid imaging.
4. PERCIST.
5. Glycolysis.
6. Biological tumour volume.
7. List three cardiac PET radiopharmaceuticals and its mechanism.
8. Maximum intensity projection.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Importance of serum creatinine prior to 18F FDG PET-CT study.
2. Hydrocortisone injection.
3. List mode acquisition.
4. PIXEL.
5. Colour scale for image display.
6. Correction steps in PET image processing.
7. List mode acquisition.
8. Noise Equivalent Count Rate.
9. Partial volume effect.
10. Cross calibration factor in PET.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[AHS 0922]**

**SEPTEMBER 2022**

**Sub. Code: 2121**

**(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR – (Regulation from 2010-2011)**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Describe the image fusion techniques in Nuclear Medicine practice.
2. Instrumentation of PET scanner and its working principles.
3. Iterative reconstruction techniques of SPECT imaging.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Standardized uptake value.
2. Linogram.
3. Beam Hardening Artifact.
4. Maximum intensity projection.
5. Scintillation crystals in PET scanner.
6. Patient preparation for  $^{18}\text{F}$ -FDG PET study.
7. Contrast allergy.
8. Hybrid imaging and its applications.

**III. Short answers on:**

**(10 x 3 = 30)**

1. DICOM.
2.  $^{18}\text{F}$  DOPA.
3. LSO.
4. Ramp filter.
5. Radio immunotherapy.
6. Cyclotron produced tracers.
7. Liver cancer radiopharmaceuticals for treatment.
8. Alpha tracer.
9.  $^{18}\text{F}$ -FDG uses.
10. Intraoperative gamma probe.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[AHS 0424]**

**APRIL 2024**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR – (Regulations 2010-2011& 2018-2019 onwards)**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. How to start a high dose Radionuclide Therapy facility in the premises of a tertiary care Government Hospital? What are the various factors to be considered in its design and commissioning as well as waste disposal methods from this facility?
2. Discuss the attenuation, random, dead time and scatter corrections for PET CT Scanner.
3. Mention any four of the current Radiopharmaceuticals for SPECT imaging. Describe the basic steps in the image acquisition for any one of them.

**II. Write notes on:**

**(8 x 5 = 40)**

1. PET brain tracers.
2. What is F -18 sodium fluoride used for imaging? Compare with MDP.
3. Shielding for Alpha, Beta, X-Rays and Gamma Radiations.
4. Carrier – free Radiopharmaceuticals.
5. LOR.
6. Short lived positron emitters.
7. Matrix selection for SPECT Imaging.
8. Contrast allergy.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Cyclotrons produced tracers.
2. Radio immunotherapy.
3. Intraoperative Gamma Probe.
4. Ge-<sup>68</sup>Ga generator.
5. Nomenclature of planes in SPECT.
6. Partial volume effect.
7. Y90 Microsphere.
8. Cyclotron.
9. Mention BGO-density, effective Z and decay time.
10. Pocket dosimeter.

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[AHS 0125]**

**JANUARY 2025**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR – (Regulations 2010-2011& 2018-2019 onwards)**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. What are the different factors one should consider in designing a PET center without any cyclotron?
2. Describe in detail on Radio metals in Theranostic Nuclear Medicine.
3. PACS has become the most efficient means of exchanging patients' data among physicians and medical institutions. Specify some important features and advantages of PACS to justify such a unique status.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Method of attenuation correction for PET acquisition data.
2. Types of Filters.
3. DICOM and Teleradiology.
4. LCD monitors are superior to CRT monitors for image display. Explain why?
5. Acceptance Tests in PET.
6. Methods of daily and weekly quality control tests of PET CT.
7. Physical properties of common PET scintillator detectors.
8. Small Animal PET Scanner.

**III. Short answers on:**

**(10 x 3 = 30)**

1. RIA.
2. Gallium-68 Tracers.
3. Rhenium-188 tracers.
4. Bone pain palliation Radiopharmaceuticals.
5. Sentinel node probe.
6. Nitrogen-13-labeled ammonia.
7.  $^{82}\text{Rb}$ -Rubidium Chloride.
8. Pyrogenicity.
9. Radionuclide purity.
10. What is the difference between the nucleophilic and electrophilic reaction?

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**THE TAMIL NADU DR. M.G.R. MEDICAL UNIVERSITY**

**[AHS 0425]**

**APRIL 2025**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR – (Regulations 2010-2011& 2018-2019 onwards)**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. A tertiary care teaching hospital decides to acquire a new, well equipped Nuclear Medicine facility. List out the different equipments needed, design and regulatory approvals required. Also briefly describe what molecular imaging equipment will be appropriate and its technical justification.
2. Recent therapeutic applications of Radiopharmaceuticals in Nuclear Medicine.
3. Discuss the attenuation, random, dead time and scatter corrections for PET CT scanner.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Alpha blending technique.
2. Gross tumour volume.
3. Time of flight.
4. Reconstruction of Myocardial SPECT images.
5. Line of response.
6. Histogram.
7. Digital PET.
8. Image guided Radiotherapy.

**III. Short answers on:**

**(10 x 3 = 30)**

1. Nomenclature of planes in SPECT.
2. Y90 microsphere.
3. Mention BGO density, effective Z, decay time.
4. Importance of serum creatinine prior to <sup>18</sup>F FDG PET-CT study.
5. Colour scale for image display.
6. Cross calibration factor in PET.
7. Hydrocortisone injection.
8. Multiplanar reconstruction.
9. Noise equivalent count rate.
10. FFT (Fast Fourier transformation).

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**THE TAMIL NADU Dr. M.G.R. MEDICAL UNIVERSITY**

**[AHS 1125]**

**NOVEMBER 2025**

**Sub. Code: 2121**

**B.Sc. NUCLEAR MEDICINE TECHNOLOGY**

**THIRD YEAR – (Regulations 2010-2011, 2016-2017 & 2018-2019 onwards)**

**PAPER I – RECENT ADVANCE IN NUCLEAR MEDICINE TECHNIQUES**

***Q.P. Code: 802121***

**Time: Three Hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Newer computer applications in Nuclear Medicine.
2. What is Theranostics? Explain the concept with suitable example.
3. Mention any four of the current radiopharmaceuticals for SPECT imaging. Describe the basic steps in image acquisition for any one of them.

**II. Write notes on:**

**(8 x 5 = 40)**

1. Image guidance for stereotactic Surgery.
2. Attenuation correction in SPECT CT imaging.
3. Short lived positron emitters.
4. Radiation safety precautions in  $^{18}\text{F}$ -FDG PET study.
5. Continuous rotation VS step and shoot in SPECT acquisition.
6. Telemedicine.
7. Translational imaging.
8. Medical Internal Radiation Dose calculation (MIRD calculation).

**III. Short answers on:**

**(10 x 3 = 30)**

1. Mention GSO-density, effective Z, and decay time.
2. Line spread function.
3. Mention LSO- density, effective Z, and decay time.
4. Tabulate three differences between 2D and 3D modes in PET.
5. Gaussian filter.
6. DAT scan.
7. List three radiopharmaceutical used in PET other than FDG and its applications.
8. Surface rendering.
9. Attenuation correction in PET.
10. Biological tumour volume.

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