

[LA0512]

Sub. Code: 4033

**M.Sc (MEDICAL PHYSICS) DEGREE EXAMINATION- MAY 2012
SECOND YEAR**

**PAPER III – PHYSICS OF NUCLEAR MEDICINE AND INTERNAL
DOSIMETRY**

Q.P. Code: 284033

**Time: Three hours
180 (Min)**

Answer All questions.

Maximum: 100marks

I. Elaborate on :

**Pages Time Marks
(Max) (Max) (Max)**

- | | | | |
|--|----|----|----|
| 1. What is two compartmental model? Describe two compartmental model with and without back transference. | 17 | 40 | 20 |
| 2. Write in detail about PET detector and scanner design. | 17 | 40 | 20 |

II. Write notes on:

- | | | | |
|---|---|----|---|
| 1. Accelerator based radionuclides. | 4 | 10 | 6 |
| 2. Photonuclear activation. | 4 | 10 | 6 |
| 3. Life span of RBC. | 4 | 10 | 6 |
| 4. Pinhole collimator. | 4 | 10 | 6 |
| 5. Three dimensional imaging techniques. | 4 | 10 | 6 |
| 6. Single Photon Emission Computed Tomography. | 4 | 10 | 6 |
| 7. Working of medical cyclotron. | 4 | 10 | 6 |
| 8. Positron emitting radionuclides. | 4 | 10 | 6 |
| 9. Dose reciprocity theorem. | 4 | 10 | 6 |
| 10. Treatment of thyroid cancer with ^{131}I . | 4 | 10 | 6 |

[LC 0413]

APRIL 2013

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M.Sc (MEDICAL PHYSICS - DEGREE EXAMINATION
SECOND YEAR

PAPER III – PHYSICS OF NUCLEAR MEDICINE AND INTERNAL
DOSIMETRY

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Time: 3 hours

maximum: 100 marks

I. Elaborate on:

(2X20=40)

1. Describe in detail about the construction and function of a gamma camera
2. Discuss the principle of coincidence detection and explain the application of PET scan in medicine and advantage over gamma camera.

II. Write notes on:

(10X6=60)

1. Spatial resolution, Temporal resolution
2. Medically useful radionuclide produced by cyclotron
3. Pulse height analyzer
4. Difference between static and dynamic gamma imaging
5. Desirable properties required for gamma imaging radionuclide and radiopharmaceutical.
6. Function of collimator and types of collimator
7. Define: Physical half-life, biological and effective half-life of a radionuclide and establish relationship between them
8. Radiation safety procedures for personnel and patient during radionuclide administration.
9. Positron emission tomography
10. Technetium generator

[LD 1013]

OCTOBER 2013

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M.Sc (MEDICAL PHYSICS - DEGREE EXAMINATION
SECOND YEAR

PAPER III – PHYSICS OF NUCLEAR MEDICINE AND INTERNAL
DOSIMETRY

Q.P. Code: 284033

Time : 3 hours

Maximum : 100 marks

I. Elaborate on:

(2X20=40)

1. Describe in detail about the three methods for producing nuclear medicine radionuclides.
2. Discuss about principles of operation of single photon emission tomography

II. Write notes on:

(10X6=60)

1. Internal dosimetry and discuss about MIRD method.
2. Contrast and resolution
3. Coincidence detection
4. Image reconstruction and image quality.
5. Attenuation correction and scatter correction.
6. Calculate the total energy production and energy of each photon during annihilation processes.
7. Dead time, field of view and field uniformity
8. PET detector materials
9. Radiation synovectomy and its isotopes.
10. Waste disposal methods used in nuclear medicine laboratory.
