

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

[AHS 0122]

**JANUARY 2022
(OCTOBER 2021 EXAM SESSION)**

Sub. Code: 2314

**M.Sc. NUCLEAR MEDICINE TECHNOLOGY
SECOND YEAR (From 2019-2020 onwards)
PAPER IV – QUALITY CONTROL OF NUCLEAR MEDICINE EQUIPMENT
Q.P. Code : 282314**

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate notes on: (2 x 20 = 40)

1. Enumerate the importance of quality assurance of nuclear medicine instruments. List the quality assurance tests carried out for planar gamma camera.
2. Enumerate the various acceptance tests during installation of PET CT scanner. What are the routine quality assurance procedures for PET CT scanners?

II. Write Short Notes on: (10x6 = 60)

1. What is the Isotope Calibrator's linearity? Mention how important it is in routine radiopharmaceutical dose measurements. What are the various ways, and how do you go about determining linearity?
2. In a SPECT gamma camera, what is the center of rotation (COR)? How do you go about correcting the COR?
3. What is the difference between pincushion and barrel distortion? How do you correct it?
4. What is the Jaszczak SPECT Phantom and how does it help in the SPECT gamma camera quality assurance?
5. Explain why the iso-response curve is important for the flat field collimator used in thyroid uptake probes.
6. Give a brief overview of the various Recliner Scanner acceptance and reference tests.
7. What is the difference between counting device's precision and accuracy? How do you determine the accuracy?
8. What you understand by energy linearity of well counter? What is the procedure for performing an energy linearity test?
9. What exactly is the sample volume effect? Why is it significant? Write down the procedure to find sample volume effect.
10. What you understand by preventive maintenance? Describe the different preventative maintenance practices followed in nuclear medicine.

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[AHS 1022]

OCTOBER 2022

Sub. Code: 2314

**M.Sc. NUCLEAR MEDICINE TECHNOLOGY
SECOND YEAR**

(Candidates admitted from 2019-2020 & 2020-2021 onwards)

PAPER IV– QUALITY CONTROL OF NUCLEAR MEDICINE EQUIPMENT

Q. P. Code: 282314

Time: Three hours

Maximum : 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. The various NEMA recommended test for a SPECTCT gamma camera at the time of installation.
2. Elaborate on the frequency and importance of QC of a SPECTCT system.

II. Write notes on:

(10 x 6 = 60)

1. PET Normalization procedure.
2. Uniformity of gamma camera.
3. Linearity of Dose calibrator.
4. Iso-Response curve of a thyroid probe system.
5. Procedures involved in the preventive maintenance of a gamma camera.
6. Collimator Integrity test.
7. Streak artifact in PETCT.
8. Curvilinear cold artifact on PET image.
9. SPECT CT alignment test.
10. Geometric positioning and movement test of CT on a PETCT system.

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Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Explain in details about operational check of scintillation camera.
2. Describe about film processing and handling in nuclear medicine department.

II. Write notes on:

(10 x 6 = 60)

1. Write about NEMA body phantom for quality check of PET scan.
2. Explain about daily quality tests of rectilinear scanner.
3. Write about purpose of static phantom used in nuclear medicine lab.
4. Write about fog and latitude.
5. Write about daily quality control check of automatic film processor.
6. Write about quality control test of sensitivity.
7. Explain the quality control test of linearity of energy response.
8. Write about daily quality check in dose calibrator.
9. Briefly explain operational check of gamma camera.
10. Write about weekly quality control tests of PET scan.

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Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. Explain in details about various technical performance tests procedures for acceptance of gamma camera.
2. Describe the routine quality control tests procedures for rectilinear scanner.

II. Write notes on:

(10 x 6 = 60)

1. Write about daily quality control tests of dose calibrator.
2. What are the characteristics of dark room?
3. Write about test of counting precision.
4. Write about dark room safe light test procedure.
5. Explain operational check of collimator.
6. Write about constituents of developer.
7. Explain the quality control test of energy calibration.
8. Write about QC phantoms used in nuclear medicine lab.
9. Briefly explain about COR and its QC test.
10. Write about objective of QA.

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Time: Three hours

Maximum: 100 Marks

Answer ALL Questions

I. Elaborate on:

(2 x 20 = 40)

1. a) Enumerate the various acceptance and reference tests of SPECT CT as per NEMA standards.
b) Briefly explain routine quality assurance test of gamma camera.
2. Enumerate the various phantoms used for the acceptance and reference tests of PET CT.

II. Write notes on:

(10 x 6 = 60)

1. Image quality and accuracy of attenuation, scatter correction and quantitation of PET CT.
2. What are the pincushion and barrel distortion effects? How do they differ? How do you correct them?
3. Briefly explain the various Recliner Scanner acceptance and reference tests as per NEMA guidelines.
4. What do you understand about energy linearity of radiation counting devices? How do you perform this test?
5. What is precision and accuracy of counting devices? How do they differ? How do you perform the Chi-Square test?
6. What is the normalization procedure of PET Scanner? How do you perform normalization QA test?
7. What is preventive maintenance? List a few examples of preventive maintenance.
8. Briefly explain various quality assurance tests of isotope calibrator.
9. What is the iso-response curve of the flat field collimator used in thyroid uptake probes? How do you perform this test?
10. What is the dead time of a counting or imaging device? How do you determine the dead time of gamma ray spectrometer?
