

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

[AHS 0122]

JANUARY 2022

Sub. Code: 1853

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSION)

B.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code : 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail about the Biological Effects of Radiation.
2. What is the aim of Radiation Protection? Explain in detail the three principal methods by which the radiation exposure can be minimized.
3. Describe in detail the various steps to obtain registration of an X-ray machine with AERB.

II. Write notes on:

(8 x 5 = 40)

1. Free Air Ionization chamber.
2. Linear Energy Transfer.
3. Sources of Radiation.
4. Explain briefly the procedure for congruence of optical and radiation field test.
5. Good work practice in Diagnostic Radiology.
6. Detector Efficiency.
7. Write briefly the Guidelines to use TLD Badge.
8. What are the Mechanical tests to be performed in CT scanner?

III. Short answers on:

(10 x 3 = 30)

1. Quality factor.
2. Acute exposure.
3. i). Roentgen ii) Flux
4. What is meant by the term Quality Assurance?
5. Any three responsibilities of Licensee.
6. What are the five factors that the attenuation depends on?
7. What is Radiation survey?
8. Radiation Symbol and Warning sign.
9. Define i)HVL ii) TVL
10. Define i) KERMA ii) ALARA.

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

[AHS 0922]

SEPTEMBER 2022

Sub. Code: 1853

(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)

B.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY

THIRD YEAR (Regulation from 2018-2019)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code : 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. What is Personnel Monitoring? Explain in detail the Thermoluminescent dosimeter with neat diagram. Also mention its advantages over film badge.
2. Explain in detail the Quality Assurance procedures for i) Fluoroscopy machine ii) Mammography unit.
3. Define Radiation risk. Explain in detail the types of radiation risks and risk models.

II. Write notes on:

(8 x 5 = 40)

1. GM type survey meter.
2. Effects of Time and Distance in minimizing Radiation exposure.
3. Late somatic effects.
4. Explain the philosophy of radiation protection.
5. The role of Technologist in Radiology Department.
6. Draw the model layout of Computed Tomography room. Calculate the workload of the hospital with 50 patients/day, 3 films/patient and 50mAs per film.
7. Mention the five effects of detectors.
8. Write the dose reduction methods in Pediatric Radiography.

III. Short answers on:

(10 x 3 = 30)

1. i) Absorbed dose ii) Roentgen to Rad conversion factor.
2. Mass Attenuation coefficient.
3. Write two types of Radiation and give examples.
4. Define Occupancy factor.
5. Define Filtration. What are the two types of filtration?
6. What is Radiation Biology?
7. i) eLORA ii) Competent Authority
8. Write three types of Gas filled detectors.
9. i) Ionization ii) Excitation.
10. Controlled and Uncontrolled areas.

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

[AHS 0423]

APRIL 2023

Sub. Code: 1853

B.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019 onwards)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code : 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail about the Biological Effects of Radiation – Stochastic and Deterministic effects, Somatic and Hereditary effects.
2. Explain in detail about Planning and Installation of Computed Tomography (CT) Scan in Diagnostic Radiology Department.
3. Describe in detail the various steps involved to obtain registration of Fixed Digital Radiography (X-ray) Unit.

II. Write notes on:

(8 x 5 = 40)

1. Personnel Monitoring Device.
2. Linear Energy Transfer (LET) / Relative Biological Effectiveness (RBE).
3. Sources of Radiation – Natural Radioactive Source.
4. Explain briefly the procedure for Congruence of Optical and Radiation field test.
5. Good work practice during Radiography procedure in Diagnostic Radiology.
6. G.M. Counters.
7. Area monitor.
8. What are the mechanical tests to be performed in CT scanner?

III. Short answers on:

(10 x 3 = 30)

1. Quality factor / Weighting factor.
2. Acute Exposure.
3. Flux / Exposure.
4. Excitation and Ionization.
5. Any three responsibilities of Employer.
6. What are the methods to protect your patient from Radiation exposure?
7. How will you perform a Radiation Survey for Radiography?
8. Draw a Radiation symbol.
9. Define i) HVL ii) TVL.
10. Define Time-Distance-Shielding (TDS) / ALARA.

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

[AHS 1123]

NOVEMBER 2023

Sub. Code: 1853

B.Sc. RADIOGRAPHY AND IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019 onwards)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code: 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Mention the various detectors used in Radiation detection and measuring devices.
2. Explain in detail the gas filled Radiation detectors.
3. Explain in detail principles of Radiation Protection.

II. Write notes on:

(8 x 5 = 40)

1. Personnel monitoring.
2. Chromosome aberration and biological dosimetry.
3. General guidelines for planning a Radiation facility.
4. How will you test the Beam Alignment in an X-ray unit?
5. What are the responsibilities of Employers?
6. How will you perform Radiation survey in a CT machine room?
7. Acute exposure.
8. Relative Biological Effectiveness.

III. Short answers on:

(10 x 3 = 30)

1. Define Radioactivity and its types.
2. Expand i) AERB ii) ICRP iii) IAEA.
3. Define workload in Diagnostic X-ray unit.
4. Define Equivalent dose.
5. Occupational exposure.
6. Define Annual dose limits for i) Radiation worker ii) Public iii) Trainees.
7. Tube current.
8. Area monitor.
9. Somatic effect.
10. Write any three personnel protective devices.

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

[AHS 0424]

APRIL 2024

Sub. Code: 1853

B.Sc. RADIOGRAPHY & IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019 onwards)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code: 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain in detail about the biological effects of Radiation.
2. Write at least five main Quality Assurance procedures required for a conventional X-ray machine.
3. What is ALARA? Explain various methods to reduce patient dose in Radio diagnosis.

II. Write notes on:

(8 x 5 = 40)

1. AERB specifications for obtaining license for a CT machine.
2. a) Sources of Radiation b) Equivalent dose and Effective dose.
3. Good work practices in CT.
4. AERB regulations on warning signs at a diagnostic X-ray room.
5. Light field and X-ray field alignment test.
6. Primary radiation, scattered radiation.
7. Explain any two Radiation detectors.
8. Planning of X-ray installation.

III. Short answers on:

(10 x 3 = 30)

1. Chromosome aberration.
2. Excitation and Ionization.
3. Types of shielding material.
4. AERB.
5. Phantoms.
6. Type approval.
7. Dose fractionation.
8. Occupational exposure.
9. Use factor.
10. Responsibilities of Radiographer.

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

[AHS 0125]

JANUARY 2025

Sub. Code: 1853

B.Sc. RADIOGRAPHY & IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019 onwards)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS / IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code: 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. The Stochastic Effects of Radiation.
2. The Quality Assurance tests to be performed for a diagnostic X– ray Equipment.
3. The methods to reduce patient Dose in Diagnostic Radiological Procedures.

II. Write notes on:

(8 x 5 = 40)

1. Equivalent dose and Effective dose.
2. The factors affecting Radio-sensitivity.
3. The Principle of Thermo Luminescence Dosimeter.
4. The principle and function of a Radiation Survey meter.
5. The methods of Radiation Exposure Control.
6. Specification of the Layout of Computed Tomography as per AERB Norms.
7. Pregnancy and Radiation Protection.
8. Measurement of Computed Tomography Dose Index.

III. Short answers on:

(10 x 3 = 30)

1. Exposure and its Unit.
2. Effective Dose Limit to Public and Trainee.
3. LD50/60.
4. Chromosomal aberration.
5. Advantages of Pocket Dosimeter.
6. Fluorescence and Phosphorescence.
7. ALARA.
8. Recommended Filtration Thickness.
9. Work load and its unit.
10. International Regulatory Bodies for Radiation Protection.

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

[AHS 0425]

APRIL 2025

Sub. Code: 1853

B.Sc. RADIOGRAPHY & IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019 onwards)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code: 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Explain about the somatic and genetic effects of radiation with example.
2. Describe about the various radiation detectors used in radiology.
3. Write in detail the various steps to obtain registration of an X-ray machine with AERB.

II. Write notes on:

(8 x 5 = 40)

1. How to reduce patient dose in X-ray studies on children.
2. TLD (Thermoluminescent Dosimeter) badge.
3. Maximum permissible dose limits for public and radiation worker.
4. Primary radiation and Leakage radiation.
5. Field congruence test.
6. Work load.
7. Determination of focal spot size.
8. Background radiation exposure.

III. Short answers on:

(10 x 3 = 30)

1. ALARA.
2. Mobile X-ray unit exposure cable length.
3. Shielding materials for X-ray and Gamma rays.
4. Relationship between time and exposure.
5. Inverse square law.
6. Effective dose.
7. Survey meter.
8. International agencies responsible for radiation safety.
9. Three steps of quality control.
10. Chromosome aberration.

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

[AHS 1125]

NOVEMBER 2025

Sub. Code: 1853

B.Sc. RADIOGRAPHY & IMAGING TECHNOLOGY

THIRD YEAR (Regulation 2018-2019 onwards)

**PAPER III – QUALITY CONTROL, RADIOBIOLOGY & RADIATION SAFETY
IN RADIODIAGNOSIS/IMAGING OTHER THAN X-RAY RELATED**

Q.P. Code: 801853

Time: Three hours

Answer ALL Questions

Maximum: 100 Marks

I. Elaborate on:

(3 x 10 = 30)

1. Describe the procedure and methods of AERB regulatory requirements to design a diagnostic X-ray installation with neat diagram.
2. Explain in detail about the categories of harmful effects of Radiation.
3. Write with diagram of Quality Assurance procedures required for a conventional X-ray machine.

II. Write notes on:

(8 x 5 = 40)

1. Central Beam alignment test.
2. Principle and working of a pocket dosimeter.
3. Dose limits for occupational worker and public.
4. Good Work Practices in CT.
5. Primary and scattered radiation.
6. How to monitor radiation dose to patient in fluoroscope and CT.
7. GM counter.
8. Table top dose measurement.

III. Short answers on:

(10 x 3 = 30)

1. Grid ratio.
2. Contamination monitor.
3. Inverse square law.
4. Work load.
5. Densitometer.
6. Define Roentgen.
7. Mutation.
8. Annual dose limit of pregnant radiation worker.
9. Equivalent dose.
10. Warning light and placard.
