

April-2001

[KD 143]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

(Revised Regulations)

Branch VIII — Radio Diagnosis

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. (a) What is the principle of MRI? (5)
(b) Describe with the help of diagram the various parts of an MRI system and its working. What are the advantages over CT? (20)
 2. (a) Define Isotope and Isomer. (5)
(b) Explain with diagram the working of a scintillation detector system for gamma detection. (20)
 3. Write short notes on : (5 × 10 = 50)
 - (a) Ultrasound transducers.
 - (b) Compton effect.
 - (c) Film Badge.
 - (d) X ray grids.
 - (e) D.S.A.
-

November-2001

[KE 143]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

(Revised Regulations)

Branch VIII — Radiodiagnosis

Part II — Preliminary

MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIODIAGNOSIS

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. Describe in detail mammography. Explain the different image receptors employed. (25)
 2. Describe the various processes by which X rays interact with matter. (25)
 3. Write short notes on : (5 × 10 = 50)
 - (a) Doppler ultrasonography.
 - (b) PET.
 - (c) Grids.
 - (d) Film badge.
 - (e) Cine radiography.
-

September-2002

[KH 143]

Sub. Code : 2039

M.D. DEGREE EXAMINATION.

(Revised Regulations)

Branch VIII — Radio Diagnosis

Part II — Preliminary

**MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. Describe in detail various protective measures in diagnostic and therapy departments. (25)
2. What are X-rays? Describe with neat diagram the construction and working of modern X-ray tube. (25)
3. Write short notes on : (5 × 10 = 50)
 - (a) Resistances in series and parallel
 - (b) Tube rating charts
 - (c) Factors affecting radio graphic quality
 - (d) Photo multiplier tube
 - (e) Cyclotron.

April-2003

[KI 143]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

(Revised Regulations)

Branch VIII — Radiodiagnosis

Part II — Preliminary

**MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. Briefly outline the various physical principles involved in X-ray therapy. (25)
 2. Describe the working of a scintillation counter for detecting gamma rays. (25)
 3. Write short notes on : (5 × 10 = 50)
 - (a) Half life and average life
 - (b) Radio active equilibrium
 - (c) Capacitors in series and parallel
 - (d) Greniacher and Villard circuit
 - (e) Tele CO⁶⁰ unit.
-

[KJ 143]

Sub. Code : 2040

Short notes questions :

(10 × 5 = 50)

M.D. DEGREE EXAMINATION.

(Revised Regulations)

Branch VIII — Radiodiagnosis

Part II — Preliminary

**MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Theory : Two hours and
forty minutes

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

M.C.Q. must be answered **SEPARATELY** on the
answer sheet provided as per the instructions on the
first page.

Answer ALL questions.

Draw suitable diagrams wherever necessary.

Essay Questions :

(2 × 15 = 30)

1. Analyse the characteristic curve of an X-ray film.
2. Discuss different radioactive isotopes used for medical imaging.

3. (a) Silverless radiology department.
(b) TLD as a personnel monitoring device.
(c) Detectors used in CT scanner.
(d) Bucky factor and grid ratio.
(e) Heel effect and its importance.
(f) Dedicated mammography X-ray units.
(g) Rare earth screens.
(h) Developer and its ingredients.
(i) Different types of cassettes.
(j) High frequency X-ray units.

[KM 143]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

Branch VIII — Radiodiagnosis

Part II — Preliminary

**MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams whenever necessary.

I. Essay questions : (2 × 15 = 30)

(1) Discuss in detail on interaction of X-rays with matter.

(2) Discuss the basic principles of localisation of foreign bodies and tomography.

II. Short note questions : (10 × 5 = 50)

(a) Natural and artificial radioactivity

(b) Full wave rectification

(c) Tube rating

(d) Protective barriers

(e) Filters in Radiology

(f) Quality of X-rays

(g) Cones and grids

(h) Conductors and insulators

(i) Transformers

(j) Timers.

[KO 143]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

Branch VIII — Radiodiagnosis

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO DIAGNOSIS

Time : Three hours **Maximum : 100 marks**

Theory : Two hours and forty minutes	Theory : 80 marks
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M.C.Q. : Twenty minutes M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I. Essay questions : (2 × 15 = 30)

(1) Describe the various interactions of X-rays with matter.

(2) Describe the various methods of radiation protection and Radiation personnel monitoring available.

II. Short notes questions : (10 × 5 = 50)

- Characteristic X-Radiation
- Rotating anode
- Linear Accelerator

- (d) I-131 Therapy
- (e) Spin lattice relaxation time
- (f) CT numbers
- (g) Piezo electric effect
- (h) Image intensifier
- (i) X-ray film processing
- (j) Filters.

[KP 143]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

Branch VIII — Radiodiagnosis

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIODIAGNOSIS

Time : Three hours **Maximum : 100 marks**

Theory : Two hours and forty minutes

M.C.Q. : Twenty minutes **M.C.Q. : 20 marks**

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I. Essay questions :

(1) (a) Explain the importance of Quality Assurance tests in Diagnostic radiology.

(b) Discuss various quality assurance tests and test stools required in Diagnostic Radiology. (20)

(2) (a) Explain the functions of each layer of Medical X-ray film.

(b) Discuss principles and functions of intensifying screen.

(c) What are the various steps in film processing? (15)

(3) Outline the process by which X-rays are produced in an X-ray tube? What are the various factors which influence the X-ray emission spectrum? (15)

II. Short notes : (6 × 5 = 30)

- (a) Grids and Grid ratio
- (b) Characteristic curve
- (c) Latent image formation
- (d) Gamma camera
- (e) Line focus principle
- (f) Grinacher X-ray Circute

[KQ 133]

Sub. Code : 2040

M.D. DEGREE EXAMINATION.

Branch VIII — Radio Diagnosis

**MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Common to

Part II — (Preliminary/New/Revised Regulations)

(Candidates admitted from 1988–89 onwards)

and

Paper I (for candidates admitted from 2004–2005 onwards)

Time : Three hours

Maximum : 100 marks

**Theory : Two hours and
forty minutes**

Theory : 80 marks

M.C.Q. : Twenty minutes

M.C.Q. : 20 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

I. Essay :

1. Explain the physical principle of Computerised Tomography (CT) and describe its technological evolution to the present status. What are the clinical advantages of the new generation scanner? (20)

2. What is Doppler Effect? Describe its major medical applications based on the spectral waveform. What are the factors that affect Doppler signal? (15)

3. What are the different factors that influence the quality of a radiograph? Describe the different contrast enhancement techniques. (15)

II. Short notes : (6 × 5 = 30)

- (a) Vignetting and pincushion effect.**
- (b) Magnetic Resonance Spectroscopy.**
- (c) Renogram.**
- (d) Molybdenum target X ray tube.**
- (e) Effective half life.**
- (f) Contrast media in ultrasound imaging.**

MARCH 2008

[KS 136]

Sub. Code : 2031

M.D. DEGREE EXAMINATION.

Branch VIII — Radio Diagnosis

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO
DIAGNOSIS

(Common to all Regulations)

Q.P. Code : 202031

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

Draw suitable diagrams wherever necessary.

- I. Essay : (2 × 20 = 40)
1. Write the principle of colour doppler. What are the causes of deep vein thrombosis? Discuss merits and demerits of various imaging modalities used in evaluation of DVT? (20)
 2. What are scattered radiations? What is its significance in radiography? What are the methods to reduce scattered radiations? (20)
- II. Short notes : (10 × 6 = 60)
1. Principle digital subtraction angiography DSA.
 2. Replenisher.
 3. Three phase generators.
 4. Inverse square law.
 5. Comptons effect.
 6. Phase transformer.
 7. Capacitors.
 8. Factors on which quality of X rays depend.
 9. Rotating anode.
 10. Grid.
-

March 2009

[KU 136]

Sub. Code: 2031

M.D. DEGREE EXAMINATION
Branch VIII – RADIO DIAGNOSIS
(Common to all candidates)

Paper I – MEDICAL RADIATION PHYSICS AS APPLIED
TO RADIO DIAGNOSIS
Q.P. Code : 202031

Time : Three hours

Maximum : 100 marks

Draw suitable diagram wherever necessary.

Answer ALL questions.

I. Essay questions : **(2 x 20 = 40)**

1. Discuss the various factors that control the sharpness of “Radiographic Image”.
2. **a)** Describe the construction of the transducer used in ultrasonography.
b) Discuss briefly about the various transducers used in ultrasound imaging.

II. Write short notes on : **(10 x 6 = 60)**

1. Dark room construction.
2. Focal spot in a x-ray tube.
3. Intensifying screens.
4. Xero-Radiography.
5. Macro radiography.
6. Radiation protection in diagnostic radiology.
7. Grid cassette.
8. Static marks.
9. Daylight automatic processing unit.
10. Rectifiers.

March 2010

[KW 136]

Sub. Code: 2031

M.D. DEGREE EXAMINATION

Branch VIII – RADIO DIAGNOSIS

**Paper I – (for candidates admitted upto 2007-2008) and
Part I – (for candidates admitted from 2008-2009 onwards)**

**MEDICAL RADIATION PHYSICS AS APPLIED
TO RADIO DIAGNOSIS**

Q.P. Code : 202031

Time : Three hours

Maximum : 100 marks

Draw suitable diagram wherever necessary.

Answer ALL questions.

I. Essay questions :

(2 x 20 = 40)

1. What are the factors affecting radiographic quality? How to improve the radio graphic quality?
2. X-ray of both hands including forearms as an index of systemic diseases. Discuss in detail.

II. Write short notes on :

(10 x 6 = 60)

1. Avascular necrosis.
2. Digital radiography.
3. Pulmonary embolism.
4. Contrast media.
5. Ewings sarcoma.
6. Cold abscess pathway – cervical to caudal.
7. Aorto arteritis.
8. Intussusception.
9. X-ray filters.
10. Pulmonary alveolar microlithiasis.

MAY 2011

[KY 136]

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO DIAGNOSIS

Q.P. Code : 202031

**Time : 3 hours
(180 Min)**

Maximum : 100 marks

Answer ALL questions in the same order.

I. Elaborate on :

Pages (Max.)	Time (Max.)	Marks (Max.)
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1. Describe the X-ray tube and function of each part with help of a diagram. What are the various types and recent advances in X-ray tubes?

11	35	15
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2. Explain the various steps involved in X-ray film processing. Discuss the formation of latent image, its development and fixation.

11	35	15
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II. Write notes on :

1. MR Angiography.

4	10	7
---	----	---

2. Attenuation Correction.

4	10	7
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3. Filters.

4	10	7
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4. Automatic Brightness Control.

4	10	7
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5. Multidetector CT.

4	10	7
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6. Scatter radiation.

4	10	7
---	----	---

7. CR vs DR.

4	10	7
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8. Maximum permissible dose.

4	10	7
---	----	---

9. Ultrasound artifacts.

4	10	7
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10. Harmonic imaging.

4	10	7
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April 2012

[LA 136]

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO DIAGNOSIS

Q.P. Code : 202031

**Time : 3 hours
(180 Min)**

Maximum : 100 marks

Answer ALL questions in the same order.

I. Elaborate on :

	Pages (Max.)	Time (Max.)	Marks (Max.)
1. Describe the Physical Principles of MDCT.	16	35	15
2. Discuss the various factors that affect the radiographic image.	16	35	15

II. Write notes on :

1. What are the types of Rectifiers? Describe its function.	4	10	7
2. Give a note on Compton effect.	4	10	7
3. Describe the functioning of Gamma Camera.	4	10	7
4. Give an account on Modern Laser Dry Imagers.	4	10	7
5. What do you mean by ALARA Principle (As Low as Reasonably Achievable).	4	10	7
6. Discuss in detail Stochastic effects of Radiation.	4	10	7
7. Describe the principle of Magnetic Resonance Angiography.	4	10	7
8. Write notes on Ultrasound transducer.	4	10	7
9. What are the common MRI artifacts? Discuss about Magic angle phenomenon.	4	10	7
10. Compare stationary and Rotating Anode, give the advantages of the latter.	4	10	7

(LC 136)

APRIL 2013

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII –RADIO DIAGNOSIS

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO DIAGNOSIS

Q.P.Code: 202031

Time: Three Hours

Maximum: 100 marks

I. Elaborate on:

(2X15=30)

1. Describe the Physical Principles of MRI.
2. Explain the functions of each layer of medical X-ray film. Discuss Principles and functions of intensifying screens and the steps in film processing.

II. Write notes on:

(10X7=70)

1. What does Inverse square Law state and give its application.
2. Discuss about photoelectric effect and its clinical applications.
3. Describe Hounsfield number.
4. Discuss the interaction between ultrasound and matter.
5. Discuss the function of image intensifier.
6. Describe with a neat sketch, about a Thermoluminescent dosimetry (TLD Badge)
7. Discuss the functioning of Automatic Processor.
8. Discuss vital parameters of Spiral CT
9. Write notes on Doppler Physics.
10. What are the advanced techniques in ultrasound machines. Describe tomographic ultrasound imaging (TUI).

[LG 136]

APRIL 2015

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P.Code: 202031

Time: Three Hours

Maximum: 100 marks

Answer ALL questions

I. Elaborate on:

(2 x 15 = 30)

1. Discuss in detail a modern X-ray tube and write about X-ray artifacts.
2. Discuss in detail radiation protection and patient doses in diagnostic imaging.
Write a note on dose reduction in CT.

II. Write notes on:

(10 x 7 = 70)

1. Window level and Window width.
2. Piezoelectric effect and its clinical applications.
3. Heel effect and its role in mammography.
4. Half value layer.
5. Radiation units.
6. Photoelectric effect
7. Computed Radiography.
8. Beam restrictors.
9. Digital radiography (DR).
10. Physics of MRI principles.

[LI 136]

APRIL 2016

Sub. Code: 2031

**M.D. DEGREE EXAMINATION
BRANCH VIII – RADIO DIAGNOSIS
PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code :202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe basic physics of mammography imaging. Write about various views and interpretations in it.
2. What is sharpness in radiography? Classify unsharpness. Write about factors affecting radiographic images quality.

II. Write notes on:

(10 x 7 = 70)

1. Artifacts in CT imaging.
2. Inverse square law and its clinical application.
3. Composition of ultrasound gel and its role.
4. Physics of ultrasound elastography.
5. Evaluation of grid performance.
6. Computed Radiography.
7. Principles of MRI imaging.
8. Annihilation coincidence detection.
9. Radiology Information System (RIS).
10. Film gamma.

[LJ 136]

OCTOBER 2016

Sub. Code: 2031

**M.D. DEGREE EXAMINATION
BRANCH VIII – RADIO DIAGNOSIS**

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code :202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Mention the types of interaction of X-rays with matter. Describe stochastic and deterministic effects. Write a note on personal dosimeter devices in use.
2. Describe the principle and design of a PET-CT system. What are the precautions to be taken while handling radio-nuclides?

II. Write notes on:

(10 x 7 = 70)

1. Linear attenuation co-efficient.
2. Conventional X-ray film.
3. X-ray mammography Equipment.
4. X-ray tube focal spot.
5. Doppler principle.
6. Larmor frequency.
7. Artifacts in Computed tomography.
8. Inversion recovery pulse sequence.
9. Image Intensifier Tube.
10. MR spectroscopy principles.

[LK 136]

MAY 2017

Sub. Code: 2031

**M.D. DEGREE EXAMINATION
BRANCH VIII – RADIO DIAGNOSIS**

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code :202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the Physical Principles of MRI.
2. Digital Radiography and Computerised Radiography.

II. Write notes on:

(10 x 7 = 70)

1. Discuss the function of image intensifier.
2. Thermoluminescent dosimetry (TLD Badge).
3. What are the advanced techniques in ultrasound machines?
4. Digital Subtraction Angiography.
5. Give a note on Compton effect.
6. What do you mean by ALARA Principle (As Low as Reasonably Achievable)?
7. X ray Artifacts.
8. X ray Tube.
9. Filters.
10. Describe the various radiation protection aprons with regards to the materials used for manufacturing.

[LL 136]

OCTOBER 2017

Sub. Code: 2031

**M.D. DEGREE EXAMINATION
BRANCH VIII – RADIO DIAGNOSIS**

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code :202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Construction of conventional X-ray Tube, Dedicated digital X-ray advantages.
2. Describe the phenomenon of nuclear magnetic resonance. Describe the salient parts of a superconducting MRI system.

II. Write notes on:

(10 x 7 = 70)

1. Role of collimators and filters in Radiology.
2. CT dose index.
3. Interaction of ultrasound with matter.
4. Anode heel effect.
5. Image reconstruction Algorithms in CT.
6. Diffusion weighted images in MRI.
7. Compton scatter.
8. Intensifying screens.
9. Characteristic curve of X-ray mammography.
10. Radiation dose limits for patients and radiation worker.

[LM 136]

MAY 2018

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code :202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Various imaging techniques in Cathlab.
2. Describe the Physical Principles of MDCT.

II. Write notes on:

(10 x 7 = 70)

1. Describe Hounsfield number.
2. Describe the principle of Magnetic Resonance Angiography.
3. Write notes on Ultrasound transducer.
4. What are the common MRI artifacts?
5. Compare stationary and Rotating Anode.
6. Radiation protection gadgets in Interventional Radiology.
7. Ultrasound artifacts.
8. CR vs DR.
9. Scatter radiation.
10. Image intensifier.

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Discuss the principles and physics of ultrasound and Doppler imaging.
2. Planning radiology department for a 750 bedded multi-specialty hospital.

II. Write notes on:

(10 x 7 = 70)

1. Dark room plan for wet processing of X-ray films.
2. Spin echo sequence.
3. X-ray films – Types and characteristics.
4. The ways to minimize radiation for children during radiographic investigations.
5. Safety precautions during MRI.
6. Spiral CT.
7. Discuss the artefacts in MR imaging.
8. Rotating anode X-ray tube.
9. Photoelectric effect.
10. PACS in a Radiology Dept.

[LO 136]

MAY 2019

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the basic principles of MRI. Discuss briefly about T1 and T2 relaxation and its utility in MRI.
2. Describe the different types of contrast media reactions. Discuss briefly the precautions to be taken to avoid these reactions and their management.

II. Write notes on:

(10 x 7 = 70)

1. 3D and 4D ultrasound.
2. Personal dosimeters.
3. What are grids? Classify them and discuss their utility in imaging.
4. Methods to reduce radiation dose in CT.
5. Acoustic Radiation Force Impulse (ARFI) imaging.
6. Hepatobiliary-specific MRI contrast agents.
7. CT artifacts.
8. Principle and utility of MR spectroscopy.
9. Tissue Harmonic Imaging.
10. X-ray beam restriction devices.

[LP 136]

OCTOBER 2019

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Enumerate the differences between Film-Screen Radiography, Computed Radiography and Digital Radiography.
2. Briefly describe a superconducting MRI magnet with a neat diagram. List various coils involved in imaging with their specific uses.

II. Write notes on:

(10 x 7 = 70)

1. Dual energy CT.
2. Time, Distance, Shielding.
3. Image resolution in radiography.
4. Ultrasound artifacts – How to rectify?
5. Filters.
6. Cone beam CT.
7. Factors that affect Doppler signal and spectrum.
8. Grid: types and uses.
9. FAT suppression technique in MRI.
10. Barium as a contrast agent.

[LQ 136]

**AUGUST 2020
(MAY 2020 SESSION)**

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. What is the basic principle of MDCT (Multi detector computed tomography)?
Add a detailed note about detectors used in it.
2. Enumerate the various interactions of X – ray with matter. Describe any three interactions in detail

II. Write notes on:

(10 x 7 = 70)

1. Quench and its implications.
2. ALARA Principle (As low as reasonably achievable)
3. Structure and principle of intensifying screens.
4. Anaesthesia in MRI.
5. Discuss the function of image intensifier
6. Automatic film processor
7. PCPNDT act
8. Nephrogenic systemic fibrosis
9. Differences between a conventional X-ray tube and mammography tube
10. Role of USG in intussusception

[LS 136]

**NOVEMBER 2020
(OCTOBER 2020 SESSION)**

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Discuss the Biological effects of Radiations and the measures taken against its protection for Radiation workers and patients in Radio-diagnosis dept.
2. Describe the principles of acoustics applicable to ultrasound. Construction of transducers and write a note on the various ultrasonography controls

II. Write notes on:

(10 x 7 = 70)

1. AERB (Atomic energy regulatory board) Guidelines for X- ray and CT installation
2. MRI artefacts. How to rectify them in the study?
3. Half value layer
4. Anode heel effect.
5. Role of Phosphorescence in Radiology
6. PACS in radiology
7. Physical principles of PET-CT. Discuss the role of PET in post treatment evaluation of lymphoma.
8. Various views for Paranasal sinuses
9. Compare stationary and rotating anode, Describe the advantages of rotating anode.
10. MR angiography technique.

[MD 0721]

**JULY 2021
(MAY 2021 SESSION)**

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the physics of conventional fluoroscopy, flat panel with DSA. The differences and indications for single plane and by plane fluoroscopy.
2. Quality checking in radiology, auditing and accreditations pertaining to radiology departments.

II. Write notes on:

(10 x 7 = 70)

1. Physics of PET.
2. Artifacts related to X-ray and how to rectify them.
3. Advanced ultrasound techniques.
4. MDCT.
5. Mobile radiography.
6. Maximum permissible dose.
7. Fast sequences in MRI.
8. Collimators.
9. MRI Hazards.
10. Tomosynthesis.

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

[MD 1121]

**NOVEMBER 2021
(OCTOBER 2021 SESSION)**

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Described the physics of Ultrasound. Enumerate the advanced techniques and the physics behind them.
2. Image optimization in radiology.

II. Write notes on:

(10 x 7 = 70)

1. Contrast during pregnancy and Lactation.
2. Artifacts related to MRI and how to rectify them.
3. Legislations related to Radiology department.
4. Post processing techniques in CT.
5. PACS.
6. Physical parameters of MRI contrast.
7. Physics of SPECT.
8. Screen film Cassette.
9. TLD.
10. Digital 3D Mamography.

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[MD 0522]

MAY 2022

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. National and international various regulatory boards in radiology and their regulations.
2. Various MR Angiographic sequences with special reference to May Thurner syndrome.

II. Write notes on:

(10 x 7 = 70)

1. Pre Conception and pre natal Diagnostic Technique Act.
2. Detector system in Filmless technique.
3. DEXA Scan in osteoporosis.
4. Doppler physics with special notes on Renal transplant.
5. Artifacts in helical CT.
6. MRI Gradient sequences.
7. Filters in mammogram.
8. Heel effect.
9. What are the types of Grid? Write notes on Grid ratio.
10. Brief notes on photo electric effect and Compton scattering.

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[MD 0723]

**JULY 2023
(MAY 2023 EXAM SESSION)**

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Describe the various measures and planning necessary for installation of 1.5 Tesla MR Machine.
2. Describe in detail the principle of Ultrasound Elastography and their clinical applications.

II. Write notes on:

(10 x 7 = 70)

1. CT Angiography Techniques.
2. Factors affecting quality of X-Ray.
3. Rare earth screens.
4. Types of Grid and their uses.
5. Various inversion recovery sequences and clinical applications.
6. Digital Radiography.
7. Weight bearing views in X-Rays.
8. Post processing methods in CT.
9. Mobile Radiographic Equipment
10. Meniere's disease.

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

[MD 1223]

**DECEMBER 2023
(OCTOBER 2023 EXAM SESSION)**

Sub. Code: 2031

M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

**PAPER I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO DIAGNOSIS**

Q.P. Code: 202031

Time : Three Hours

Maximum : 100 Marks

I. Elaborate on:

(2 x 15 = 30)

1. Practical aspects of Radiation protection with special references to patient doses of dose assessment.
2. HRCT Techniques and protocols. Write about image quality, artifacts in HRCT and Protocols of HRCT Temporal bone.

II. Write notes on:

(10 x 7 = 70)

1. Atomic Energy Regulatory Board and eLORA Guidelines.
2. Mammogram techniques and Equipment.
3. Physics of CT PET.
4. Artifacts of Doppler imaging.
5. Diffusion weighted imaging.
6. Ultrasound Probe.
7. Personal dosimetric devices.
8. Interaction of X- Rays with matters.
9. Step up and step down transformer.
10. MRI Artifacts.
