

APRIL 2001

[KD 1514]

Sub. Code : 3019

**DIPLOMA IN MEDICAL RADIOLOGY — DIAGNOSIS
EXAMINATION.**

(New Regulations)

**Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIODIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. Discuss in brief the biological effects of radiation on man and the measures taken for radiation protection in a department of Radiodiagnosis. (25)
 2. Discuss the basic physical principles and the recent advances in Ultrasonography. (25)
 3. Write short notes on the following : (5 × 10 = 50)
 - (a) Rotating anode tube
 - (b) Digital subtraction angiography
 - (c) Intensifying screen
 - (d) Automatic film processor
 - (e) Adverse reaction to contrast material.
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NOVEMBER 2001

[KE 1514]

Sub. Code : 3019

**DIPLOMA IN MEDICAL RADIOLOGY – DIAGNOSIS
EXAMINATION.**

(New Regulations)

**Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIODIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Attempt ALL questions.

1. Describe the principle and construction of image intensifier. (25)
 2. Discuss the physical principles of spiral CT and its role in present day imaging. (25)
 3. Write short notes on the following : (5 × 10 = 50)
 - (a) Grids
 - (b) Principle of MRI
 - (c) Focal spot of X Ray tube
 - (d) Scattered radiation
 - (e) High KV radiography.
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MARCH 2002

[KG 1514]

Sub. Code : 3019

**DIPLOMA IN MEDICAL RADIOLOGY – DIAGNOSIS
EXAMINATION.**

(New Regulations)

Part I

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

Time : Three hours Maximum : 100 marks

Answer ALL questions.

1. What is rectification? Discuss the solid state rectifiers. How do you test the working of rectifier system. (25)

 2. Describe the X ray tube with the help of a diagram. How are X rays produced from an X ray tube. (25)

 3. Write short notes on the following : (5 × 10 = 50)
 - (a) Characteristic curve of X ray.
 - (b) Autotransformer.
 - (c) Intensifying screens.
 - (d) Half value layer.
 - (e) X ray grids.
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SEPTEMBER 2002

[KH 1514]

Sub. Code : 3019

**DIPLOMA IN MEDICAL RADIOLOGY-DIAGNOSIS
EXAMINATION.**

(New Regulations)

Part - I

**Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIO DIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. How do X rays and γ rays interact with matter? Comment on the various factors affecting the interaction processes. (25)
 2. Describe the construction and working of a rotating anode X ray tube. How does the cooling of target takes place? (25)
 3. Write short notes on : (5 × 10 = 50)
 - (a) Filtration.
 - (b) Antiscatter grids.
 - (c) Structure of a radiographic film.
 - (d) Atomic structure.
 - (e) Maximum permissible doses.
-

APRIL 2003

[KI 1514]

Sub. Code : 3019

**DIPLOMA IN MEDICAL RADIOLOGY –
DIAGNOSIS EXAMINATION.**

(New Regulations)

Part I

**Paper I – MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIODIAGNOSIS**

Time : Three hours

Maximum : 100 marks

Answer ALL questions.

1. Rotating anode tubes — Describe various parts and explain its functioning. How these are helpful to achieve quality radiographs? (25)
 2. Explain various steps involved in X-ray film processing. Discuss the theory of latent image, its development and fixing. (25)
 3. Write short notes on the following : (5 × 10 = 50)
 - (a) Intensifying screens
 - (b) Half wave and full wave rectification
 - (c) Personnel monitoring devices
 - (d) Reflection and transmission type targets
 - (e) Photomultiplier tube.
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FEBRUARY 2005

[KM 1514]

Sub. Code : 3019

DIPLOMA IN MEDICAL RADIOLOGY DIAGNOSIS
EXAMINATION.

(New Regulations)

Part I

Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIODIAGNOSIS

Time : Three hours Maximum : 100 marks

Theory : Two hours and Theory : 80 marks
forty minutes

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) (a) Explain the basic physical principles
involved in getting a diagnostic X ray radiographic film.

(b) Explain in detail how the scattered
radiation affect the images in diagnostic radiology and
enumerate the methods to reduce the scattered
radiation.

(2) (a) Write in detail construction of X ray tube
with diagram.

(b) Explain self, half and full wave
rectification with suitable circuit diagram.

II. Short notes : (10 × 5 = 50)

- (a) Use of Ammeter and voltmeter.
- (b) Conductors and insulators.
- (c) Resistances in series and parallel.
- (d) Pair production.
- (e) Tube rating.
- (f) Fluorescence.
- (g) Atomic structure.
- (h) Radioactive equilibrium.
- (i) Protective measures in diagnostic department.
- (j) Dark adaptation.

MARCH 2007

[KQ 1514]

Sub. Code : 3019

DIPLOMA IN MEDICAL RADIO-DIAGNOSIS
EXAMINATION.

Paper I — MEDICAL RADIATION PHYSICS AS
APPLIED TO RADIO-DIAGNOSIS

Common to

(Candidates admitted from 1993-94 onwards)

And

(Candidates admitted from 2004-05 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 the questions.

Draw suitable diagrams wherever necessary.

I. Essay :

1. Discuss the disadvantages of conventional fluoroscopy. Explain the principle and design of Image Intensifier tube. Enumerate I.I. tube's advantages. (20)

2. Describe the interaction of ionizing radiation with matter. Discuss the role of beam limiting devices in Radiology. (15)

3. Discuss principle, construction, working of Gamma Camera. (15)

II. Short notes : (6 × 5 = 30)

(a) X-ray tube rating

(b) High KV technique

(c) Film speed, contrast, fog level

(d) Electromagnetic radiations

(e) Grids

(f) Natural and artificial radioactivity.

MARCH 2008

[KS 1514]

Sub. Code : 3019

DIPLOMA IN MEDICAL RADIO-DIAGNOSIS (DMRD)
EXAMINATION.

Paper I — MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIO-DIAGNOSIS

Common to all regulations

Q.P. Code : 343019

Time : Three hours

Maximum : 100 marks

Draw diagram's wherever necessary.

Answer ALL questions.

- I. Write Essay on : (2 × 20 = 40)
1. Discuss the Physical Principles of Magnetic Resonance Imaging.
 2. Discuss the Physical Principles of Ultrasonography.
- II. Write short notes on : (10 × 6 = 60)
1. Composition of Fixer
 2. Computed Radiography System.
 3. X – Ray tube.
 4. Multislice Computed Tomography.
 5. Intensifying screens.
 6. Safe lights.
 7. Fluoroscopy.
 8. Grids.
 9. Artefacts in MRI.
 10. High resolution CT.
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MARCH -2009

[KU 1514]

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION.**

**Paper I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIODIAGNOSIS**

(Common to all candidates)

Q.P. Code : 343019

Time : Three hours

Maximum : 100 marks

Draw suitable diagram wherever necessary.

Answer ALL questions.

I. Essay questions : (2 X 20 = 40)

1. Discuss the physical principles of multislice CT and its major applications.
2. Describe the properties of X-rays, its harmful effects and its prevention.

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

1. Intracavitary ultrasound.
2. Automatic processing unit.
3. Principles and working of MR angiography.
4. Ultra sound transducers and their applications.
5. TLD Badge.
6. Colour Doppler Imaging.
7. PET.
8. MR spectroscopy.
9. Artefacts in conventional radiography.
10. Digital subtraction angiography.

September - 2009

[KV 1514]

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION.**

**Paper I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIODIAGNOSIS**

(Common to all candidates)

Q.P. Code : 343019

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 hazards of radiation? What are the methods of radiation protection in diagnostic radiology?
2. Discuss the physical principles of Doppler imaging.

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

1. MR contrast media.
2. Computerized radiography.
3. Transformers.
4. Automatic processing unit.
5. Image intensifier.
6. 3D ultra sound.
7. Contrast media osmolarity.
8. Ultrasound transducer.
9. Cassettes.
10. CT fluoroscopy.

March 2010

[KW 1514]

Sub. Code: 3019

DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)

EXAMINATION

Paper I – MEDICAL RADIATION PHYSICS AS APPLIED

TO RADIODIAGNOSIS

(Common to all candidates)

Q.P. Code : 343019

Time : Three hours

Maximum : 100 marks

Draw suitable diagram wherever necessary

Answer ALL questions

I. Essay questions :

(2 x 20 = 40)

1. Discuss the interaction of x-rays with matter.
2. Discuss the physical principles of MDCT.

II. Write short notes on :

(10 x 6 = 60)

1. GRIDS.
2. Dark room artifacts.
3. PACS.
4. Digital mammography.
5. Rectifiers.
6. Intensifying screens.
7. Heel effect.
8. USG contrast media.
9. Automatic processor.
10. MR spectroscopy.

[KX 1514]

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION.**

**Part I / Paper I – MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIODIAGNOSIS**

(Common to all candidates)

Q.P. Code : 343019

Time : Three hours

Maximum : 100 marks

**Draw suitable diagram wherever necessary.
Answer ALL questions.**

I. Essay questions : (2 X 20 = 40)

1. Discuss the physical principles and advances in Computed Tomography.
2. Enumerate constituents of developer and fixer. Explain how radiographic image is formed on a film.

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

1. Digital Radiography.
2. Biological effects of radiation.
3. Factors affecting quality of image.
4. Principles of image intensifier.
5. Basic principles of MRI.
6. Filters.
7. Non ionic intravenous contrast media.
8. Fluoroscopy.
9. Ultrasonography probe.
10. Artefacts.

APRIL 2011

[KY 1514]

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION**

**MEDICAL RADIATION PHYSICS AS APPLIED TO
RADIODIAGNOSIS**

Q.P. Code : 343019

**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 Gamma Camera in detail. | 11 | 35 | 15 |
| 2. Explain the principles of magnetic resonance imaging. Explain T1 and T2 relaxations and describe the pulse sequences commonly used in imaging. | 11 | 35 | 15 |

II. Write notes on :

| | | | |
|-----------------------------------|---|----|---|
| 1. Ultrasound transducers. | 4 | 10 | 7 |
| 2. High KV technique. | 4 | 10 | 7 |
| 3. Physics of Doppler ultrasound. | 4 | 10 | 7 |
| 4. X-ray film processing. | 4 | 10 | 7 |
| 5. Superconducting magnet in MRI. | 4 | 10 | 7 |
| 6. Virtual colonoscopy. | 4 | 10 | 7 |
| 7. PET. | 4 | 10 | 7 |
| 8. MR coils. | 4 | 10 | 7 |
| 9. PACS. | 4 | 10 | 7 |
| 10. Beam hardening effect. | 4 | 10 | 7 |

April 2012

[LA 1514]

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION**

**MEDICAL RADIATION PHYSICS AS APPLIED TO RADIODIAGNOSIS
Q.P. Code : 343019**

**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. Principles of radiation protection. Describe various Parameters which can reduce patient radiation in conventional radiography and fluoroscopy. | 16 | 35 | 15 |
| 2. Describe the interactions of x – ray with matter. Add a note on scatter radiation reduction. | 16 | 35 | 15 |

II. Write notes on :

| | | | |
|---|---|----|---|
| 1. Multipulse multifrequency X – ray. | 4 | 10 | 7 |
| 2. MRI artefacts. | 4 | 10 | 7 |
| 3. Larmor frequency. | 4 | 10 | 7 |
| 4. Cassettes of conventional and dedicated digital radiography. | 4 | 10 | 7 |
| 5. Principles of image intensifier tube. | 4 | 10 | 7 |
| 6. Principles of DWI. | 4 | 10 | 7 |
| 7. Cones on Radiology Department. | 4 | 10 | 7 |
| 8. Modulation Transfer Function. | 4 | 10 | 7 |
| 9. Factors which control quality of X - rays. | 4 | 10 | 7 |
| 10. Half value layer. | 4 | 10 | 7 |

[LB 1514]

OCTOBER 2012

Sub. Code: 3019

DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)

EXAMINATION

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIODIAGNOSIS

Q.P. Code: 343019

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 in detail the interaction of X-rays with Matter. | 16 | 35 | 15 |
| 2. Describe in detail the principles of Multi detector CT. | 16 | 35 | 15 |

II. Write notes on:

| | | | |
|--|---|----|---|
| 1. Processing Steps in Computed Radiography. | 4 | 10 | 7 |
| 2. Composition and functions of Developer and Fixer | 4 | 10 | 7 |
| 3. Methods used to detect Radiation Dose. | 4 | 10 | 7 |
| 4. Different Gradient Sequences used in MRI. | 4 | 10 | 7 |
| 5. Application of Air gap Technique in Radiography. | 4 | 10 | 7 |
| 6. Causes and types of Fog in Radiography | 4 | 10 | 7 |
| 7. Definition, sources and types of Artefacts in MRI. | 4 | 10 | 7 |
| 8. Design and Operation of Single Photon Emission Computed Tomography | 4 | 10 | 7 |
| 9. Basic Doppler systems used in Doppler Sonography | 4 | 10 | 7 |
| 10. Radio isotopes used in Thyroid Scanning. | 4 | 10 | 7 |

(LC 1514)

APRIL 2013

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION**

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIODIAGNOSIS
Q.P. Code : 343019

Time: Three Hours

Maximum: 100 marks

I. Elaborate on:

(2X15=30)

1. Define scatter radiation. Comment briefly on the factors controlling scatter radiation.
2. Define roentgen. Mention various recommendations on Maximum permissible dose for patients and staff members in radiology department.

II. Write notes on:

(10X7=70)

1. Adverse reactions of MR contrast media.
2. Doppler artefacts.
3. Gradient echo sequences.
4. Principles, types of bone densitometry.
5. Describe the basics of BOLD imaging.
6. Principles of ultrasound elastography.
7. Factors which affect the radiographic quality of image.
8. Beam hardening artefacts.
9. Stationary and moving X – rays grids.
10. Primary and secondary radiation.

(LD 1514)

OCTOBER 2013

Sub. Code: 3019

**DIPLOMA IN MEDICAL RADIODIAGNOSIS (DMRD)
EXAMINATION**

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIODIAGNOSIS
Q.P. Code : 343019

Time: Three Hours

Maximum: 100 marks

I. Elaborate on:

(2X15=30)

1. Discuss the factors that affect "Radiographic image."
2. Discuss the physical principles of Doppler imaging.

II. Write notes on:

(10X7=70)

1. Compare computed Radiography versus Digital Radiography.
2. Outline the basic principle in multi slice CT.
3. Principle of Digital subtraction angiography.
4. Write a note on stochastic effects of Radiation.
5. Define Larmour frequency Explain T1 and T2 relaxation times.
6. Write a short note on intensifying screens.
7. Principle of SPECT.
8. Automatic Processing Unit.
9. Describe an ultrasound transducer.
10. Explain Anode Heel effect with a diagram.
