[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 delection.   (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.

[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.

[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.

[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 : $(5 \times 10 = 50)$

    (a) Half life and average life

    (b) Radio active equilibrium

    (c) Capacitors in series and parallel

    (d) Greniacher and Villard circuit

    (e) Tele CO^{60} unit.

[KJ 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

Theory : Two hours and   Theory : 80 marks
      forty minutes

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.

Short notes questions :   (10 × 5 = 50)

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 it's importance.

   (f) Dedicated mammography X–ray units.

   (g) Rare earth screens.

   (h) Developer and it's ingredients.

   (i) Different types of cassettes.

   (j) High frequency X–ray units.

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[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   Theory : 80 marks

forty minutes

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.

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2   **[KM 143]**

[KO 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　　　　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 :　　　　　　$(2 \times 15 = 30)$

　(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 :　　　　$(10 \times 5 = 50)$

　(a)　Characteristic X–Radiation

　(b)　Rotating anode

　(c)　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　　　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 :

(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 omission 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

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[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　　　　　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 :

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.

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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 : $(2 \times 20 = 40)$

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 : $(10 \times 6 = 60)$

1.   Principle digital substraction 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.

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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.

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[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.

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[KY 136]   **Sub. Code: 2031**

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M.D. DEGREE EXAMINATION

BRANCH VIII – RADIO DIAGNOSIS

MEDICAL RADIATION PHYSICS AS APPLIED TO RADIO DIAGNOSIS

Q.P. Code : 202031

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Time : 3 hours   **Maximum : 100 marks**
  (180 Min)

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Answer ALL questions in the same order.

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I. Elaborate on :	Pages (Max.)	Time (Max.)	Marks (Max.)
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
2. Explain the various steps involved in X-ray film processing. Discuss the formation of latent image, its development and fixation.	11	35	15

II. Write notes on :

1. MR Angiography.	4	10	7
2. Attenuation Correction.	4	10	7
3. Filters.	4	10	7
4. Automatic Brightness Control.	4	10	7
5. Multidetector CT.	4	10	7
6. Scatter radiation.	4	10	7
7. CR vs DR.	4	10	7
8. Maximum permissible dose.	4	10	7
9. Ultrasound artifacts.	4	10	7
10. Harmonic imaging.	4	10	7

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