

**DIPLOMA IN RADIOGRAPHY & IMAGING TECHNOLOGY**  
(New Syllabus 2018-2019)  
**FIRST YEAR**  
**PAPER III – X-RAY MACHINES ACCESSORIES & MAINTENANCE**

*Q.P. Code: 841423*

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer All questions.**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. What is rectification? With a diagram describe the Half-Wave Rectification Circuit.
2. Screens – their structure and types.
3. Collimators – their uses and types.

**II. Write notes on:**

**(10 x 5 = 50)**

1. Pottor Bucky System.
2. Tube rating chart.
3. A.E.C. – Automatic Exposure Control.
4. X-ray tube cooling.
5. The target in an X-ray tube.
6. Self Rectification Circuit.
7. Characteristics of the Anode (Target Electrode) in an X-ray tube.
8. Grids and their types.
9. X-ray circuits.
10. Advantage of Focussing cup.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Fluorescence.
2. Gamma Rays.
3. Vacuum tube diode.
4. Types of cassette.
5. Space Charge Effect.
6. Role of vacuum in X-ray tubes.
7. Self rectifying circuit.
8. Fluorescence.
9. Filament circuit.
10. Image intensifier tube.

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**FIRST YEAR**  
**PAPER III – X-RAY MACHINES ACCESSORIES & MAINTENANCE**

*Q.P. Code: 841423*

**Time : Three Hours**

**Maximum : 100 Marks**

**Answer All questions.**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Explain in detail the factors influencing the quality and quantity of x-rays.
2. Explain in detail of image intensifying tube (II Tube) construction and working principle.
3. Explain in detail of modern x-ray tube, construction and working principle.

**II. Write notes on:**

**(10 x 5 = 50)**

1. Line focus principle.
2. Full-wave rectification.
3. X-ray tube housing.
4. Filters and its uses.
5. Characteristic x-rays.
6. Filament circuit.
7. Interaction of electrons with the target.
8. Artifacts during film processing.
9. X-ray beam quality.
10. Thyristor.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Inverse square law.
2. Transformer efficiency.
3. Advantage of 3-phase generator.
4. Fluorescence.
5. X-ray beam quality.
6. Scatter radiation.
7. Image intensifier tube.
8. Automatic exposure control.
9. Half-value layer (HVL).
10. Aperture diaphragm.

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

**[AHS 0321]**

**MARCH 2021**

**Sub. Code: 1423**

**(AUGUST 2020 EXAM SESSION)**

**DIPLOMA IN RADIOGRAPHY AND IMAGING TECHNOLOGY**

**FIRST YEAR (Regulation 2018-2019)**

**PAPER III – X-RAY MACHINES ACCESSORIES & MAINTENANCE**

***Q.P. Code : 841423***

**Time: Three hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. What is transformer? Explain in detail about step-up, step-down and Auto Transformer.
2. Discuss in detail the working and construction of rotating anode X-ray tube.
3. Write a short note on conventional fluoroscopy. Explain the working and construction of image intensifier.

**II. Write notes on:**

**(10 x 5 = 50)**

1. Half wave rectifier circuit.
2. Potter Bucky System.
3. Scatter radiation.
4. Reasons for grid cut-off.
5. Anode heel effect and line focus principle.
6. Cathode ray oscilloscope.
7. Various methods of printing of images in radiology.
8. Types of cassettes.
9. Artifacts during film processing.
10. Space charge effect.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Automatic exposure control.
2. Semiconductor.
3. Steps of manual film processing.
4. X-ray beam quality.
5. Exposure time.
6. Types of grid.
7. Three phase X-ray generator.
8. Galvanometer.
9. Self rectifying circuit.
10. Focal spot size.

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

[AHS 0122]

JANUARY 2022

Sub. Code: 1423

(FEBRUARY 2021 & AUGUST 2021 EXAM SESSION)

**DIPLOMA IN RADIOGRAPHY AND IMAGING TECHNOLOGY  
FIRST YEAR (Regulation 2018-2019)  
PAPER III – X-RAY MACHINES ACCESSORIES & MAINTENANCE  
Q.P. Code : 841423**

**Time: Three hours**

**Answer ALL Questions**

**Maximum: 100 Marks**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. How are x-rays produced? With a suitable diagram describe a Rotating Anode Tube.
2. What are the components of an x-ray generator? Explain “quality” and “intensity” of an X-ray beam. What are the factors that affect the quality of an X-ray beam?
3. Explain in detail of image Intensity Tube (I I Tube) construction and working principle.

**II. Write notes on:**

**(10 x 5 = 50)**

1. X-ray tube cooling.
2. Kilo voltage circuit.
3. Semiconductors.
4. Characteristic x-rays.
5. Off Focus Radiation.
6. Mammography X-Ray tube.
7. Photo Electric effect.
8. Half wave rectifier circuit.
9. Automatic Exposure Control.
10. H.T Transformer.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Half – value layer (HVL).
2. Inverse – square law.
3. Types of x-ray generators.
4. Heel Effect.
5. Earthing.
6. Aperture Diaphragms.
7. Multipulse X-Ray Unit.
8. Grids.
9. Large focal spot.
10. X-ray couch.

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

[AHS 0922]

**SEPTEMBER 2022**

**Sub. Code: 1423**

**(FEBRUARY 2022 & AUGUST 2022 EXAM SESSIONS)**

**DIPLOMA IN RADIOGRAPHY AND IMAGING TECHNOLOGY**

**FIRST YEAR (Regulation from 2018-2019)**

**PAPER III – X-RAY MACHINES ACCESSORIES & MAINTENANCE**

*Q. P. Code: 841423*

**Time: Three hours**

**Maximum : 100 Marks**

**Answer ALL Questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. What are the factors influencing the quality and intensity of X-rays?
2. How X-rays are produced? With a suitable diagram describe the stationary anode tube.
3. What is transformer? Explain in detail step-up, step down and auto transformer.

**II. Write notes on:**

**(10 x 5 = 50)**

1. Characteristic X-rays.
2. Mammography.
3. X-ray tube cooling.
4. Photo electric effect.
5. Full wave rectifier.
6. Tube Current.
7. Write notes on Heel effect.
8. Kilovoltage circuit.
9. Crooke's tube.
10. Electronic timer.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Triode.
2. Thermionic emission.
3. Filters.
4. Vacuum tube diode.
5. Aperture diaphragms.
6. Grid.
7. Focal spot.
8. Atomic Number.
9. Filament.
10. Semiconductor.

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

**[AHS 0423]**

**APRIL 2023**

**Sub. Code: 1423**

**DIPLOMA IN RADIOGRAPHY AND IMAGING TECHNOLOGY  
FIRST YEAR (Regulation 2018-2019 onwards)  
PAPER III – X-RAY MACHINES ACCESSORIES AND MAINTENANCE**

*Q. P. Code: 841423*

**Time: Three hours**

**Maximum : 100 Marks**

**Answer ALL Questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. Collimators – Their uses and types.
2. With a neat diagram, Describe Rectification, Half Wave and Full Wave Rectification Circuit.
3. Explain in detail about Image Intensifying Tube (I. I. Tube) construction and working principle.

**II. Write notes on:**

**(10 x 5 = 50)**

1. Stationary Anode X-ray Tube.
2. Focusing cup.
3. Space charge effect.
4. Target in X-ray tube.
5. Potter-Bucky System.
6. Anode angle.
7. mA circuit.
8. Kilovoltage circuit.
9. Line focus principle.
10. Mass Miniature Radiography.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Grid.
2. Inverse Square Law.
3. Phosphorescence.
4. Heel effect.
5. Automatic exposure control.
6. Triode.
7. Filament.
8. Scatter Radiation.
9. Voltmeter.
10. Thermionic emission.

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

**[AHS 1123]**

**NOVEMBER 2023**

**Sub. Code: 1423**

**DIPLOMA IN RADIOGRAPHY AND IMAGING TECHNOLOGY  
FIRST YEAR (Regulation 2018-2019 onwards)  
PAPER III – X-RAY MACHINES ACCESSORIES AND MAINTENANCE**

*Q. P. Code: 841423*

**Time: Three hours**

**Maximum : 100 Marks**

**Answer ALL Questions**

**I. Elaborate on:**

**(3 x 10 = 30)**

1. How are X-rays Produced? With a suitable diagram describe a Rotating Anode X-ray Tube?
2. Explain in detail Image Intensifying Tube (I.I. Tube) construction and working principle.
3. Explain in detail about Intensifying Screens.

**II. Write notes on:**

**(10 x 5 = 50)**

1. Kilovoltage circuit.
2. Half wave rectifier circuit.
3. Generations of X-ray tube.
4. Autotransformer.
5. Tube Rating Chart.
6. H.T. Transformer.
7. Diode.
8. Automatic Exposure Control.
9. Filters and their uses.
10. Artifacts during film processing.

**III. Short answers on:**

**(10 x 2 = 20)**

1. Inverse Square Law.
2. Line Focus principle.
3. Ammeter.
4. Ionization.
5. Earthing.
6. Collimators.
7. Conductors.
8. Large focal spot.
9. Photo timer.
10. X-ray couch.

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