Question Paper

Exam Date & Time: 05-Jan-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER M. Sc. MRP DEGREE EXAMINATION - JANUARY 2023
SUBJECT: MRP6101 - PHYSICS OF MEDICAL IMAGING
(2021 SCHEME)

Marks: 100 **Duration: 180 mins.**

Answer all the questions.

1)	Outline the construction of X-ray tube and list the various properties of X-rays.	(20)
2)	What is Mammography? Explain the instrumentation of mammography equipment.	(20)
3A)	Explain the image display in ultrasound.	(10)
3B)	Explain the instrumentation of digital subtraction angiography.	(10)
3C)	What are beam restrictors? Explain the different beam restricting devices.	(10)
3D)	Explain the working principle of CR & DR System.	(10)
4A)	Explain the instrumentation of orthopantomography.	(5)
4B)	What are intensifying screen? Illustrate the steps involved in care and maintenance of intensifying screens.	(5)
4C)	Explain the process of X-ray image formation.	(5)
4D)	Explain the factors affecting the radiographic image quality.	(5)

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Question Paper

Exam Date & Time: 13-Jan-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER M.Sc. (MEDICAL RADIATION PHYSICS) DEGREE EXAMINATION - JANUARY 2023
SUBJECT: MRP6102 - PHYSICS OF RADIOTHERAPY
(2021 SCHEME)

Marks: 100 **Duration: 180 mins.**

Answer all the questions.

1) Explain the following concepts of electron field shaping

1A)	External shielding	(5)
1B)	Measurement of transmission curves	(5)
1C)	Effect of blocking in Dose rate	(5)
1D)	Internal shielding	(5)

Answer all the questions.

2) Write in detail about the following systems of dose specification for the brachytherapy treatment of the cancer of cervix

2A)	Milligram-hours	(5)
2B)	The Manchester System	(7.5)
2C)	The ICRU system	(7.5)
3A)	Describe the treatment of cancer cervix by Brachytherapy	(10)
3B)	Discuss about penumbra and derive the relation between penumbra and SSD.	(10)
3C)	Explain PDD and TAR and derive the relationship between them	(10)
3D)	Describe about different methods to Correct for tissue inhomogeneity.	(10)
4A)	Write a short note on Manchester system of implantation in brachytherapy	(5)
4B)	Write short note on Electron Arc Therapy	(5)
4C)	Write short note on Tissue compensators	(5)
4D)	Write short note on Dynamic Wedge	(5)

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Question Paper

Exam Date & Time: 11-Jan-2023 (10:00 AM - 01:00 PM)

MANIPAL ACADEMY OF HIGHER EDUCATION

THIRD SEMESTER M.Sc. (MEDICAL RADIATION PHYSICS) DEGREE EXAMINATION - JANUARY 2023
SUBJECT: MRP6104 - RADIATION SAFETY AND REGULATIONS
(2021 SCHEME)

Answer ALL questions.
Draw neat and labelled diagram as and when required.

Marks: 100 **Duration: 180 mins.**

1)	Describe the design and planning of a Cobalt Teletherapy Treatment Room.	(20)
2)	What is a package? What are the different types of the package? Also, write in detail about the rules and regulations involved in the transport of radioactive material. (3+10+7 = 20 marks)	(20)
3A)	Briefly explain the principles of radiation protection with examples.	(10)
3B)	What is an Emergency in a Brachytherapy Unit? What are the steps to be taken in such a situation?	(10)
3C)	What are the responsibilities of RSO in nuclear medicine?	(10)
3D)	What are the requirements for a category IV nuclear medicine laboratory with respect to staff, area, equipment, and monitoring facilities? Explain with a diagram.	(10)
4A)	Explain leakage radiation. State the permissible leakage levels from a Telecobalt machine in source OFF and ON conditions. (3+2 = 5 marks)	(5)
4B)	Write short note on effective half-life.	(5)
4C)	Define HVT and TVT. Derive the relationship between them. (2+3 = 5 marks)	(5)
4D)	What is the deterministic effect? Explain with example. (3+2 = 5 marks)	(5)

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